# *Appendix A*
# *Environmental and Social Management System*

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| CESMP | Construction Environmental and Social Management Plan |
| CSE | Construction Supervision Engineer |
| E&S | environmental and social |
| EHS | environmental, health, and safety |
| EIA | Environmental Impact Assessment |
| EPC | engineering, procurement, and construction |
| ESHS | environmental, social, health, and safety |
| ESIA | Environmental and Social Impact Assessment |
| ESMMP | Environmental and Social Management and Monitoring Plans |
| ESMC | Environmental and Social Management Cell |
| ESMS | Environmental and Social Management System |
| EST | Environmental Supervision Team |
| ESST | Environmental and Social Supervision Team |
| GIIP | Good International Industry Practice |
| GM | General Manager |
| IFC | International Finance Corporation |
| NWEDC | Nepal Water and Energy Development Company |
| O&M | operations and maintenance |
| OE | Owner's Engineer |
| PMO | Project Management Office |
| SEO | Safety and Environmental Officer |
| SOP | Standard Operating Procedure |

# 1. INTRODUCTION

## 1.1. PURPOSE

The Environmental and Social Management System (ESMS) has been prepared for Upper Trishuli-1 Hydropower Project (Project) for the purpose of defining standards, protocols, and procedures at the project level for managing environmental and social risks and opportunities associated with the project construction and operation activities. The ESMS establishes the Project's commitment to put in place an adequate management system to manage the environmental and social (E&S) impacts and associated risks arising from the Project, as well as to ensure that the Project is developed and operated in a sustainable manner. The applicable reference framework against which the ESMS has been developed included national, international, and lender regulations, which have been included in Chapter 5, Applicable Legal and Lender Requirements.

## 1.2. OVERVIEW

The ESMS developed by Nepal Water and Energy Development Company (NWEDC) for the Project defines the environmental, social, health, and safety (ESHS) principles, objectives, and protection measures that ensure the project does not cause any harmful impacts. Contractors, including engineering procurement and construction (EPC) contractor and operation and maintenance (O&M) contractor, will follow the ESMS. NWEDC retains ultimate responsibilities for the environmental, health, and safety (EHS) performance of all contractors.

This ESMS will be updated and/or revised as necessary to address the prevailing conditions and stage of the Project. Responsibilities for implementation of identified mitigation or management actions are outlined in the Environmental and Social Management and Monitoring Plans (ESMMP) for the Project. NWEDC's Environmental and Social Management Cell (ESMC) along with the Owner's Engineer (OE) will oversee and monitor the implementation of relevant ESMMP elements by the EPC/O&M contractors and subcontractors. ESMC and OE will monitor, audit, and assess the compliance of the EPC contractor's implementation of the relevant aspects of the ESMMP during the construction phase and ensure that corrective actions are taken when necessary to maintain EHS performance in line with international standards and Good International Industry Practice (GIIP).

This ESMS should be read along with the ESMMP and update accordingly, should there be relevant changes to the Management plans.

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# 2. COMPANY ESHS POLICY

NWEDC adopted an Environmental and Social Policy Statement on 19 December 2016, which was formally executed by its Chief Executive Officer, Bo Seuk Yi (see Attachment 1).

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# 3. COMPANY EHS STAFFING

The Project will establish an organisational structure at the corporate and site level to manage environmental, health, safety and social impacts and to aid in meeting their respective goals and objectives as well as implementing the Project's commitment through their respective policies. Figure 1 highlights the Project's development and management organisational structure.

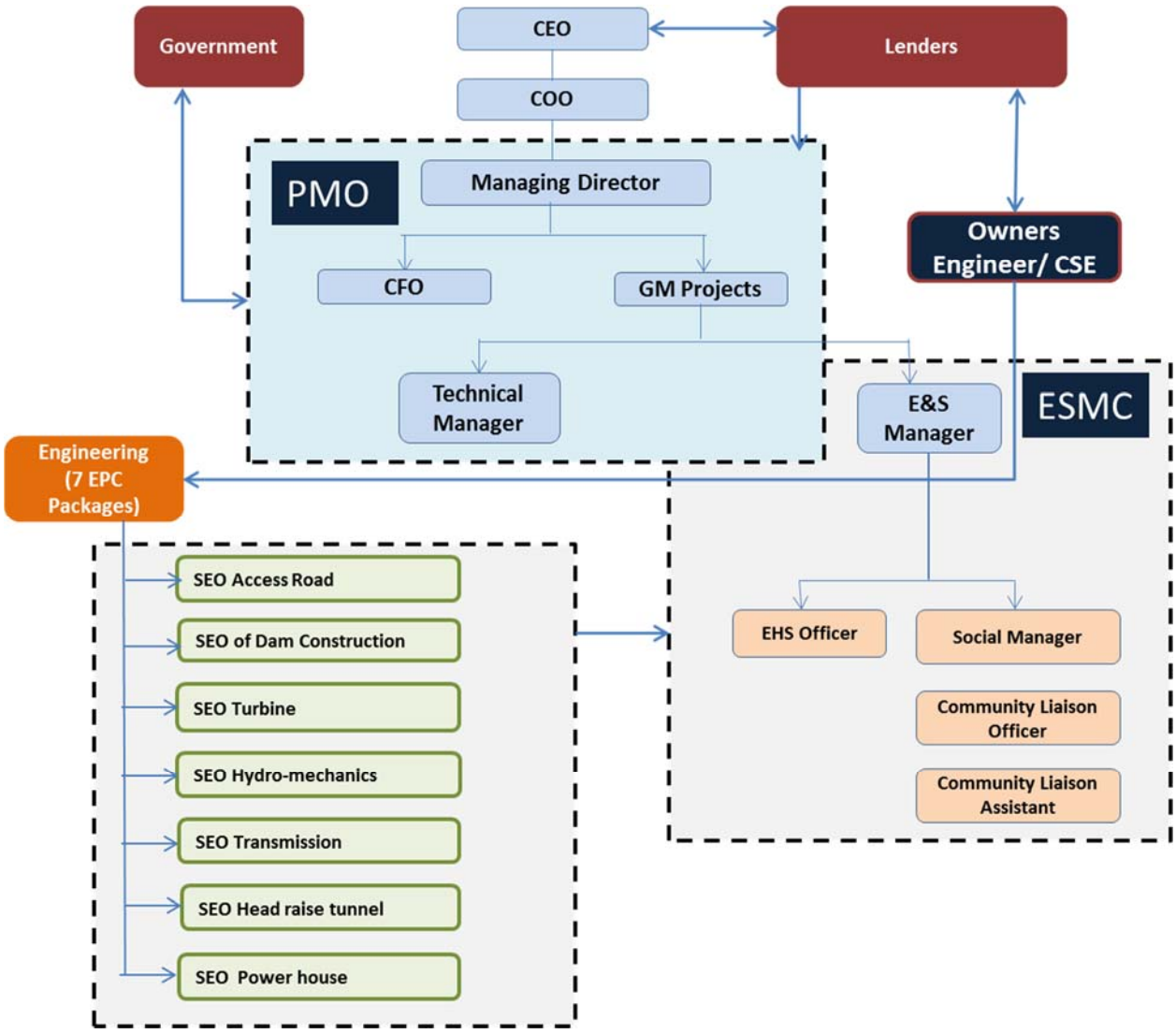


**Figure 1: UT-1 ESMS Implementation Organisational Chart**

## 3.1. KEY STAKEHOLDERS FOR ESMS IMPLEMENTATION

The Project Management Office (PMO) has the ultimate responsibility for the Project and is supported by the ESMC in managing the environmental and social impacts. The ESMC will be responsible for the overall implementation of the ESMS and for ensuring the Environmental Impact Assessment (EIA) recommended mitigation and monitoring actions are implemented,

monitored, assessed, evaluated, and disseminated to project stakeholders for feedback and improvements. The ESMC will consist of the following personnel:

- An Environmental and Social (E&S) Manager at the corporate level (already appointed);
- One Social Manager supported by two community liaison officers at the site level; and
- Two to three E&S officer (already appointed).

## 3.2. ROLES AND RESPONSIBILITY

### 3.2.1. Construction Phase

See Table 1 for the various departments and personnel that will play an integral role in the implementation of the ESMS. In addition to the various departments and responsibilities presented in Table 1, the Corporate E&S Manager will present the key observations, findings, and issues as well as the findings of the external consultant/OE's findings to the Board on a monthly basis.

## Table 1: Department Roles and Responsibilities in the Construction Phase

| Designation | Description | Responsibilities ( not limited to) |
|---|---|---|
| Project Management Office (PMO)<br><br>ESMS committee (PMO and Environmental and Social Manager) | The PMO will comprise of the General Manager (GM) Projects, Chief Financial Officer, MD and other personnel who the MD might authorize.<br><br>The PMO has the overall responsibility to ensure management of the environmental and social impacts of the project. | • Remove the Contractor's representative or any employee(s) from the site or work or suspend the representative or employee if the Contractor or his employees fails to implement Environmental and Social Management and Monitoring Plans (ESMMP) until the matter is remedied.<br>• Submit performance reports to the Lenders as per an agreed upon frequency, detailing the progress of the ESMS and any other issues therein.<br>• Approve the qualifications and criteria for members in the Environmental and Social Management Cell (ESMC) and the Environmental Supervision Team.<br>• Along with the E&S Manager, act as the ESMS Committee and meet once a month to discuss on the key aspects of ESMMP implementation for the Project based on the reports from Environmental and Social Management Cell (ESMC) and Owner's Engineer (OE). |
| Environmental and Social Management Cell (ESMC) | The ESMC will consist of community liaison officers, Environmental Health and Safety Officer, Social Manager, and one Environmental Manager. The Environmental Manager at corporate leads the ESMC. | • Ensure that the Environmental Impact Assessment (EIA) recommended mitigation and monitoring measures are being implemented, monitored, assessed and evaluated.<br>• Obtain the necessary compliances and permits for the Project.<br>• Provide progress/performance reports to the PMO in the ESMS committee meetings.<br>• Stop construction in emergency situations where consultation with the Construction Supervision Engineer (CSE) or the Environmental Supervision Team (EST) is not immediately possible.<br>• Conduct periodical inspection of construction site.<br>• Consult and/or communicate with the local communities, project-affected people, regulatory agencies, and other stakeholders during the project preparation and construction to ensure that they have full knowledge of project progress, potential issues and mitigation actions, and to listen and respond to their concerns, suggestions and demands for environmental and community protection.<br>• Maintain open and direct lines of communication with Contractors, CSE/OE and the Environmental and Social Supervision Team (ESST) with regard to E&S matters. |
| Site-level EHS Team, ESMC | Will be located on-site and will report directly to the E&S Manager. They form a part of the ESMC. | • Monitor the environment health and safety activities of the Contractors on-site against the requirements in the ESMS and Management Plans.<br>• Supervise the baseline, compliance, and impact monitoring of construction contractor's activities and advise the on-site engineers of needed actions at the site during regular environmental management meetings.<br>• Provide needed corrective action as per the field requirements to minimize impacts.<br>• Analyse and review the environmental monitoring report of the project construction and forward to the Corporate E&S Manager for review by stakeholders. |

| Designation | Description | Responsibilities ( not limited to) |
|---|---|---|
| Site level Community Liaison Officers, ESMC | Community Liaison Officers will work in close proximity to the affected communities and settlements near the Project site.<br><br>They will report directly to the Social Manager and form a part of the ESMC; | • Handle community grievances.<br>• Implement the Livelihood Restoration Plan and the Project Development Agreement requirements related to community development and benefit sharing.<br>• Maintain direct communication with the community on matters related to the project.<br>• Understand the concerns of the community and communicate to the E&S manager. |
| Owner's Engineer (OE)/Construction Supervision Engineer (CSE) | OE/CSE will verify the ESMMP implementation and provide support as necessary. OE/CSE will be responsible for monitoring EPC contractor's compliance to the environmental issues listed in the ESMMP.<br><br>The OE/CSE will report to the PMO/ESMS committee through E&S manager;<br><br>The OE/CSE will supervise construction works according to the provisions of EIA, the Environmental and Social Specifications for Contractors and direct the construction contractor in consultation with the environmental engineers for the environmental improvement | • Preside over monthly Environmental Management and Health and Safety Meetings of the supervision engineers, contractors and Environmental Engineers.<br>• Supervise the Contractor's compliance with contract specifications, including the implementation and operation of environmental mitigation measures and ensure their effectiveness, and other aspects of the ESMMP Implementation Plan. Major noncompliance by the Contractor will be cause for suspension of works and other penalties until the non-compliance has been resolved to the satisfaction of the ESMC. Contractors are also required to comply with national and municipal regulations governing the environment, public health and safety.<br>• Instruct the Contractor(s) to take remedial actions within a specified timeframe and carry out additional monitoring, if required, according to the contractual requirements and procedures in the event of non-compliances or complaints.<br>• Supervise the Contractor's activities and ensure that the requirements in the ESMMP and contract specifications are fully complied with.<br>• Instruct the Contractor(s) to stop activities which generate adverse impacts, and/or when the Contractor(s) fails to implement the ESMMP requirements / remedial actions instructed by the ESMC.<br>• Participate in the joint site inspection with ESMC.<br>• Order site protection and report to the relevant authorities and the ESMC if the Contractor discovers cultural relics by chance.<br>• Request and monitor Contractors' felling of trees and vegetation and ensure they are strictly in accordance with the pre-determined area, numbers, species, etc.<br>• Engage a qualified staff, preferably a landscape architect, to review and monitor the Contractor's submitted Clearing, Revegetation and Restoration Management Plan (included in Contractor's environmental specifications), and to supervise the Contractor's landscaping works.<br>• Monitor noise levels at sensitive receptors by use of portable noise monitoring kit. Monitoring will take place during intensive construction activities, such as excavation, piling, power generation, material transport and night time construction and will be conducted near villages, schools, and other sensitive receptors along the project alignment.<br>• Conduct visual inspections to check for air-borne dust during demolition, bulk material handling and storage, and transportation routes near the villages; |

| Designation | Description | Responsibilities ( not limited to) |
|---|---|---|
| | | • Conduct visual inspections to check water quality in receiving rivers, fish ponds, and lakes affected by the construction activity. Check for turbidity, odour, colour, fish kills, etc., at discharge points in water bodies adjacent to construction sites and construction camps.<br>• Prepare reports for environmental monitoring data and site environmental conditions.<br>• Adhere to procedures for carrying out grievance and complaint investigations.<br>• Review and approve relevant Standard Operating Procedures (SOPs) prepared by the Safety and Environmental Officer (SEO) and EPC Contractor in coordination with ESMC. |
| EHS personnel of OE/CSE | OE/CSE is expected to have EHS personnel to look after the E&S performance of the project. | • Carry out environmental site inspections to assess and audit the Contractors' site work practices, equipment, and work methodologies with respect to pollution control and adequacy of environmental mitigation measures implemented.<br>• Monitor compliance with environmental protection measures, pollution prevention, and control measures and contractual requirements.<br>• Investigate complaints and recommend any required corrective measures.<br>• Advise the Contractor on environment improvement, awareness, and proactive pollution prevention measures.<br>• Complete start-up, weekly, monthly, and site-closure checklists.<br>• Follow the procedures in the ESMMP and recommend suitable mitigation measures to the Contractor in the case of noncompliance. Carry out additional monitoring of noncompliance within the specified timeframe.<br>• Submit Contractor’s ESMMP Implementation Plan reports to the ESMC and relevant administrative authorities, if required.<br>• Keep detailed records of all site activities that may pertain to the environment.<br>• Supervise construction works where environmental management is a key aspect (e.g. in sensitive areas, with high environmental risk, etc.).<br>• Keep a photographic record of progress on site from an environmental perspective.<br>• Keep a register of complaints in the site office and recording and dealing with any community comments or issues.<br>• Keep a record of on-site incidents and accidents and how these were dealt with.<br>• Implementing the BMP with the support of the ESST |
| EPC Contractor and contractors for separate work packages | Key responsibility for implementation of the requirements of the mitigation activities in the construction ESMMP.<br><br>The EPC contractor will be responsible for subcontractor(s) performance including | • Develop a project specific CESMP and elaborate other parallel sub plans.<br>• Provide a construction site layout plan that identifies key activity area including laydown, accommodation and parking etc. prior to commencement of works.<br>• Produce detailed method statements relating to key activities that include specific reference to requirements of the plans contained herein during the Project progression.<br>• Provide all training necessary to oversee and implement ESMMP requirements.<br>• Be responsible for producing comprehensive suite of EHS management and coordination procedures. |

| Designation | Description | Responsibilities ( not limited to) |
|---|---|---|
| | subcontractor(s) adhere to the requirements of the Construction Environmental and Social Management Plan (CESMP). | • Identify a full-time person on site with dedicated EHS responsibilities to oversee works on site (SEO).<br>• Ensure that all subcontractor(s) have dedicated EHS staff to implement the CESMP and monitor and manage this on an on-going basis. The subcontractor(s) staff will be required to liaise closely with the EPC contractor EHS staff, including the provision of monthly reports and participation in weekly construction review meetings.<br>• Comply with relevant legislative requirements governing environment, public health, and safety.<br>• Work within the scope of contractual requirements and other tender conditions.<br>• Organize representatives of the construction team to participate in the joint site inspections undertaken by the ESMC.<br>• Carry out any corrective actions as instructed by the ESMC or the OE.<br>• Provide information to and update the OE regarding works activities that may result in adverse environmental conditions.<br>• In case of non-compliances/discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impacts.<br>• Stop construction activities that generate adverse impacts upon receipt of instructions from the ESMC or OE. Propose and carry out corrective actions and implement alternative construction method, if required, to minimize environmental impacts. Major noncompliance by the Contractor will be cause for suspension of works and other penalties until the noncompliance has been resolved to the satisfaction of the ESMC. |
| Workplace Safety and Environmental Officer (SEO) of each of the seven packages | To be appointed by each of the EPC contractors for relevant work packages. | • Oversee the Contractor's internal compliance with the ESMMP requirements and ensure that the environmental specifications are adhered to.<br>• Carry out regular environmental site inspections to monitor compliance with the environmental protection measures<br>• Submit the Contractor's ESMMP Implementation Plan to the ESMC, EST, PMO, and other relevant authorities as required.<br>• Prepare relevant SOPs as required, detailing the step-by-step actions, responsibilities, and the monitoring mechanism and get it approved with ESMC.<br>• Investigate complaints and recommend any mitigation measures.<br>• Prepare relevant reports and submit to the ESMC and OE/SCE as per pre-identified frequencies;<br>• Inform both OE/SCE and ESMC about any incidents/accidents within 12 hours.<br>• Work in close coordination with ESMC's site team.<br>• Take prime responsibility for practical implementation of the environmental management.<br>• Oversee and ensure the implementation of the CESMP and parallel management plans (with support from the EPC contractor EHS Expert and Construction Manager and ensure all contractors and subcontractors are in compliance with the CESMP requirements.<br>• Review and report performance to the EPC contractor Construction Manager. |

| Designation | Description | Responsibilities ( not limited to) |
|---|---|---|
| | | • Review subcontractors' environmental protection/mitigation measures to ensure compliance with the CESMP.<br>• Report any CESMP noncompliances to the EPC contractor Construction Manager on a daily basis.<br>• Carryout regular environmental awareness sessions and assist personnel in applying environmental standards on site.<br>• Conduct regular audits/inspections to check that committed impact mitigation measures are being implemented.<br>• Act as the first point of contact on environmental matters for the EPC contractor, for the government authorities, other external bodies and the general public |
| ESST (Environment and Social Supervision Team) | ESST on-site comprising of EPC site head and SEO, OE/CSE Engineer and E&S person (representatives of ESMC) and site head | • Meet once a month to discuss on E&S aspects and ESMMP implementation.<br>• Carry out audits as relevant.<br>• Monitor the implementation of the BMP.<br>• Discuss on correction actions required.<br>• Agree on key decisions to be taken.<br>• Report to the PMO the minutes for approval of any key decisions and/or sanctions. |

### 3.2.2. Operations Phase

The proposed operations phase organizational structure is shown in **Error! Reference source not found.**. The Environment and Social Supervision Team (ESST) will be comprised of the O&M site head and SEO, representatives of ESMC, and site head, and will meet once in a month to discuss on the overall E&S performance, ESMMP implementation, and take key decisions as relevant. The Minutes of the Meeting will be sent to the PMO at the corporate level for approval and sanctions as necessary. Also many of the OE functions during the construction phase will be taken over by the ESST during the operations phase as the accident/incident analysis etc.

The roles and responsibility will be similar to construction stage apart from the CSE/OE which will cease to exist beyond two years of operations stage; i.e. the period from which NWEDC awards Provisional Acceptance Certificate (PAC) to EPC contractor to the time NWEDC awards Final acceptance certificate (FAC).

An external consultant should be hired by NWEDC to monitor the progress on a six-monthly basis in the operations phase depending upon its internal monitoring requirements or lenders requirement.

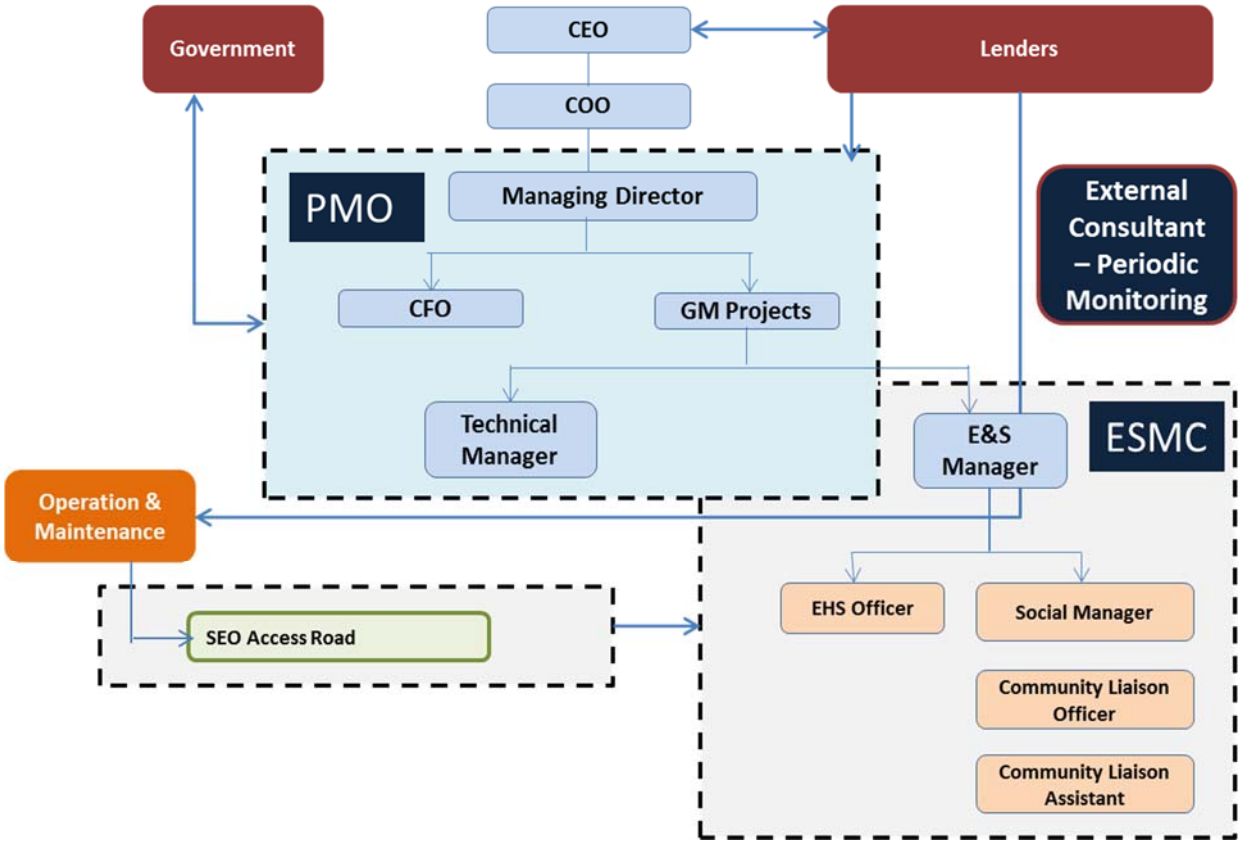


**Figure 2: UT-1 ESMS Implementation Organisational Chart (Operation Stage)**

# 4. CODE OF CONDUCT

A major concern during the construction of large hydroelectric projects is the potential negative impacts that might arise from the interaction of outside workers with local communities. For this reason, it is required that NWEDC establish a Code of Conduct that emphasizes the importance of appropriate behaviour, respect for local communities and customs, and compliance with relevant Nepalese laws and regulations.

All contractors of NWEDC should sign and follow the Code of Conduct. Each NWEDC and Contractor employee working on the Project shall be informed of the Code of Conduct once she/he has signed the contract to work for the Project. The Code of Conduct should be available to local communities at the Public Information Centres established for the Project.

The Code of Conduct should address at least the following topics:

- All the workers/labourers shall comply with the laws and regulations of Nepal;
- All illegal substances, abuse of drugs and alcohol, carrying of firearms, as well as pornographic material and gambling shall be prohibited;
- Fighting (physical or verbal), creating nuisances and disturbances in or near communities, or disrespecting local customs and traditions shall be prohibited;
- Smoking shall only be allowed in designated areas;
- Workers shall follow appropriate standards of dress and personal hygiene while visiting local communities and in the accommodation quarters; and
- Workers visiting the local communities shall behave in a manner consistent with the Code of Conduct.

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# 5. APPLICABLE LEGAL AND LENDER REQUIREMENTS

The ESMS has been prepared in compliance with the identified reference framework, which includes both applicable environmental and social regulations of Nepal as well as international standards such as the International Finance Corporation (IFC) Performance Standards, in keeping with the Lender requirements. Table 2 provides a brief overview of the regulations. Detailed analysis of the reference framework governing the project is provided in Chapter 3, Legislative and Regulatory Framework, of the Summary Environmental and Social Impact Assessment (ESIA).

**Table 2: Applicable Reference Framework**

| S.No | Reference Framework | |
|---|---|---|
| 1 | Nepal Laws and Act | • Constitution of Nepal 2072 BS (2015 AD) replacing the Interim Constitution of Nepal, 2007 AD<br>• Environmental Protection Act, 1997<br>• Nepal Environmental Policy and Action Plan 1993<br>• The Water Resources Act 1993<br>• Water Resource Regulation, 1993; Local Self Governance Act, 2055 BS (1998 AD)<br>• Wildlife Protection Act, 1958 (2015 BS)<br>• National Park and Wildlife Conservation Act, 1973<br>• Aquatic Life Protection Act, 1961 and First Amendment, 1998<br>• Soil and Watershed Protection Act, 1982<br>• Solid Waste Management and Resource Mobilization Act, 1987<br>• Forest Act, 1993<br>• Hydropower Development Policy, 2056 (2001)<br>• Electricity Act, 2049 BS (1992) AD<br>• Explosives Act, 1961<br>• Local Self Governance Act, 1998<br>• Land Acquisition Act, 2034 (1977)<br>• Agriculture (New Arrangements) Act (1963)<br>• Land Administration Act (1963)<br>• Land Reform Act, 2021 (1964)<br>• The Land Revenue or Malpot Aien (Land Administration and Revenue) Act 2034 BS (1977)<br>• Land (Survey and Measurement) Act, (1963)<br>• The Land (Measurement and Inspection) Act, 2020 BS (1962, as amended)<br>• Land Acquisition, Resettlement and Rehabilitation Policy for Infrastructure Development Projects, 2071 BS (2015 AD)<br>• The Guthi Corporation Act, 2033 BS (1976) Second Amendment 1993. |
| 2 | Nepal Rules and Regulations | • Environmental Protection Rules, 1997<br>• Forest Rule, 1995<br>• Local Self Governance Regulations, 1999<br>• Electricity Rules, 1993<br>• National Park and Wildlife Conservation Rules, 1974<br>• Agricultural Perspective Plan, 1995<br>• Forest Sector Master Plan, 1988<br>• Nepal Biodiversity Implementation Plan, 2003<br>• Revised Forest Policy, 2000<br>• National Conservation Strategy, 1988 |

| S.No | Reference Framework | |
|---|---|---|
| | | • Poverty Reduction Strategy, 2002<br>• Water Resources Strategy, 2002. |
| 3 | International Treaties and Conventions | • Convention on International Trade of Endangered Species<br>• Convention on Biological Diversity 1992<br>• Ramsar Convention, 1971<br>• International Tropical Timber Agreement, 1983<br>• Basel Convention, 1992<br>• Biodiversity Convention, 1992<br>• ILO 169: Convention on Indigenous People |
| 4 | Guidelines | • National EIA Guidelines, 1993<br>• EIA Guidelines for Water Resource Sector 1994<br>• EIA Guidelines for Forest Sector, 1995<br>• Community Forest Guidelines (2001) & Inventory Guidelines (2005)<br>• Guidelines of Use of Forestland for Other Purposes, 2006 (2063 BS)<br>• National Health Care and Waste Management Guideline, 2002<br>• Guidelines on Environmental Management Plan, Monitoring and Auditing Published by MoEST, 2006<br>• Environmental Management Guidelines, (Road),1997<br>• Forest Product Collection and Sales Distribution Guidelines, 2000 (2057 BS)<br>• Buffer Zone Management Guidelines, 1999 |
| 5 | International requirements | • IFC Performance Standards (PS 1-8), 2012 Edition<br>• IFC/WB General EHS Guidelines (April 30 2007)<br>• EHS Guidelines for Electric Power Transmission and Distribution (2007)<br>• ADB Safeguard Policy Statement, 2009<br>• World Bank Operational Policies<br>• OP 4.01: Environmental Assessment<br>• OP 4.04: Natural Habitats<br>• OP 4.10: Indigenous People<br>• OP 4.11: Physical Cultural Resources<br>• OP 4.12: Involuntary Resettlement<br>• European Investment Bank's Statement of Environmental and Social Principles and Standards, 2009 |

EHS = environmental health and safety; EIA = Environmental Impact Assessment; IFC = International Finance Corporation; ILO = International Labour Organization; WB = World Bank

## 5.1. RISK MANAGEMENT

A Regulatory EIA (June 2012) and a Supplementary ESIA (December 2014) have been undertaken for the Project, per IFC Performance Standards. These documents identify the major environmental, ecological, and social impacts due to the construction and operation of the project. A Cumulative Impact Assessment was also carried out considering the all the project in the entire Trishuli watershed.

The studies assessed the impacts based on duration, extent, and magnitude during the construction and operation phases, and proposed mitigation measures that will need to be implemented. In addition, an impact assessment is presented in Chapter 7, Key Project Environmental and Social Impacts, Risks, and Mitigation, of the Summary ESIA.

Based on the measures identified, construction and operation phase management plans have been developed to ensure the impacts are managed and the appropriate mitigation measures are in

place. These plans include the following management plans for construction and the operations phase. See Appendix B, Environmental and Social Management and Monitoring Plans, for a detailed discussion of these management plans.

### 5.1.1. Construction and Phase Management Plans

The following management plans have been developed for the construction phase of the project:

- Air Quality
- Blasting and Explosives
- Cultural Heritage
- Emergency Preparedness and Response
- Excavation, Slope Stability, Sediment and Erosion Control
- Materials Handling and Storage
- Noise and Vibration Control
- Occupational Health and Safety
- Site Security Site
- Rehabilitation and Landscaping
- Spill Prevention and Response
- Spoil Management and Disposal
- Traffic
- Waste Management Plan
- Wastewater management
- Water Quality
- Worker Accommodations
- Stockpiles, Quarries, and Borrow Pits Impact Management
- Maintenance Management Plan

The following management plans have been developed for the operations phase of the project:

- Key Highlights of Operation Phase Mitigation Measures
- Environmental Flow Management Plan

The following general management plans have been developed for the project:

- Biodiversity Action Plan
- Stakeholder Engagement/Grievance Redress Mechanism
- Land Acquisition and Livelihood Restoration Plan

- Indigenous and Vulnerable Peoples Development Plan
- Labour Influx Management Plan
- Plans Required by the PDA
- Cumulative Impacts Management Plan; and
- Environmental and Social Management and Monitoring and Reporting Plan.

These management plans will be implemented during the pre-construction, construction, and post-construction phases of the Project development. The Contractors must be made aware of these management plans and sufficient training on implementation of the same must be provided to the workers as planned by the ESMC and agreed upon with EPC and O&M contractors.

Regular monitoring of the management plan implementation will need to be conducted by the SEO and verified by EHS personnel of OE/ESMC. The schedule of monitoring will be agreed upon with the Lenders and in keeping with the requirements in the management plans, if any.

### 5.1.2. Operation Phase Management Plan

During the operation phase of the project, the main impact will be due to the improper management of environmental flow in the area, which will lead to deterioration of water quality and will subsequently impact aquatic habitat. Hence, the major management plan for implementation during this phase is the Environmental Flow Management Plan. Additionally, the O&M Contractors will need to implement key mitigation measures to ensure protection of environmental and socioeconomic conditions of the project site

The site EHS team within the ESMC will be in charge of ensuring that the Contractors comply with the specifications as set in the Management Plans. In addition, SEO will also ensure monitoring of management plan implementation during the project activities.

Progress reports tracking the performance of the ESMP will be sent by the ESMC for review by the Lenders, and any changes required will be submitted for review and approval. ESMC will also consolidate the findings and observations of the OE. ESMC will rely on its site level E&S staffs.

If the Contractor or his employees fail to implement the ESMMP, the PMO can have the Contractor’s representative or any employee(s) removed from the site or stop work or suspended until the matter is remedied.

External consultants should also be hired on annual basis to track the performance of the ESMS implementation, including the ESMMP implementation and E&S status of the Project. These reports should be shared with the PMO and lenders and action taken based on the same to meet the gaps.

# 6. ESHS TRAINING

Training is one common method of supplying individuals with additional skills and knowledge. To be successful, training programs need to be thought out carefully and systematically. A robust social, environmental, health, and safety training plan is important for effective implementation of an ESMS.

An annual training calendar must be developed by the E&S manager and approved by the PMO for external trainings. Sector specialists from within the organization or from the EPC/O&M contractors or OE organization may provide the training. Training records will be maintained by the ESMC, especially internal trainings, and by NWEDC's Human Resource department, which will keep track of both internal and external trainings.

## 6.1. E&S-RELATED CAPACITY BUILDING FOR THE SITE-LEVEL ESMC STAFF

The ESMC staff, especially site-level staff, is required to undergo training for capacity buildings. The same should be done through both in-house and external trainings. This will ensure that they have adequate capacity for implementation of the ESMMP.

## 6.2. EHS-RELATED TRAINING FOR THE EPC AND O&M WORKERS/STAFF

The SEO, along with relevant personnel in the EPC/O&M team, will ensure that EHS induction and job-specific training are identified based on the existing capacity of project personnel, relevant site activities, and job assigned to an individual. The EPC/O&M SEO will also be in charge of ensuring that the trainings are provided as required and records of the same are maintained if required for review. Table 3 provides a list of trainings that should be carried out on routine basis.

**Table 3: Project Operations Training Requirements**

| SN | Type of Training | Implementation Authority | Frequency | Documentations |
|---|---|---|---|---|
| 1 | Workshops to integrate ESMS requirements, including ESMMP with contractors' work plan | ESMC with EPC Contractor | Prior to site mobilization for construction activities | The outcome should be to clearly define the requirements/ frequencies from the EPC: Plans, SOPs, records, reports, etc., to be developed/ maintained by EPC |
| | | ESMC with O&M Contractor | Prior to site mobilization for O&M | The outcome should be to clearly define the requirements/ frequencies from the EPC: Plans, SOPs, records, reports, etc., to be developed/ maintained by O&M. |
| 2 | Induction Trainings related to EHS and site | EPC Contractor with SEO | Prior to start of construction with quarterly refreshers as staff gets inducted | Records of person inducted and training provided |
| | | O&M Contractor with SEO | Prior to start of O&M and as staff gets inducted and quarterly refreshers | Records of person inducted and training provided |

| SN | Type of Training | Implementation Authority | Frequency | Documentations |
|---|---|---|---|---|
| 3 | Job-specific safety training | EPC Contractor with SEO and relevant department | On the job prior to start of work | Records of type of training |
| | | O&M Contractor with SEO and relevant department | On the job prior to start of work | Records of type of training |
| 4 | Environment, occupational health and safety, including PPE, fire safety, etc. | EPC Contractor and SEO | Regularly (bi-monthly) during construction | Records of training |
| | | O&M Contractor with SEO | Monthly during operations phase | Records of training |
| 5 | Emergency response preparedness | EPC Contractor with SEO and ESMC | Regularly (bi-monthly) during construction | Records of trainings, mock drills, etc. |
| | | O&M Contractor with SEO and ESMC | Quarterly during operations phase | Records of trainings, mock drills, etc. |
| 6 | Ecology/biodiversity conservation training | EPC contractor with SEOs and ESMC | Quarterly during construction | Records of training |
| | | O&M contractor with SEOs and ESMC | Six- monthly during operation phase | Records of training |
| 7 | Handling community engagements and grievances | SEO, EPC and ESMC with HR | Quarterly during construction | Records of training |
| | | SEO, O&M and ESMC with HR | Six- monthly during operation phase | Records of training |
| 8 | Training for security staff | EPC contractor with SEOs and ESMC | Quarterly during construction | Records |
| | | O&M contractor with SEOs and ESMC | Six- monthly during operation phase | Records of training |
| 9 | Driver training | EPC contractor with SEOs and ESMC | Quarterly during construction | Records of training |
| | | O&M contractor with SEOs and ESMC | Six- monthly during operation phase | Records of training |
| 10 | Operational trainings | O&M Contractor with SEO | Operations phase | Annual calendar with type of trainings planned |
| 11 | Environmental and social management training | EST | Throughout construction and operation phases. | Records |
| 12 | Internal training for capacity building of ESMC staff | Corporate E&S manager and personnel from relevant department | As decided | Records |
| 13 | External training for capacity building of ESMS staff | External agencies | As decided | Records |
| 14 | Others as identified | | | |

ESMC = Environmental and Social Management Cell; EPC = engineering, procurement, and construction; O&M = operations and maintenance; PPE = personal protective equipment; SEO = Safety and Environmental Officer

Any other applicable training will be identified and implemented during the project life cycle as part of mitigation measure and also capacity building of the staffs. Also, general environmental awareness will be increased among the Project team and workers to encourage the implementation of environmentally sound practices and compliance requirements of the Project. This will help in minimising adverse environmental impacts, ensure compliance with the applicable regulations and standards, and achieve performance beyond compliance. The same

level of awareness and commitment will be imparted to the contractors and subcontractors prior to the commencement of the project. To ensure the competency of the employees, the Contractor will establish and maintain procedures to ensure that employees and workers are aware of the following:

- The significant environmental aspects and safety risks, actual or potential, of their work activities and consequences and the benefits of improved personal performance;
- Their role and responsibility in meeting policy and procedure requirements and health, safety, and environmental arrangements, including emergency preparedness and response requirements; and
- The potential consequences if operating procedures are not followed.

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# 7. REPORTING AND MONITORING

The E&S Manager will overlook the reporting and monitoring program of the Project. The objective of the reporting and monitoring program will be:

- To track performance of the project and compare it against the established benchmarks or requirements as set in the ESMS;
- To record information to track performance and establish relevant operational controls;
- To establish key quantitative and qualitative measures for social, environment, ecology, health, and safety indicators;
- To verify compliance against the applicable reference framework and progress towards the desired outcomes; and
- To identify any necessary preventive and corrective actions that will need to be updated into the ESMS.

The E&S Manager will receive periodic performance reviews of the effectiveness of the ESMS from the ESST on site. Based on the results, the ESMC will take necessary actions to ensure effectiveness of the ESMS. The ESMC will be presenting these reports in the ESMS committee on a monthly basis.

## 7.1. INTERNAL AND THIRD-PARTY REPORTING PROTOCOL

An internal reporting system shall be established to periodically monitor the effective implementation of the ESMS. Inspection and audits finding or any other informational requirements from the project shall be communicated by the SEO of EPC/O&M Contractor to the site-level ESMC on a regular basis. The site-level ESMC staff will report to the E&S Manager, who will then discuss these reports with the PMO in the ESMS committee meeting. As mentioned in Section 1.3.2, the PMO will also work as the corporate-level ESMS committee with inclusion of the E&S Manager.

The communication from the project level will be obtained by the site-level ESMC staff from the different SEOs of the seven EPC Contractors: access road construction, dam construction, hydro-mechanics, transmission line, etc.

The on-site activities will be monitored through the following mechanisms:

- SEOs of the EPC/O&M contractors;
- Site-level ESMC personnel;
- CSE/OE along with its EHS personnel during the construction Phase;
- E&S Manager/ESMC;
- Overall supervision and decision making by ESST; and
- PMO (through ESMC, EST as well as CSE/OE).

The reporting mechanisms are discussed below.

### 7.1.1. Contractor's Reporting Protocol

The Contractors and subcontractors on-site will be required to follow the environmental and social specifications as mentioned in the management plans for the construction and operation phases of the Project. The activities carried out will be supervised by the SEO and EHS personnel of CSE/OE and any deviations/noncompliances reported to ESMC and further to ESST and PMO.

The EPC Contractor's SEO will report directly to the CSE/OE during the construction phase and the O&M contractor's SEO will directly report to the ESMC. The contractor will be required to provide regular reports to the CSE/OE and ESMC regarding the following:

- Weekly/daily safety meeting and activities undertaken;
- Attendance for EHS trainings undertaken;
- Details and activities undertaken as part of the monthly environmental meetings;
- Attendance sheet on-site;
- Status report on ESMMP implementation;
- All the above might be consolidated into weekly/Monthly EHS monitoring report from contractor;
- Any major accident/incident on site and steps undertaken to manage it (these reports need to be submitted within 24 hours); and
- Collect and report on data as requested by ESMC;

### 7.1.2. CSE/OE Reporting Protocol

The CSE/OE is in charge of supervising the various construction works such as civil work, electric installation work, etc. The EHS personnel of OE/CSE will also monitor the implementation of the environmental, health and safety measures as specified in the management plans. The CSE/OE will review and approve the SOPs to be used by the Contractors during the construction activities of the Project. Any monitoring reports/checklists prepared by the CSE/OE will be reviewed by the ESMC before being sent to PMO.

Additionally, the CSE/OE will supervise and head monthly environmental meetings to discuss any major environmental and social issues that have been faced during the project development. The CSE/OE will maintain a record of the topics discussed during these meetings and any corrective actions taken based on the outcome of the meeting discussion. The CSE/OE will provide the following reports to the PMO and Corporate E&S Manager who will be presenting it to corporate ESMS committee (including all PMOs):

- Monthly/periodic status report of E&S aspects on site covering only key issues and findings from reviewing and supervision activities;

- The OE shall also collect and report on data as requested by the PMO/ESMC;
- Immediate information on any incidents/ major deviations from the SOPs;
- Analysis of any incidents/major deviations within an agreed time frame;
- At the end of the commissioning, the OE/CSE shall prepare a final report summarizing the key findings from their work, the number of infringements, resolutions, etc., as well as advice and guidance for how such assignments should be conducted in the future.

### 7.1.3. Environmental and Social Management Cell's Reporting Protocol

As a minimum the ESMC shall prepare the following written reports and submit to the E&S Manager, ESMC.

**Site Level**

- Weekly report of non-compliance issues;
- Summary monthly report of key issues and findings from auditing activities;
- Summary monthly report of key issues arising from CSE/OE supervision activities during construction phase;
- Consolidated summary report from Contractor's monthly report; and
- Collect and report on data as requested by corporate ESMS committee;

**Corporate Level**

- Monthly summary of the E&S status on site to PMO; and
- Final report summarizing Project's environmental performance as desired by corporate ESMS committee.

### 7.1.4. Environmental and Social Supervision Team's Reporting Protocol

The ESST will meet once a month during the construction phase and quarterly during the operations phase, and in case of any emergencies as required:

- Minutes of meeting to corporate ESMS committee highlighting any key issues with respect to ESMMP implementation and E&S performance;
- Any decisions/approvals required from corporate ESMS committee; and
- Analysis of any incidents/major deviations within an agreed time frame especially during operations phase;

A list of records to be maintained by the ESST is included in Table 4.

## Table 4: List of Environmental and Social Records to be Maintained during Construction Phase

| Category | Record |
|---|---|
| General | • Environmental training records (e.g. attendance records for environmental awareness training, topics covered)<br>• Environmental permits and licenses<br>• Site inspection records<br>• Construction program and schedule<br>• Records identified to be maintained in the SOPs prepared by EPC/O&M<br>• Records as per requirements under various E&S Management Plans;<br>• Equipment maintenance and repair records<br>• Correspondence with concerned parties and other parties in relation to environmental matters<br>• HIV/AIDS information<br>• Meeting minutes |
| Noise control | • Updated list of powered mechanical equipment currently on site<br>• Details of examination periods and the results if any environmental sensitive receivers such as local schools, hospitals, resident villages may be affected.<br>• Records of noise levels near sensitive receptors |
| Water pollution control | • Records of quantities of collected spent bentonitic slurries and/or drilling mud for reuse, reconditioning and disposal<br>• Records of maintenance and cleaning schedules for sediment and oil/grease traps<br>• Records of toilet sewage disposal (where connection to existing sewer is not undertaken)<br>• Records of the wastewater final discharge quantity and the pollutants concentration<br>• Plans of construction site drainage |
| Waste management | • Copies of relevant valid licenses as provided by employed waste haulers and waste collectors<br>• Records of quantities of reused and recycled waste<br>• Waste disposal records |
| Atmosphere | • Route and the program of the construction material transportation<br>• Mitigation measures on the atmosphere effect such as sprinkling<br>• The monitoring results of the atmosphere quality |
| Culture property | • Drawings of the identified culture property sites (if any)<br>• Log of construction near culture property sites (if any)<br>• Records of discoveries during construction (if any) |
| Land contamination | • Preliminary analysis results of materials suspected to be contaminated (if any) |
| Ecological resources | • Records of sensitive ecological resources locations and associated protection plan |
| Storage of explosives, chemicals, and hazardous substances | • Drawings of storage facilities<br>• Logs of inventory and consumption<br>• Material data sheets of all substances kept on site |
| Emergency/accident/incident | • Emergency accident/incident records<br>• Investigation Reports |
| Grievance | • Records of Grievance registered |
| Corrective and preventive action plan | • Corrective and preventive action request records and forms |
| Other records | • As per regulatory requirement from different authorities |

E&S = environmental and social; EPC = engineering, procurement, and construction; O&M = operations and maintenance

## 7.2. EXTERNAL REPORTING FOR REGULATORY COMPLIANCE

The main regulatory bodies for obtaining permits/approvals/licenses during the Project lifecycle include:

- The Ministry of Science, Technology and Environment
- Ministry of Energy/Department of Electricity
- Ministry of Forest and Soil Conservation
- Department of Forest and its district offices

The ESMC will be responsible for obtaining the required environmental, ecological, and social (mainly land) approvals and licenses from the regulatory authorities. They will prepare any necessary documents that need to be submitted on a regular basis, such as air/noise/water monitoring results to assess the performance of the project against environmental and social parameters. The ESMC will also be responsible for organising any visits to the site or consultations with the local communities if required by the regulatory authority.

The ESMC team should consolidate list of reports to be maintained as part of the Regulatory compliances and submit the same to the regulatory authorities as per the desired frequencies. The data for the same may be taken from the EPC/O&M contractors as relevant.

Some of the reports that can be maintained internally by the project team for review of project performance are shown below in Table 5.

**Table 5: Reporting Matrix**

| Key Report to be Generated | Reporting To | Responsibility for Report Preparation | Frequency |
|---|---|---|---|
| *Internal and Third-Party Reporting* | | | |
| EHS Monitoring report with details regarding: Safety meetings; EHS Training details; ESMMP Implementation status report. | ESMC | EPC SEO<br>O&M SEO | Weekly/monthly |
| Accident/incident report | ESMC | EPC SEO<br>O&M SEO | As applicable |
| Report on noncompliance issues | ESMC Manager | ESMC | Weekly |
| Key issues and findings report | ESMC Manager | ESMC | Monthly |
| Summary of Contractor report | ESMC Manager | ESMC | Monthly |
| Summary of E&S Status | ESMC Manager | ESMC | Monthly |
| Minutes of environmental meeting | PMO | ESST | Monthly during construction phase and quarterly during operation phase |
| Accident/incident analysis | PMO | ESST | As applicable |
| Summary E&S status reports of the supervision activities | PMO and Corporate E&S Manager | OE/CSE | Monthly/as agreed |
| Immediate information on any incidents/ major deviations from the SOPs | PMO and Corporate E&S Manager | OE/CSE | As applicable |
| Analysis of any incidents/major deviations within an agreed time frame; | PMO and Corporate E&S Manager | OE/CSE | As applicable |

| Key Report to be Generated | Reporting To | Responsibility for Report Preparation | Frequency |
|---|---|---|---|
| Final report summarizing the key findings from their work, the number of infringements, resolutions, etc., as well as advice and guidance for how such assignments should be conducted in the future. | PMO and Corporate E&S Manager | OE/CSE | At the end of commissioning |
| *External Reporting for Regulatory Compliance* | | | |
| Compliance reports: As per Project approvals/permits as per regulatory requirements from Ministry of Science, Technology and Environment Ministry of Energy/Department of Electricity, Ministry of Forest and Soil Conservation/ Department of Forest and its District Office/Other government authorities as relevant | Relevant authorities | ESMC | As required by the regulatory authority |
| *Lender's Reporting Requirements* | | | |
| Environmental and Social Performance Reports, which will summarise:<br>• Environmental and social impacts observed and progress as per the ESMP, RAP, or any other management plans under implementation;<br>• Any areas of noncompliance or other issues;<br>• Performance review of the effectiveness of the ESMS;<br>• Any new/unreported environmental, ecological or social impacts observed on-site; and<br>• Reports of any third party audits/studies. | Lenders | PMO | Based on the frequency as agreed upon with the Lenders |

## 7.3. LENDER'S REPORTING REQUIREMENTS

The ESMS committee will review, approve, and submit environmental and social performance reports at the frequency agreed upon with Lenders, with respect to the project operations. The reports will be sent to the ESMS committee by the E&S Manager of the ESMC team. These reports will summarize the following:

- Environmental and social impacts of projects observed by the project proponent, including progress as per the Environmental and Social Management plan, Resettlement Action Plan, or any other similar management plans under implementation;
- Any areas of non-compliance or other issues arising from the implementation of the suggested environmental and social safeguards;
- Performance review of the effectiveness of the ESMS ;
- Any new/unreported environmental, ecological or social impacts observed on-site and which need to be included in the ESMS; and
- Reports of any third party audits/studies.

# 8. CONTRACTOR MANAGEMENT

Contractors refer to the teams appointed by NWEDC to undertake the construction activities as well as O&M for the Project. The Contractor(s), its subcontractor(s), and employees shall minimise impacts that may result from Project construction and operational activities, and comply with the mitigation measures set forth in the ESMMP to prevent harm and nuisances to local communities. The duties of the contractor(s) and subcontractor(s) include but are not limited to:

- Compliance with relevant legislative requirements governing environment, public health and safety;
- Work within the scope of contractual requirements and other tender conditions;
- Comply with the ESMMP requirements as mentioned in the ESIA;
- Organise representatives of the construction team to participate in the joint site inspections undertaken by the ESMC;
- Carry out any corrective actions as instructed by the ESMC, OE/CSE, and/or ESST;
- Provide and update information to the OE/CSE and ESST regarding works activities that may result in adverse environmental conditions;
- In case of noncompliances/discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impacts;
- Stop construction activities which generate adverse impacts upon receipt of instructions from the OE/CSE, ESMC, or ESST;
- Propose and carry out corrective actions and implement alternative construction/operational method, if required, to minimize environmental impacts; and
- Major noncompliance by the Contractor will be cause for suspension of works and other penalties until the noncompliance has been resolved to the satisfaction of the ESMC and OE/CSE.

## 8.1. MINIMUM ENVIRONMENTAL AND SOCIAL STANDARDS TO BE MET BY CONTRACTOR

The contractor must comply with the minimum environmental and social standards presented in the Attachment 2 Minimum E&S Standards to be met by the Contractor, for the Project.

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# 9. MANAGEMENT OF CHANGE

The procedures provided here will be applicable for instances when there are changes to the facilities (equipment, operation procedures, materials, and operating conditions) as well as changes to the organisational structure or designated person due to operational necessity. To ensure that the ESMS is adaptive to the changes that will be faced during the Project lifecycle, the following actions will need to be implemented by the ESMC and monitored by the PMO:

- The ESMMP will be reviewed and amended in accordance to the Project design and status as it evolves. Key information about changes to the Project design will be regularly reviewed and site visits will be undertaken by the ESMC staff in coordination with SEOs and relevant personnel to ensure the same and to identify any environmental, social or ecological impacts to the Project.
- The ESMC and PMO will have the authority to select the staff to oversee the environmental and social activities of the Project. During change in management of the Project, the new staff will obtain the induction training, that will cover, but not be limited to, the following aspects:
  - General health and safety training;
  - Briefing on the E&S performance of the Project;
  - Training regarding the project policies and objectives;
  - Regular audits that need to be conducted; and
  - Reporting protocol to be followed.
- The ESMMP implementation will be monitored regularly throughout the lifecycle of the Project to assess its effectiveness during project operations. Evaluation will be undertaken through continuous communication with the relevant stakeholders, namely contractors, subcontractors, workers, community, etc. Additionally, this will be supported through the data obtained from the monitoring audits and reviews conducted on a regular basis.
- The ESMMP will be changed or updated based on the feedback obtained from the contractors as well as from the data obtained through reviews and audits. The areas of improvement will be identified and mitigation measures for the same will be integrated into the ESMS, after approval from the PMO and lenders.

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# ATTACHMENT 1

# NWEDC Environmental and Social Policy Statement

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NWEDC
NEPAL WATER & ENERGY
DEVELOPMENT COMPANY

Nepal Water & Energy
Development Company Pvt. Ltd.
3rd Floor, Four Square Complex,
Narayan Chaur, Naxal, Kathmandu. Nepal
Tel: 014412257 | 014412557

# Environmental and Social Policy Statement

**Nepal Water & Energy Development Company Pvt. Ltd. (NWEDC)** declares that a core value in the management of our company is environmental protection and social responsibility. NWEDC commits to comply with national and good international industry practices in the hydropower industry in the construction and operation of all our projects, and further commits to:

- Comply with all applicable environmental and social regulations and World Bank Group Performance Standards on Environmental and Social Sustainability without compromise;
- Promote a working environment to provide women with opportunities for gainful employment and advancement in the workplace;
- Provide a safe and healthy working environment to all employees and contract workers;
- Adopt mitigation strategies to avoid, reduce, or compensate environmental degradation, pollution and adverse social impacts, and adapt to the impact of climate change of our projects;
- Provide benefits to the communities affected by our projects that promote the enhancement of their livelihoods;
- Identify, avoid or actively manage all project related risks to the health, safety and security of affected communities;
- Minimize land acquisition and involuntary resettlement and ensure that affected households are fairly compensated and actively assisted to restore and improve their livelihoods and living conditions;
- Foster biodiversity conservation and sustainable management of living natural resources, minimize our environmental footprint, and reduce the depletion of bio-diversity and ecosystem services by applying the latest technology in combination with local knowledge and practice;
- Recognize the values of indigenous peoples living within the areas of influence of our projects and take appropriate actions to address and satisfy their concerns;
- Understand and respect the culture, heritage and religious beliefs of the communities living within the areas of influence of our projects;
- Disclose all relevant project information to stakeholders in a timely and inclusive manner and to maintain open lines of communication with stakeholders throughout the life of a project; and
- Organize, train and equip our project management teams to identify and address environmental and social issues throughout the life of a project.

NWEDC is committed to continuous improvement in the management of the environmental and social impacts of our projects through monitoring, evaluation and implementation of appropriate corrective actions whenever needed. The Management of NWEDC understands that responsible environmental and social performance is a priority for our company.

Bo Seuk Yi
Chief Executive Officer

NWEDC
NEPAL WATER & ENERGY
DEVELOPMENT COMPANY

19.12.2016

**ATTACHMENT 2**

**Minimum E&S Standards to be met by the Contractor**

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The contractor should develop plans, SOPs, formats, maintain records, and submit reports as agreed upon with the Nepal Water and Energy Development Company. These should be set out clearly and agreed upon during pre-mobilization workshops for construction and operations and maintenance phase. The following table indicates a list of minimum environmental and safety standards to be met by the contractor.

| **Issues** | **Key Principle / Mitigation Standard** | **Minimum Mitigation Method** |
|---|---|---|
| Unemployment of local labour | Villagers shall not be disadvantaged by the influx of outside workers | • Have a Human Resources Policy<br>• Hire local labour as much as possible<br>• Encourage women to work in the Project |
| Workers intruding on village life and disrespecting traditional cultural values. | Workers shall respect local traditions and culture | • Education and orientation of outside workers to local culture and social norms before the start of work<br>• Have an environmental training program for workers |
| Health issues | Contractor to present a Health Management Plan | • The Health Program shall be made available to the communities<br>• Implement a vaccination program<br>• Provide education program on sexually transmitted diseases HIV/AIDS, tuberculosis and other illnesses<br>• Provide periodical health check to construction workers<br>• Implement measures against malaria if applicable |
| *Workers' Camps and Work Sites* | | |
| Water supply affecting ecology or village water supply | Camp to provide its own water supply that does not affect village water supply | • Any water supply sources should be located so that it does not adversely affect the villages supply<br>• The intake of water from streams for water supplies should leave residual flows in the watercourses<br>• Storage tanks should be used to buffer water supplies |
| Wastewater discharges affecting water quality | Wastewater to be treated prior to discharge | • Sewage disposal methods should be designed to the standards outlined by the Nepalese government |
| Solid waste polluting the environment and causing health hazards | No waste to be burnt or buried on site | • All solid waste shall be removed from site and disposed of at a municipal landfill or at an approved disposal site |
| Camps using local services and resources, at the expense of villagers | Camps shall not affect local resources, infrastructure, utilities | • Locations of camps shall be approved by ESMC and local authorities<br>• Provide adequate housing to outside workers with potable water and proper medical and sanitary facilities<br>• Camps shall be self- sufficient in resources and services<br>• Camps to be secure and discourage workers from leaving the camp |

| Issues | Key Principle / Mitigation Standard | Minimum Mitigation Method |
|---|---|---|
| *Village Impacts* | | |
| Deterioration of current quality of life and traditional livelihoods | Villagers should have the ability to communicate issues to ESMC, EST, SEO, and Contractors. Villagers have the expectation that issues will be addressed and resolved by negotiation. Meetings shall be undertaken to ensure villager's concerns are recorded and addressed. Villagers shall be adequately informed of all potential hazards to health and safety. | • Set up a communication network for discussing issues with ESMC, EST, SEO, Contractors. Complaints should be directed to the ESMC full-time safeguards staff<br>• ESMC to manage a grievance mechanism, and have staff on site at all times to manage grievances<br>• The Contractor's Health Management Plan shall be made available to the communities<br>• Developing village protocol that could serve as a guideline for outside workers<br>• A complaints record shall be kept of all issues raised by villagers in response to construction activities as well as the remedial actions taken and the turnaround time for the response and actions noted |
| Health and safety risks from such activities as increased traffic, blasting, operation of heavy machinery, etc.; traffic causing safety risks to villagers | Safety risks shall be minimised. Villagers have the expectation that issues will be addressed and resolved by negotiation. | • OHS management in Chapter 11 |
| Nuisance issues such as noise, dust and vibration | Nuisances shall be minimised. Villagers have the expectation that issues will be addressed and resolved by negotiation. | • Noise management in Chapter 11 |
| Sediment affecting river water uses | Sediment discharges to the river shall be minimized | • Erosion and sediment control in Chapter 11 |
| *Construction Issues* | | |
| Construction of access roads can affect cultivated areas, sensitive areas and cause noise, dust and erosion | New access roads should not disrupt village life and affect ecosystems, and agricultural land | • Design and location of access roads shall be approved by a road engineer and ESMC<br>• Follow erosion and sedimentation procedures, and noise and dust procedures as explained below<br>• Avoid constructing access roads in sensitive areas and agricultural land.<br>• Build an appropriate drainage system |
| Erosion and sedimentation caused by the construction activities | Erosion and sedimentation have to be maintained to a minimum to avoid changes in water flow patterns, loss of productive land, landslides, and destruction of surface vegetation | • Protect all areas susceptible to erosion by installing necessary temporary and permanent erosion and sediment control structures.<br>• Conserve as much vegetation as possible<br>• Initiate revegetation after completion of construction works |

| Issues | Key Principle / Mitigation Standard | Minimum Mitigation Method |
|---|---|---|
| Noise and vibration associated with construction activities, excavation and blasting | Noise must not unreasonably intrude on traditional village life | • Keep a current list of all noise and vibration producing machinery<br>• Machinery operation to occur only during designated hours (to be confirmed by Contractor in agreement with villagers)<br>• Blasting to occur at the same time each day, and / or a warning siren should sound prior to blasting<br>• Use of complaints register and procedures to address issues as they arise<br>• Work to be carried out in daylight, in typical working hours<br>• Concrete batching plants and other noisy equipment to be located as far as practical from villages |
| Dust generation from construction activities | Dust must not cause a hazard or nuisance to village life | • Dust generating operations to occur only during designated hours (to be confirmed by contractor in agreement with villagers)<br>• Use of complaints register and procedures to address issues as they arise<br>• Concrete batching plants and other dusty equipment to be located as far as practical from villages |
| Increased utilization of roads by traffic associated with construction activities | There should be no significant increased risk to local populations from traffic associated with the Project | • Road upgrades, including signage, speed humps, re-grading<br>• Wetting of roads to reduce dust during the dry season, and as necessary<br>• Training of locals regarding the hazards of traffic<br>• Training of vehicle drivers regarding the driving risks through villages and along remote roads<br>• Use of complaints register and procedures to address issues as they arise |
| Pollution risk activities occurring on site | Develop appropriate storage, transport and use practices for storage and handling of mixed classes of dangerous goods in packages and intermediate bulk containers. There shall be no solid or liquid waste disposal directly or indirectly to any water course (whether flowing or not). | • Keep a current list of all potentially<br>• Contaminating materials used onsite<br>• Develop and implement appropriate storage, transport and use practices to recognized standards<br>• Solid waste disposal shall be taken off site |

| Issues | Key Principle / Mitigation Standard | Minimum Mitigation Method |
|---|---|---|
| *Clearing, Revegetation and Restoration of Construction Sites* | | |
| Loss of productive land, disturbance of soil profile, loss of habitats for animals. Lack of appropriate compensatory planting at the end of construction or use of non-native species | Clearing activities shall allow the existing usage of land to continue as long as is practicable. Avoid discharging sediments and vegetation material into watercourses cultivated land, an irrigation canals. Initial revegetation of exposed areas as soon as possible. | • Clearing shall take place in a phased matter to retain vegetative cover as much as possible<br>• Areas not approved for clearing shall be kept undisturbed and demarcated by construction fencing<br>• Save as much topsoil as possible<br>• Appropriate local native species of vegetation shall be selected for the compensatory planting and restoration of the natural landforms.<br>• Establish a method for timber salvage with participation of local communities<br>• All affected areas should be landscaped and any necessary remedial works should be undertaken without delay including revegetation and reforestation. |
| *Earthworks, Fill Slopes, Cuts, Borrow Pits, Quarries, Disposal Sites, Stockpiles* | | |
| Generation of suspended solids from bare ground and runoff into watercourses | Construction activities should not give rise to storm water containing elevated suspended solids. Provide treatment to achieve 75% reduction in suspended solids. | • No direct discharge of sediment laden water without treatment<br>• Earthworks and land clearance should be minimized and phased<br>• Storm water should be diverted around exposed areas<br>• Any discharges to watercourses should occur during high flow and / or discharged as close to the outfall as possible to maximize mixing<br>• Stockpiles, borrow pits, quarries, disposal sites should be located at least 50 metres from a watercourse and avoid sensitive areas<br>• Timing of works around the drier seasons where possible<br>• Provision of storm water cut off drains wherever possible |
| Introduction of invasive species | Fill material should not contain invasive species. | • The use of imported fill shall be minimized<br>• Machinery should be cleaned prior to working on site to reduce the opportunity of the spread of weeds |
| Disturbance of natural habitats for spoil alluvial material. | Soils should be reused where possible in the development – to reduce the need for spoil sites and the need to import fill. | • Limit extraction of material to approved and demarcated quarries and borrow pits<br>• Stockpile and reuse soils before excavating new soils / alluvium<br>• Stockpiles should be compacted as much as practical and not be exposed for extended periods<br>• Stockpiles should be reused as soon as practicable<br>• Storm water should be diverted around stockpiles |
| Efficiency of control measures over time | Control measures should continue to work appropriately throughout the construction period | • Earthworks control measures should be inspected and maintained in efficient operating condition over the construction period |

| Issues | Key Principle / Mitigation Standard | Minimum Mitigation Method |
|---|---|---|
| *Work in Watercourses* | | |
| Sediment discharges arising from working in and near the river | Work in the wetted area of the riverbed should be minimized, and only in relation to the construction of the power house, weir and intake structure or to insert culverts for stream crossings | • Stabilize works at the end of each working day and prior to storm events<br>• Do the work during low flow periods<br>• Works shall be minimized<br>• Diversion of the river around the work area where possible<br>• Culverts shall be placed in access tracks where they cross streams more than 3 metres wide and 0.5 metre deep |
| *Tunnels* | | |
| Contaminants in water discharged from tunnels during construction | No direct discharges of tunnels water to any water course. Provide treatment prior to discharge to achieve 75% reduction in suspended solids. | • Settlement ponds and /or sediment infiltration devices<br>• Monitoring immediately upstream and 50 metres downstream of the discharge with a clarity tube to estimate any effects on clarity; for nutrients to detect explosives residue and for pH<br>• Any discharges to watercourses should occur during high flow and / or discharged as close to the outfall as possible to maximise mixing<br>• Spill kits and emergency procedures should be used for spills of chemicals, fuels and oils and staff trained |
| *Concrete, Cement* | | |
| Contaminants in water discharged from concrete manufacturing, including a rise in pH | No direct discharges of concrete batching water to any water course. Provide treatment prior to discharge to achieve 75% reduction in suspended solids. | • Settlement ponds and / or sediment infiltration gallery<br>• Monitoring immediately upstream and 50 metres downstream of the discharge with a clarity tube to estimate any effects on clarity; for pH to detect alkali discharges<br>• Any storm water discharges to watercourses should occur during high flow and / or discharged as close to the outfall as possible to maximise mixing<br>• Water to be reused where possible in the process<br>• Procedures for handling of unhydrated cement material and wet cement to avoid spills |
| Community nuisances | Noise and dust must not unreasonably intrude on traditional village life | • Concrete batching plants and other noisy / dusty equipment to be located at least 100 metres from villages |
| *Material Handling, Use and Storage* | | |
| Pollution risk associated with the storage and use of fuels, chemicals, explosives, hazardous substances | No oil, lubricants, fuels or containers should be drained or dumped to ground or waterways. Accidental spills shall be minimized, and procedures put in place to clean up the environmental damage. | • Keep a current list of all chemical and hazardous substances stored on site<br>• Keep the Safety Data Sheet of all hazardous materials used on site<br>• Develop appropriate storage, transport and use practices to recognized standards<br>• Explosives, chemicals and hazardous substances to be handled by authorized personnel<br>• Diesel to be stored in truck tankers or in overhead tanks to a maximum of 5,000 litres<br>• Diesel to be stored on flat ground and 50 metres from a waterway |

| Issues | Key Principle / Mitigation Standard | Minimum Mitigation Method |
|---|---|---|
| | | • Dikes to capture 100% of fuel must be placed around fuel storage areas<br>• All refuelling of vehicles and plant to be done on flat ground<br>• All significant vehicle and plant maintenance shall be undertaken offsite where possible<br>• Spill kits and emergency procedures should be used and staff trained<br>• There shall be no deliberate discharge of oil, diesel, petrol or other hazardous materials to the surrounding soils and waterways |
| *Maintenance of Construction Equipment and Working Areas* | | |
| Reduction of air quality due to emission from poorly maintained equipment and vehicles<br>Risk of pollution of vegetation and watercourses due to improper disposal of used lubricants and fuels | Equipment and vehicles shall not reduce air quality. No oil, lubricants, fuels used for the maintenance of equipment should be drained or dumped to ground or waterways. Construction debris shall be disposed at approved disposal sites | • Maintain all equipment in good working conditions<br>• Establish spill prevention procedures<br>• Ensure that maintenance activities are carried out in approved areas<br>• Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for debris<br>• Onsite burning of debris and wastes shall be prohibited |
| *Safety Issues* | | |
| Health and safety risks from such activities as increased traffic, blasting, operation of heavy machinery, etc. | Health and safety risks to villagers and workers shall be minimized | • Provide personal protective equipment and clothing (goggles, gloves, dust masks, hard hats, steel-toed boots, etc.,) for construction workers and enforce their use<br>• Follow national regulation on blasting<br>• Inform villages one week in advance of the blasting event blasting is prohibited during night-time hours<br>• Establish a methodology to be followed in case of fire<br>• Remove workers from tunnels and underground construction in case a hazardous gas is present<br>• Respond to emergencies in a prompt matter |
| Traffic causing safety risks to road users | Construction traffic will be managed to minimize the impact on existing road users | • Signage to be used to identify current risks to road users<br>• EST and Contractors to discuss<br>• major traffic issues with village representatives<br>• Establish pedestrian routes<br>• Heavy traffic to avoid the hours when school children walk to and from school |
| *Archaeological and cultural site disturbance* | | |
| Finding and disturbance of previously unknown sites | No sites shall be disturbed once identified | • Chance find procedure in Chapter 11 |

| Issues | Key Principle / Mitigation Standard | Minimum Mitigation Method |
|---|---|---|
| *Flora and Fauna* | | |
| Wildlife populations may be adversely affected by direct losses of individuals (e.g.: mortality, injury) or modification of habitat. Destruction of native vegetation and land outside proposed working areas. | Sufficient trainings on ecological protection and mitigation measures shall be provided to construction workers and site management staff | • Demarcate natural habitats for sensitive, rare, threatened and/or endangered species before the commencement of construction activities<br>• Ensure that no hunting, fishing, trapping, shooting, poisoning or otherwise disturbance of any fauna takes place<br>• Delineate with temporary construction fencing the vegetation to be preserved<br>• Ensure that the vegetation to be preserved is kept undamaged<br>• Prohibit use of fire wood and the burning of vegetation<br>• Install sediment control measures to prevent siltation of water courses |

ESMC = Environmental and Social Management Cell; EST = Environmental Supervision Team; SEO = Safety and Environmental Officer

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*Appendix B*
*Environmental and Social Management and Monitoring Plans*

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# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AoI | Area of Influence |
| BMP | Biodiversity Management Plan |
| CIA | Cumulative Impact Assessment |
| CIMP | Cumulative Impacts Management Plan |
| CITES | Convention on International Trade in Endangered Species |
| CR | Critically endangered |

| | |
|---|---|
| DRIFT | Downstream Response to Induced Flow Transitions |
| Eflow | Environment flow |
| EFMP | Environmental Flow Management Plan |
| EIA | Environmental Impact Assessment |
| EN | Endangered |
| EPC | Engineering, procurement, and construction |
| ERP | Emergency Response Plan |
| ESIA | Environmental and Social Impact Assessment |
| ESMC | Environmental and Social Management Cell |
| ESMMP | Environmental and Social Management and Monitoring Plan |
| ESMS | Environmental and Social Management System |
| EST | Environmental Supervision Team |
| ha | Hectare |
| IFC | International Finance Corporation |
| IUCN | International Union for Conservation of Nature |
| km/hr | kilometres per hour |
| LALRP | Land Acquisition and Livelihood Restoration Plan |
| LC | Least Concern |
| LNP | Langtang National Park |
| MSDS | Material Data Safety Sheet |
| NT | Near Threatened |
| NWEDC | Nepal Water and Energy Development Company |
| O&M | Operations and maintenance |
| PDA | Project Development Agreement |
| PH | Power House |
| PS | Performance Standards |
| RLNM | Red List of Nepal's Mammals |
| SEO | Safety and Environmental Officer |
| VU | Vulnerable |

# 1. CONSTRUCTION ESMMP

## 1.1. PURPOSE

This Plan presents the Environment and Social Management and Monitoring Plan (hereafter referred to as the ESMMP) for the construction phase of the Upper Trishuli-1 Project. The ESMMP has been formulated based on the Project understanding and impact assessment undertaken in the Environmental and Social Impact Assessment (ESIA). The ESMMP is comprised of the following:

- Summary of Management Plans to be formulated by engineering, procurement, and construction (EPC) Contractor and other contractors, which will be implemented during the Construction Phase of the Project; and
- Detailed Management Plans for specific impacts or areas of concerns.

It should be noted that some of the plans have been formulated as part of the previous assessments. These plans shall be updated in keeping with the present context. In addition to this, certain additional plans have been formulated as part of the requirements of the applicable reference framework and the requirements of the Project Development Agreement (PDA).

## 1.2. SUMMARY OF MANAGEMENT PLANS TO BE DEVELOPED BY EPC

This section identifies the Construction Phase Management Plans to be developed and implemented by the EPC Contractor. Guidance is provided for each of these plans regarding their minimum content.

### 1.2.1. Air Quality Management Plan

The Contractor shall propose and develop methods and actions to control dust resulting from construction-related activities, such as excavation, drilling, blasting, use of heavy equipment, quarry sites, crushing and concrete batching plants, earthworks including road construction, embankment and channel construction, haulage of materials, and construction of worker camps prior to the start of Project construction activities. In particular the Contractor shall ensure the following safeguards are in place:

- Dust and particulate material emissions shall be minimised at all times to avoid impacts on surrounding communities, and especially to vulnerable people (e.g. children, elders).
- Phased removal of vegetation shall be practiced to prevent large areas from becoming exposed to wind.
- Surface clearing activities shall be restricted to Project foot print.
- Batching plant, cement plant, crushers, and other construction facility shall be established away from the residential and ecological sensitive receptors.
- Crushers shall use a high-efficiency dust suppression system.

- Vehicle speed shall be restricted to 15 kilometres per hour (km/hr) at site to minimise potential for dust generation in the surroundings.
- Paved roads shall be cleaned and unpaved roads shall be stabilized to reduce offsite tracking of soils and avoid dust generation.
- Diesel generators for power supply shall be optimally operated and regularly maintained to ensure emissions from fuel combustion remain at design levels.
- Machinery shall be turned off when not in use.
- Provisions for use of kerosene oil or liquefied petroleum gas as the primary fuel by the labour shall ensure reduction in dependency on forest related products.
- Dust screens shall be placed around construction areas, paying particular attention to areas close to local communities.
- Spraying of water shall be carried out as needed on dirt roads, cut areas and soil stockpiles or fill material. The water spray operation shall be carried out in dry and windy days, at least twice a day (morning and afternoon). The frequency of water spray near local communities shall be increased as needed.
- Access roads shall be paved with gravel in the sections which are located in close proximity to the communities and other sensitive receptors, to reduce generation of air-borne dust.
- Adequate ventilation system and other measures to control concentration of air pollutants within tunnels shall be provided.
- Construction equipment/vehicles that generate significant air pollution (above the applicable limit), and those which are poorly maintained shall not be allowed on-site.
- Concrete batching plants, asphalt plants, mixing stations, and crushing plants shall be operated with approved fitted dust control devices only.
- The truck transporting powder materials, such as cement, sand, and lime, shall be covered entirely with clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle. Overflow of material shall be avoided. All the stockpiled materials and sloped surface shall be covered with impervious sheeting to reduce dust emissions.
- Linking roads shall be maintained in good condition to reduce dust and noise emitted while using these roads for transportation.
- The exhaust gases from construction machinery and vehicles are accepted. However, the engines shall be inspected and adjusted as required to minimise pollution levels. Exhaust fumes shall comply with relevant Nepalese standards on fumes.
- Use low sulfur diesel fuel for diesel-powered equipment and vehicles to the extent available.
- Regular (monthly) maintenance of all vehicles in accordance with manufacturer specifications shall be undertaken mandatorily.

### 1.2.2. Blasting and Explosives Management Plan

Any blasting activity pertaining to access road, adit, or any other construction activity shall consider the following:

- Before blasting is carried out, a detailed survey shall be conducted in the nearby communities to evaluate the degree of impacts that may be caused due to the blasting activity (e.g. possible damage to structures or infrastructure due to vibration, effects on animals, local residents, etc.).
- Survey of structures (house and shed) located within 250 metres on either side of Adit 1 access road at Hakubesi before construction shall be conducted to verify condition of these structures.
- Compensation shall be provided for these structures if reported to be damaged while blasting activities are carried out.
- The Contractor shall ensure that the site of overburden depth and with proper alignment (with respect to rock type and geological structures) is selected for tunnel excavation to reduce instabilities within the tunnel.
- No blasting shall be allowed by the Contractor during night time unless prior approval is obtained from the government authority and the Environmental Supervision Team (EST) and local residents are notified in advance.
- The Contractor shall take necessary precautions to prevent damage to special features in the surroundings (e.g. ecological, historical, or culturally important areas) and the general environment.
- Only trained personnel on blasting operations shall carry out the procedure.
- The Contractor shall provide temporary, but proper, foundation supported with rubber padding to control vibrations.
- The Contractor shall adopt optimised blasting techniques using delay detonators, blasting in confined areas (inside the tunnels).
- The equipment or machineries generating vibrations shall be placed in strong foundation and shall minimise any off-site ground vibrations.
- Prior to a blasting event, water shall be sprayed on the surface of the blast area to increase its moisture content, and wire mesh, gunny sacks, and sandbags shall be used on top of the blast area at each shot to prevent flying rocks and dust. Blasting shall not be carried out in adverse weather conditions. Spraying shall be conducted after the blast to control fugitive dust.
- The Contractor shall provide notification to any occupants of surrounding land at least one week prior to blasting activity, and shall address any concerns that they may have.
- The blasting event shall be announced with sirens, or other devices to allow the warning to be heard at up to 1 kilometre distance;

- The Contractor shall ensure that any unauthorized persons shall be located a safe distance (e.g. at least 200 metres) away from the blasting point.
- Before the detonation takes place, the Contractor shall check that there are no people inside the controlled area.
- The use of electric detonators shall be prohibited during thunderstorms.
- If there has been a failure in the blasting operation, only competent personnel may be allowed on site to do the work necessary to detonate the explosive, or completely redo the blasting.
- The quantity of blasting materials shall be carefully controlled according to the real situation requirements to avoid unnecessary breakage of rock mass.
- State of the art drilling machines provided with dust extraction system shall be used.
- Good quality explosives having proper oxygen balance with regular checking shall be used.
- The Contractor shall ensure proper stemming after charging of explosives. Proper stemming material (stone chips and drill cutting) will help in minimizing dust throw hence lower spread of dust particles in ambient air or within tunnel or adits.
- The Contractor shall regularly check the date of manufacture/expiry for effective use of explosives.
- Notify local communities before blasting
- Magazine area shall be located away from settlement or easy access locations.
- The Contractor shall provide strict security and restricted entries in magazine area.
- The Contractor shall provide good firefighting system at the explosive storage area.
- Specific training on explosive handling and safety management shall be provided to the employees appointed in magazine area.

### 1.2.3. Cultural Heritage Management Plan

According to the 2014 Environmental Impact Assessment (EIA) Report, historical and archaeological sites as well as temples are absent in the affected village development committees. Only a museum and two Ghumpas are reported in the Project's area of influence. However, the Contractor shall put in place the following measures in case sites or artefacts with archaeological or historical value are discovered during the Project construction activities:

- The Contractor shall undertake consultations/engagement with the local community in advance of blasting, drilling, or ground disturbing works to determine if:
  - The site is of cultural heritage or archaeological importance;
  - Artefacts are likely to be found;
  - The area has been/ is used as a burial ground.

- These consultations shall be undertaken in keeping with the larger Stakeholder Engagement Plan formulated for the Project. If any such risk is identified, then a detailed assessment of the site shall be conducted by an archaeologist or cultural heritage expert.
- If buried artefacts are encountered during the drilling or levelling activities, all activities in the vicinity of the site shall be stopped. The operators and worker shall be briefed about identification of artefacts and other chance find items to help them detect such finds.
- Workers shall report the findings to the Contractors, Workplace Safety and Environmental Officer (SEO) and EST immediately.
- The Contractor shall notify the Environmental and Social Management Cell (ESMC) and local or national relevant authorities (within 24 hours of the discovery).
- Once confirmed, the discovered find/feature/ site shall be delineated by the SEO or EST.
- The find location and all remains shall be left in place.
- The area shall be secured to prevent any damage or loss of removable objects.
- A night guard shall be arranged until the responsible local authorities take charge of the situation.
- Relevant local or national authorities shall arrive to the site within 48 hours and shall be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. The job of these authorities is:
  - Describe the artefact or historical remain;
  - Define the scale of the site/object;
  - Perform a preliminary evaluation;
  - Set up a plan to protect and handle the discovery; and
  - Determine the significance of the discovery.
- The significance and importance of the findings should be assessed via a Cultural Heritage Assessment, according to the various criteria relevant to cultural heritage, which include the aesthetic, historic, scientific/ research, social and economic values.
- Decisions on the procedures to handle the finding shall be taken by the responsible authorities, which could include conservation, preservation, restoration and salvage.
- If the cultural sites and/or relics are of high value and site preservation is recommended by the professionals and required by the relevant local or national authority, the Project's Proponent shall need to make necessary design changes to accommodate the request and preserve the site.
- Decisions concerning the management of the finding shall be communicated in writing by relevant authorities to the Project's Proponent.
- Construction works should resume only after permission is granted from the responsible local authorities concerning safeguard of the cultural resource.

- The staff, contractors, and contractual workmen engaged in Project activities that may result in a chance find shall be trained in the requirements of this plan. Refresher trainings shall be provided as appropriate.

## 1.2.4. Emergency Preparedness and Response Management Plan

### *1.2.4.1. Fire Control*

- The Contractor shall submit a fire control and fire emergency method statement to ESMC and EST for approval.
- The method statement shall detail the procedures to be followed by the workers in the event of fire.
- The Contractor shall take all reasonable steps to avoid increasing the risk of fire through activities on site.
- The Contractor shall ensure that basic fire-fighting equipment is available and well-maintained at all camp areas and facilities.
- The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate action is implemented in the event of a fire.
- The Contractor shall ensure that all site personnel are aware of the procedure to be followed in the event of a fire.
- Mock fire drills shall be conducted to prepare workers in case of an emergency. The records of the same will be maintained by the Contractor on site.
- Any work that requires the use of fire may only take place at a designated area approved by the EST and must be supervised at all times.
- Fire-fighting equipment should be made available at various locations within the site and especially near the designated fire work area.

### *1.2.4.2. Hazardous Gases*

The Contractor shall ensure the following safeguards are in place in case of accidental release of hazardous gases.

- The Contractor shall establish a plan to guarantee the safety of all personnel working in tunnels and underground excavations.
- If there is hazardous gas (such as coal gas) in the tunnels or underground excavations, all construction activities must stop immediately and construction workers shall withdraw from the site immediately. The Contactor must take corrective action and the construction must not re-start until there is no longer a danger.
- The Contractor shall monitor, record, and report the situation of the hazardous gas at the construction site to make sure that the hazardous gas emission has not exceeded the established standards.

- The Contractor shall provide suitable ventilation and dust extraction systems as per the requirement and manpower working at the tunnels/adit/powerhouse or any other underground working area.
- The Contractor shall regularly monitor atmospheric conditions.
- The Contractor shall develop rescue procedures including use of self-rescuers.
- The Contractor shall conduct training for work in confined spaces for various workers to be engaged.
- The Contractor shall use the correct personal protective equipment.
- The Contractor shall install an online real-time gas monitoring system, including analysis equipment, a security light, and an alarm system to provide visual and auditory alerts when elevated concentration of gases is detected.

## 1.2.5. Excavation, Slope Stability, Sediment and Erosion Control Management Plan

### *1.2.5.1. Underground Excavations*

The Contractor shall ensure the following safeguards are in place during excavation. These specifications are applicable to all underground excavations such as the desander, settling basin at the intake structure, tunnels, the surge tank, the powerhouse, etc.

- Before any underground excavation starts, the areas for disposal of excavated earth shall be selected in order to minimise the occupation of land. Excavated soil shall be used in the construction activities or disposed at the approved spoil disposal sites.
- The Contractor shall provide adequate ventilation systems and other measures to control the concentration of air pollutants within tunnels and underground excavations. Concentration of gases shall be monitored, recorded, and reported in confined spaces.
- Wastewater resulting from the construction activities shall be collected in settling ponds or tanks for solids removal. Solids shall be removed from site and the supernatant will be reused or discharged depending on the final quality. Wastewater shall not be discharged into water bodies without any prior treatment.
- Slopes shall be protected with vegetation or retaining walls.
- The excavated materials shall be used, wherever possible, in backfilling and levelling activities.
- Workers shall be provided with the proper protective equipment (e.g. masks, earmuffs, safety boots, helmets).
- The Contractor shall develop an emergency plan to handle unexpected accidents such as the collapse of tunnels and poisoning caused by gases in the underground excavations. The Contractor shall train staff to handle accidents.

- Staff shall also be trained in fire control, emergency call, and in the rescue and transportation of injured workers to health centres or the medical facilities, if available, established for the Project.
- Training on safety and personal security shall also be provided to the tunnel workers and administration staff. This training shall be incorporated into the training plan provided by Contractors to their workers.
- The use of explosives in underground excavations shall follow the rules and regulations established in Nepal.
- Temporary traffic regulations shall be implemented and signs shall be posted inside the tunnels. The movement of equipment, machinery and workers within the tunnels shall be directed by trained personnel.
- The Contractor shall install a temporary maintenance station that shall be in charge of daily maintenance and repairs to ensure the proper functioning of the equipment and machinery, close-circuit TV, and the lighting and ventilation systems inside the tunnels and underground excavations.
- The Contractor shall protect against rock-fall by the following:
  - Regular inspection of tunnel and scaling where needed;
  - Mechanically scaling and bolting;
  - Provision of ground support;
  - As soon as possible with overhead protection if done manually changing of ground support methods.
- The Contractor shall protect against high water and mud inflow by the following:
  - Grout old drill holes;
  - Pre-grout before excavation starts;
  - Probing, drilling and draining;
  - Including provision for dewatering and pumping; and
  - Providing sump and excellent drainage systems.

#### *1.2.5.2. Erosion and Sedimentation*

Site activities shall be carefully managed in order to avoid soil erosion and sedimentation of downstream waterways that can impact aquatic ecosystems. Even though the muck from the existing landslide after the April 2015 earthquake has disturbed the baseline, the Contractor should take reasonable precaution. Erosion and sedimentation shall be controlled during the construction of the Project by implementing the following mitigation measures:

- Silt fencing shall be provided around stockpiles at the construction sites close to river/tributaries/ and springs. The fencing needs to be provided prior to commencement of earthworks.
- The Contractor shall ensure the establishment of an appropriate drainage system in and around the spoil and muck disposal areas on-site.
- Muck disposal sites shall be provided with retaining walls and other engineering and biological control measures to mitigate erosion.
- The capacity/volume of the muck dumping sites shall be more than the volume of the muck to be disposed taking into consideration the swelling factor.
- Areas of the site that are not approved for construction activities shall be maintained in their existing conditions and shall remain untouched.
- The Contractor shall ensure that minimal ground area is disturbed during the construction phase. The Contractor shall ensure that the disturbed area is stabilised as quickly as possible, drainage is controlled, and the sediments are trapped onsite to prevent runoff.
- The Contractor shall erect erosion control barriers around the perimeter of cuts, disposal pits, and roadways.
- All areas susceptible to erosion shall be protected by installing necessary temporary and permanent drainage works as soon as possible and by taking any measures necessary to prevent storm water from concentrating in streams and scouring slopes, banks, etc.
- Terraces and other erosion control measures shall be implemented, where necessary to prevent soil erosion.
- As a general rule, slopes exceeding 35 percent shall not be machine cleared (bulldozer).
- The Contractor shall preserve as much vegetation as possible as it is beneficial in the following areas:
  - Floodplains;
  - Buffers;
  - Wetlands;
  - Stream banks;
  - Steep slopes; and
  - Other sensitive resource areas where it might be difficult to establish, install, or maintain erosion control devices.
- The topsoil with its leaf litter and organic matter shall be conserved, and reapplied to local disturbed areas to promote the local native vegetation growth.
- The Contractor shall add local, native grass seed and mulch to barren erosive soil areas or closed construction surfaces.

- The Contractor shall ensure that erosion control measures are implemented before the rainy season begins, preferably immediately before construction starts. Erosion control measures shall be installed at each construction site.
- Slope breakers such as silt fences, staked hay or straw bales, or sand bags shall be installed to reduce runoff velocity and divert water off the construction site.
- Slope breakers shall be installed on slopes greater than 5 percent, where the base of the slope is less than 15 metres from water bodies, wetlands, and road crossings.
- The Contractor shall reduce water speed and volume by increasing the number of drainage culverts and selecting proper places for duct placement to avoid erosion effects.
- Retaining and gabion walls shall be built to prevent scouring of river banks at strategic locations, especially upstream of the river above the dam.
- The bank of the river especially around the tailrace outlet shall be protected using inlet control structures and proper protection works.
- Sediment control structures shall be installed where necessary to slow or redirect runoff and trap sediment until vegetation is established. These control structures include windrows of logging slash, rock berms, sediment catchment basins, straw bales, brush fences, silt fences, silt curtains, fibre rolls, etc.
- Water flow through construction sites or disturbed areas shall be controlled with ditches, berms, check structures, live grass barriers, and rock liner.
- Ground surface at the site offices shall be paved in concrete, in order to minimise soil erosion.
- Until vegetation is successfully established, erosion control measures shall be maintained.
- Water shall be sprayed as needed on dirt roads, cuts, fill material and stockpiled soil to reduce wind-induced erosion.
- Larger changes in the landscape from quarries, tunnel spoil tips, etc., shall be landscaped and replanted, both to reduce erosion problems and to reduce the visual impact of the construction.
- Exposed soil and material stockpiles shall be protected against wind erosion and the location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors.
- All structures to control erosion and sedimentation shall be inspected routinely (monthly) to ensure that they are working properly.
- Traffic and movement over stabilized areas shall be restricted and controlled, and damage to stabilized areas shall be repaired and maintained to the satisfaction of EST.
- Potential impacts/activation of landslides shall be monitored regularly.

#### *1.2.5.3. Earthworks, Cuts, and Fill Slopes*

Earthworks, cuts, fill slopes, and spoil sites shall be carefully managed to minimise negative impacts on the environment through the following measures:

- The Contractor shall maintain stable cut and fill slopes at all times and cause the least possible disturbance to areas outside the prescribed limits of the construction works.
- All earthworks shall be properly controlled, especially during the rainy season.
- The Contractor shall complete cut and fill operations to final cross-sections at any one location as soon as possible and preferably in one continuous operation to avoid partially completed earthworks, especially during the rainy season.
- To protect any cut or fill slopes from erosion, in accordance with engineering drawings, cut-off drains and toe-drains shall be provided at the top and bottom of slopes and be planted with grass or other cover. Cut-off drains shall be provided above high cuts to minimise water runoff and slope erosion.
- Slope works and earth moving/excavation shall be conducted in order to minimise exposure of soil surface both in terms of area and duration.
- Temporary soil erosion control and slope protection works shall be carried out in sequence to the construction.
- During the cutting, backfilling, and levelling activities, the cut material with the best mechanical properties shall be used for backfilling. In the sections where the suitable excess material from excavation might be insufficient, the required volumes shall be extracted from quarries previously authorized by EST.
- Any excavated cut or unsuitable material shall be disposed of in designated disposal areas as agreed to by EST.

### 1.2.6. Materials Handling and Storage Management Plan

Environmental considerations shall be taken into account in the handling, use and location of any material storage areas.

#### *1.2.6.1. Transportation*

- The Contractor shall ensure that all suppliers and their delivery drivers are aware of procedures and restrictions (e.g. restricted areas) while navigating through the roads near the site.
- Material shall be appropriately secured in the vehicles to ensure safe passage between destinations during transportation.
- Loads shall have appropriate cover to prevent them from blowing during transit.
- The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

- All stockpiles shall be covered and uncovered stockpiles and transfer points shall be periodically water sprinkled to minimise fugitive dust generation.
- Construction spoils including bituminous material and other hazardous materials shall be secured so that they shall not leach into the groundwater.
- Entry/exit routes and transportation timings for heavy transport vehicles shall be planned to minimise disturbance to the surrounding locality.
- Trucks/dumpers shall be covered by tarpaulin sheets during offsite transportation.
- The construction site shall be provided with a temporary tin sheet barrier all around to isolate it from the surroundings.
- Construction equipment with idling control technologies shall be used.
- Regular maintenance of the equipment shall be carried out; and
- The workers exposed to high noise generating equipment shall be provided with earplugs and earmuffs.

#### *1.2.6.2. Explosives*

- The explosives storage building shall be a dry, well-ventilated facility. The building shall be constructed using materials resistant to firearms, fire, and atmospheric phenomena. It shall also have a metal door with a safety lock, lightning protection, warning signs and strict surveillance.
- The explosive storage building shall be located away from other buildings and high traffic roads.
- Only qualified and authorized personnel shall handle explosives.
- Explosives and detonators shall be of good quality and suitable for the blasting operation.
- Explosives with past expiration dates shall not be used.
- Explosives and detonators must be packed in closed boxes. The explosives damaged by handling or transportation shall not be used and shall be disposed of in accordance with established procedures and any national regulations.
- The boxes of explosives and blasting caps must be visibly labelled with signs indicating their contents and instructions on how to dispose and handle them.
- For the transportation, storage, processing, packaging on site, blasting and the disposal of the blasting material, the procedure shall be in accordance with the Nepalese regulations on blasting.

#### *1.2.6.3. Hazardous and Chemical Substances*

The Contractor shall provide a method statement detailing the hazardous substances/material that are to be used during construction, as well as the storage, handling, and disposal procedures for each substance / material and emergency procedures in the event of misuse or spillage that might have impact on the environment. In general terms, the following activities shall be carried out:

- All hazardous material/substances (e.g. petrochemicals, oils, paints, solvents, etc.) shall be stored on site only under controlled conditions and with appropriate secondary containment.
- All hazardous material/substances shall be stored in a secured, appointed area that is fenced and has restricted entry.
- All storage shall take place using suitable containers as prescribed by the manufacturers or regulatory authority.
- Hazard signs indicating the nature of the stored materials (Material Safety Data Sheets [MSDSs]) shall be displayed on the storage facility or containment structure.
- Areas for the storage of fuel or lubricants and any maintenance workshop shall be fenced and have a compacted/impervious floor to prevent the escape of accidental spillage of fuel and or lubricants from the site.
- Surface water drainage from fenced areas shall be discharged through purpose designed and constructed oil traps.
- Empty fuel or oil drums shall not be stored on site.
- Fuel shall be stored in a steel tank supplied and maintained by the fuel suppliers. The tank shall be located in a secure, demarcated area. It can also be stored in overhead tanks of 5,000 litres maximum on flat ground at least 50 metres from a waterway.
- Dikes to capture 100 percent of fuel must be placed around fuel storage area
- Herbicides shall be appropriately packaged, labelled, handled, stored, disposed of, and applied according to national standards.
- During servicing/repair of equipment or vehicles, a suitable drip tray shall be used to prevent oil/grease spills onto the soil, especially in case of emergency repairs.
- Leaking equipment shall be repaired immediately or be removed from the site to facilitate repair.

#### *1.2.6.4. Cement, Concrete Batching, and Surfacing Materials*

- Concrete mixing shall take place on impermeable surfaces such as geomembrane or metal platforms only and not directly on ground.
- In case of spillage of the concrete mix, the area shall be cleaned immediately. The waste shall be collected and deposited in approved sites assigned to it by the EST. It is prohibited to place these mixtures in water courses, cultivated land, parks, protected areas, etc.

- All runoff water from the batching plant areas shall be strictly controlled, and cement-contaminated water shall be collected, stored and disposed of at a site approved by the EST.
- Unused cement bags shall be stored in a weather-proof area where it will not be impacted by rain. Used (empty) cement bags shall be collected and stored in weatherproof containers to prevent windblown cement dust and water contamination. The bags shall not be used for any other purpose and shall be disposed of on a regular basis via the solid waste management system.
- All excess concrete shall be removed from site on completion of concrete works and disposed of as approved by the EST. Washing of the excess concrete into the ground is not allowed. All excess aggregate shall also be removed from site.
- Overspray of bitumen products outside of the road surface and onto roadside vegetation shall be prevented using appropriate methods.
- When heating of bitumen products, the Contractor shall take appropriate fire control measures.
- Stone chip/gravel excess shall not be left on road/paved area verges. This shall be swept/ raked into piles and removed to an approved disposal site.
- Water quality from runoff from any fresh bitumen surfaces shall be monitored by EST and remedial actions taken where required.
- The Batching Plant shall be set up at a location downwind away from any residential set up at a sufficient distance.
- The Plant shall be set up away from any drain inlet and a perimeter bund shall be erected all around the batching plant. The drainage from the bund shall be subjected to a sump which will be cleaned on periodic basis to minimise potential surface runoff from stockpiles.
- The Plant shall be enclosed with temporary barriers (3 metres high) to minimise spread of emissions of noise and dust particles.
- Unloading from cement delivery trucks shall be done on pallets, which shall be covered with tarpaulin sheets during non-working periods.
- The plant shall be operated under supervision and periodical monitoring of dust levels and noise shall be conducted at the periphery of the construction site twice on weekly basis.
- The area surrounding the temporary concrete batching plant shall be swept on daily basis.

### 1.2.7. Noise and Vibration Management Plan

To minimise noise within the construction site, the Contractor shall:

- Maintain all construction-related traffic and on-site vehicles at or below 15 to 20 km/hr on streets within 200 metres of the site.
- To the extent possible, maintain noise levels associated with all machinery and equipment at or below 90 decibels.

- In noise-sensitive areas (including residential neighbourhoods, hospitals, rest homes, schools, etc.), stricter measures shall be implemented to prevent undesirable noise levels, as per the regulatory requirements in Nepal.
- Proper measures to minimise disruptions from vibration or noise coming from construction activities shall be applied.
- A transportation schedule shall be developed for the construction materials to minimise the adverse impact on residents as well as the traffic on the existing roads.
- The transportation vehicles shall be required to slow down and be banned from horning when passing through sensitive areas.
- Maintain the construction equipment in its best operating conditions and lowest noise levels possible.
- Temporary noise barriers shall be used to minimise the noise caused by the construction equipment.
- Workers shall be provided with ear plugs around highly noisy machines such as piling, explosion, mixing, etc., for noise control and workers protection.
- The construction team shall be equipped with portable detecting devices to monitor the noise level at the sensitive receptors.
- Materials leaving the construction site shall be transported during non-peak hours to minimise traffic noise due to the increase in traffic volume.
- Properly designed silencers, mufflers, acoustically dampened panels and acoustic sheds or shields, etc. shall be used. Mufflers and other noise control devices shall be repaired or replaced if defective. Electric-powered equipment shall be used when applicable instead of diesel-powered or pneumatic-powered equipment.
- Equipment known to emit a strong noise in one direction, shall when possible, be oriented to direct noise away from noise sensitive receivers.
- Machines and equipment that may be in intermittent use shall be shut down between work periods or throttled down to a minimum.
- Equipment such as cranes, earth moving equipment, and heavy vehicles shall be routed in such a way that there is minimum disturbance to receptors along the route.
- Inherently quiet equipment shall be used (as far as reasonably practicable); the equipment shall be regularly maintained to ensure noise levels are maintained at design level.
- Loud, sudden noises shall be avoided wherever possible. Fixed noise sources shall be located more than 50 metres away from the site fencing.
- Integral noise shielding (including provision of tin sheets as noise barrier) shall be used where practicable and fixed noise sources shall be acoustically treated, for example, with silencers, acoustic louvers and enclosures. All diesel generators shall be installed in

conformance with the statutory requirement of acoustic enclosure to achieve the required norm of 75 A-weighted decibels.

- Rubber paddings/ noise isolators at equipment/machinery shall be used for construction.

#### *1.2.7.1. Night-time Construction Noise Management*

Although in general, night-time construction shall be banned near sensitive receptors, some construction may still occur for technical and other reasons. If occurred near local communities, night-time construction noise would result in particularly significant impacts to residents and other sensitive receptors. Hence, besides the above mitigation measures, the following special measures shall be taken during the construction phase to ensure minimum emission of night-time noise:

- People living within potentially impacted areas shall be notified ahead of time of the length and noise intensity of the proposed night-time construction.
- Residents shall be informed on:
  - Why the night construction is necessary; and
  - Mitigation measures that are going to be implemented to obtain their understanding.
- These residents shall be allowed to express their concerns, difficulties, and suggestions for noise control prior to the commencement of night-time construction. These concerns shall be addressed and suggestions adopted where appropriate.
- Concrete batching plants, power generators, and other stationary equipment shall be carefully placed as far away from local communities to reduce noise impacts from these machines. Wherever possible, municipal power supply shall be utilized in construction, including night-time construction, as diesel generators are extremely noisy and avoiding their use is the best mitigation possible.
- Equipment with lower noise levels shall be used for concrete pouring operations, which may require 24 hours non-stop operation.
- Temporary noise barriers at the appropriate places shall be erected to reduce the noise impacts at night.
- If necessary, the Contractor shall arrange temporary accommodations away from the impacted area for the extremely vulnerable people such as persons with illness and the elderly.
- Notification boards shall be erected at all construction sites providing information about the Project, as well as contact information about the site managers, environmental staff, telephone numbers and other contact information so that any affected people can have the channel to voice their concerns and suggestions.
- Supervision personnel shall be assigned to the construction sites during the period of night-time construction to ensure that the above measures are taken and to respond to any un-anticipated impacts by implementing any necessary mitigation measures.

## 1.2.8. Occupational Health and Safety Management Plan

The Contractor shall prepare and enforce an Occupational Health and Safety (OHS) Management Plan to address matters regarding the health and wellbeing of construction workers, Project staff and nearby communities. The Contractor shall include in his proposal the outline of the OHS Management Plan.

The SEO will issue a certificate of compliance to the Contractor prior to the initiation of Construction. The Contractor shall:

- Carry out health screening and fitness test of all workers at the time of recruitment. This health screening shall be undertaken in keeping with the work profiles of the workers. The fitness test shall screen for communicable diseases and any health risks which may create issues in undertaking the task assigned. In addition to this, regular annual health check-ups shall be undertaken of all workers.
- Implement a vaccination program for all workers, including, but not limited, to vaccination against hepatitis A and B, tetanus, polio, rabies, etc.
- Provide appropriate information and education to the workforce on basic personal hygiene, prevention of diseases, including respiratory diseases, vector-borne diseases such as malaria and dengue, water and food borne diseases such as diarrhoea, tuberculosis, etc.
- Implement a program for workers and local communities for the prevention, detection, screening, and diagnosis of sexually transmitted diseases, especially with regard to HIV/AIDS. The program shall also include information on alcohol abuse and human trafficking.
- The HIV/AIDS program shall include awareness campaigns at the construction sites and in the communities, developing peer educators and community, monitoring combined with the prevention of human trafficking, awareness on safe migration, and community monitoring.
- Distribute educational materials to all workers including brochures, and leaflets which provide information of tuberculosis, HIV/AIDs symptoms and counselling and treatment services.
- Establish a health post or a hospital or promotion of medical clinics and dispensaries in Haku area, in particular where population densities are likely to increase.
- Provide basic first-aid services to the workers as well as emergency facilities for emergencies for work-related accidents, including medical equipment suitable for the personnel, type of operation, an ambulance or motorized vehicle, and the degree of treatment likely to be required prior to transportation to a hospital or health care centre.
- Ensure that medical staff, first-aid facilities, sick bay, and ambulance service are available at all times and that suitable arrangements are made at the labour camp and work sites, for all necessary welfare and hygiene requirements and for the prevention of epidemics.
- Send details of any accident to the EST as soon as practicable after its occurrence.

- Maintain records and reports concerning health, safety and welfare of persons, and damage to property, as the EST may reasonably require.
- Include a Pest Management Program for the construction areas, including construction work camp areas, in the OHS Management Plan. The use of pesticides shall follow procedures acceptable to the government of Nepal.
- If applicable, to reduce the risk of workers contracting malaria, the following measures shall be followed:
  - Educate workers about problems and preventive measures;
  - Use protective clothing;
  - Apply repellents to clothing;
  - Minimise containers full of water;
  - Ensure correct maintenance of water and water treatment plants to prevent the breeding of mosquitoes;
  - Keep storm water drains and borrow pits free of vegetation; and
  - Use insecticides as a last control method and only after studies indicate the primary location of mosquitoes.

During construction, there will be a potential for workers to damage the community forest and waterways adjacent to camps and work areas. The Contractor shall prepare an Environmental Awareness Training Plan to ensure that all construction workers and relevant personnel are familiar with the environmental requirements of the Project. The Plan shall include:

- The Contractor shall distribute to all construction workers and relevant personnel:
  - The Contractor's Environmental Plans;
  - The Environmental and Social Specifications contained in this document; and
  - Copies of relevant environmental laws, standards and regulation of Nepal.
- The Contractor shall provide environmental training to employees according to their level of environmental responsibility.
- All employees shall be required to comply with environmental protection procedures, and training records shall be prepared showing that they attended the training sessions detailed in the Plan.
- The Plan shall educate all construction workers and relevant personnel on the following issues but not limited to them:
  - The Worker Code of Conduct;
  - The prohibitions if any;
  - Traffic regulation;

- Illegal logging and collection of non-timber forestry products;
- Non-disturbance of communities;
- Hunting and fishing restrictions;
- Waste management;
- Erosion and sediment control;
- Health and safety issues;
- Establishment of penalties for those who violate the rules; and
- Any other environmental and social aspect relevant to this Project.

- The Contractor shall present to ESMC and SEO for approval the proposed methods for conducting the training program, which shall include formal training sessions, posters, data in newsletters, signs in construction and camp areas, and 'tool box' meetings.
- The Contractor shall provide periodical training as deemed necessary.
- The Contractor shall keep records of attention and issues covered and provide such records when required by ESMC or SEO.

## 1.2.9. Site Security and Safety Management Plan

### *1.2.9.1. Site Safety*

The Contractor's responsibilities include the protection of every person and nearby property from construction accidents. The Contractor shall be responsible for the following:

- The Contractor shall comply with relevant national and local safety requirements and any other measures necessary to avoid accidents.
- The Contractor shall conduct safety training for construction workers prior to start working.
- The safety training shall be accompanied by regular refresher trainings and daily tool box talks on safety issues.
- The Contractor shall provide construction workers with sufficient personal protective equipment and clothing such as goggles, gloves, respirators, dust masks, hard hats, earmuffs, steel toed boots, etc., and enforce their use.
- During heavy rains, accidents, or emergencies of any kind, all work shall be suspended.
- Electrical and mechanical equipment shall be braced to withstand seismic events during the construction.
- Sawing, cutting, grinding, sanding, chipping, or chiselling shall be conducted with proper guards and anchoring as applicable.
- The Contractor shall establish safe sight distance in both construction areas and construction camp sites.

- The speed of vehicles moving within the construction site shall be limited to 15-20 km/hr;
- Signs shall be erected around the construction areas to facilitate traffic movement, provide directions to various components of the works, and provide safety advice and warning.
- MSDSs for each chemical present on the worksite shall be maintained.
- The Contractor shall ensure that all workers read all MSDSs explaining the risks to them and their partners, especially when pregnant or planning to start a family. The Contractor shall encourage workers to share the information with their physicians, when relevant.
- The Contractor shall ensure that the removal of asbestos-containing materials or other toxic substances shall be performed and disposed-off by trained workers.
- Seminars on safety issues for local inhabitants, particularly school students shall be organised, to include prevention of road accidents, drowning, and electric shock.
- Warning signs and fence high-risk areas signs such as deep excavations, or blasting areas shall be erected to control public access.
- The Contractor shall ensure to provide lighting at night in roads near constructions sites, if these routes are used regularly by locals.

#### *1.2.9.2. Working in Watercourses*

When crossing or working near watercourses the following measures shall be taken into consideration:

- As far as reasonably possible, the Contractor shall work in watercourses shall take place outside of the expected rainy season. Sufficient time shall be allowed for construction processes to be effected before the rains start.
- Steep slopes (>25 percent) leading to watercourses shall be hand-cleared.
- Temporary embankments shall be built to protect riverbanks and ponds from erosion.
- Fallen trees, debris, or soil inadvertently deposited within the high water mark of any watercourse shall be removed to reduce damage to any aquatic habitat.
- Drip trays shall be used for all pumps, generators, etc. to prevent water contamination as a result of fuel spills or leaks.
- In the event of a spill, the Contractor shall take prompt action to clear polluted areas and prevent spreading of the pollutants.
- The Contractor shall be liable to arrange for professional service providers to clear affected areas, if required.
- Any work requiring the fording of watercourses by machinery and vehicles shall be undertaken at slow speed and with clean vehicles (no leaks, etc.) and along a single track.
- The Contractor shall select appropriate equipment and vehicle crossing methods. Such methods shall be approved by EST.

- The Contractor shall use existing stream and river crossings as much as possible if the crossings can stand the weight of machinery and equipment.
- The Contractor shall build temporary stream crossings such as fords, culverts, polyvinyl chloride and high-density polyethylene pipe bundles, and portable or on-site constructed bridges when existing crossings cannot be used.
- Temporary crossings shall be required to provide safe, erosion-free access across a stream for construction equipment. Properly designed, installed, and maintained temporary stream crossings can greatly reduce costs and help meet concerns of regulating agencies.
- When vehicle crossing is no longer required, the Contractor shall remove stream crossing structures, restore and stabilize stream beads, banks and other disturbed areas, if required.

#### *1.2.9.3. Working in the Proximity of Community Springs/Water Sources*

A number of springs have been identified along the tunnel alignment as reported in the Supplementary ESIA report. These springs are used by local communities for drinking water, irrigation and as water supply for livestock and wildlife. The following measures shall be taken into consideration by the Contractor to minimise potential impacts on these water sources:

- Identification and flagging of the location of these springs.
- Ensuring that minimum earth works and any other disturbance in the area around the springs is carried out and sedimentation is avoided.
- Monitoring and documentation of water yield before, during and after construction to detect impacts.
- Advance notification and coordinate with the respective communities if any impact or temporal access restriction to the springs is expected.
- Implementation of a grievance mechanism that allows communities to express their concerns/claims in relation to the local water supplies.
- Provision of water supplies to villages/communities if water supply is affected due to Project-related activities.

## 1.2.10. Rehabilitation and Landscaping Management Plan

#### *1.2.10.1. Site Restoration*

Remedial actions which cannot be effectively carried out during construction shall be carried out on completion of the works (and before issuance of the acceptance of completion of works). Various activities to be carried out for site restoration are:

- Following the completion of the Project, access roads may be turned back to the local government and if desired, used as rural roads or wood land roads. If local governments elect not to use these access roads, the land can be used for farming or plantation purposes.

- At the completion of the construction work, all construction camp facilities shall be dismantled and removed from the site and the whole site shall be restored to a similar condition to that prior to the commencement of the works, or to a condition agreed to with the land owner.
- Construction campsite shall be vegetated and trees cut replaced with saplings of similar tree species.
- All affected areas shall be landscaped and any necessary remedial works shall be undertaken without delay, including vegetation and reforestation.
- To make the land fertile, compaction, grading, construction of drainage channels and spreading topsoil over terrains shall be carried out upon completion of the Project.
- Water courses shall be cleared of debris and drains and culverts checked for clear flow paths.
- All sites shall be cleaned of debris and all excess materials properly disposed as approved by EST.
- No foreign material generated/ deposited during construction shall remain on site.
- Oil and fuel contaminated soil shall be removed and transported and buried in government approved waste disposal areas.
- Soak pits and septic tanks shall be covered and effectively sealed off.
- Restoration of cleared areas, such as borrow pits no longer in use, disposal areas, construction roads, construction camp areas, stockpiles areas, working platforms and any areas temporarily occupied during construction of the Project works shall be restored using landscaping, adequate drainage and vegetation. Restored dumping sites can then further be used for farming.
- Land used for agricultural activities (especially the additional land being taken on lease), prior to use for construction activities, shall be, as much as possible, restored to a state to allow the same agricultural activity to continue.
- Watercourses, which have been temporarily diverted by the construction activities, shall be restored to their former flow paths after commencement of construction.
- Any damaged to occupied drainage, irrigation and other agricultural infrastructure shall be restored to its previous condition as much as possible.

#### *1.2.10.2. Access Roads*

To reduce the environmental impact caused by the construction of new access roads, the Contractor shall put into place the following measures:

- All new access roads shall be approved by ESMC and EST. A road engineer shall corroborate that the proposed access road is properly designed.
- The Contractor shall present a 1:5000 scale map of the road.

- The design of the new access roads shall follow the landform and avoid alignments that require large volumes of excavation and clearance of vegetation.
- The new access road shall include a drainage ditch, and all unstable slopes shall include retaining walls or other appropriate structures to control erosion and landslides.
- Where the soil texture on the slopes to be filled is too loose to resist erosive forces of storm water, a dam of 0.5 metre width by 0.2 metre height is suggested to be constructed along the edge of the roadbed to retain storm water from running down through the soils on side slopes. In addition, a temporary drainage ditch shall be constructed along the roadbed at an interval of 50 metre to divert the excessive storm water.
- A sedimentation basin shall be provided where necessary downstream of the drainage ditch in order to remove solids in the run-off before it reaches any watercourse.
- The Contractor shall carry out stabilization and appropriate bio-engineering activities such as grass and tree plantation along the entire route.
- New access roads shall avoid areas of high scenic value and protected and sensitive areas.
- Access roads shall avoid agricultural areas wherever reasonable and practical.
- The Contractor shall avoid road construction on unstable slopes and shall improve existing low-standard roads, which shall be used for the movement of construction equipment and vehicles. Community roads also used for this purpose shall be properly maintained, restored, rehabilitated or upgraded, including strengthening of the road surface and drainage system.
- Night construction activities near sensitive receptors such as residential areas, hospitals, rest homes, etc. shall be prohibited.
- The Contractor shall set all necessary warning signs, and speed bumps near sensitive receptors to reduce speed and increase traffic safety.
- For unpaved access roads, the Contractor shall spray water as needed during the dry season to reduce fugitive dust.
- If temporary bridges are needed, their design shall be reviewed by a licensed engineer and approved by ESMC and EST. These bridges can be constructed from locally available materials or the Contractor can use pre-fabricated bridges if available. All temporary bridges shall be removed after the completion of construction;
- Roads should be designed with the necessary width and slope to allow the transit of equipment and machinery in both directions without causing any delay.
- In access roads adjacent to communities, the Contractor shall inform local communities of traffic patterns and usage and provide awareness materials to schools to inform children about traffic safety.
- Once the construction of the Project is finished, all access roads shall be:
  - Given to local governments/communities;

- Decommissioned and the area restored for use in agriculture or grassing, or re-stored to its pre-construction condition; or
- Used for maintenance of the components of the Project.

#### *1.2.10.3. Clearing, Revegetation, and Restoration Management Plan*

In general, the Clearing, Revegetation and Restoration Management Plan shall include:

- Areas proposed for clearing shall be approved by ESMC and EST. Only those areas shall be cleared that are in accordance with the Plan.
- The Contractor shall identify vegetation to be preserved during the planning process and shall delineate with temporary fencing. Preserving vegetation helps to stabilize the soil, prevent erosion, protect water quality and has visual and aesthetic benefits.
- Initially, the Contractor shall perform the removal of existing vegetation to allow access for construction machinery and establish a safe workplace for employees.
- Trees and plants located in the Project area and access roads shall be marked to indicate whether they should be kept, transplanted or removed. Large or significant trees and plants with ecological value (for example, those that serve as nesting or rest areas for birds) or that have commercial value, should be preserved wherever possible.
- Transplantation of existing trees affected by the Project works shall be carried out prior to the commencement of construction.
- The Contractor shall take into account soil stability, protection of wildlife, and natural vegetation and the prevention of sedimentation of watercourses when determining the method and time to carry out the clearing.
- The removal of vegetation shall be avoided, as far as possible, in steep terrains, erosion, and landslide prone areas and ecologically sensitive sites.
- When clearing within 30 metres of permanent streams and 15 metres of intermittent streams, the Contractor shall use hand cutting or winching to remove timber.
- The Contractor shall use “brush rakes” on bulldozers to minimise disturbance of ground cover and to save as much vegetation as possible.
- The vegetation shall be removed in stages to retain topsoil as long as possible to prevent large areas from being eroded by wind and rain.
- At the reservoir, fallen vegetation shall be left in place over the cleared areas for as long as possible before flooding, so as to minimise sediment run-off.
- During excavations, it shall be ensured that damage to the root systems is avoided. Mitigation measures are also required to prevent damage to trunks and branches of trees.
- The plants and vegetation that can be used later in the process of revegetation and restoration and threatened or endangered flora identified in the areas to be cleared shall be conserved in temporary nurseries. The location of the nurseries shall be approved by EST.

- All remaining non-indigenous vegetation shall not be burned but disposed of at an EST approved landfill site.
- Successful land reclamation and re-cultivation of temporary used land are highly dependent on preservation of topsoil. Therefore, the Contractor shall remove topsoil from all areas where it shall be impacted by the construction activities, including temporary activities such as storage and stockpiling, etc.
- Stripped topsoil shall be stockpiled in locations approved by EST for later use in revegetation and reclamation, and shall be adequately protected from wind and water erosion and toxic materials.
- The Contractor shall provide a plan for timber salvage indicating the type of timber to be salvaged, methods of storage, transportation and use of timber.
- In community forests, trees shall be cut and deposited in accordance with the agreement with the affected owners.
- Trees shall be replaced in accordance with Ministry of Forest standards (2:1 ratio)
- All trees and plants deemed to have economic value to individuals or communities (for example, medicinal plants) shall be adequately compensated, according to the entitlements identified in the Land Acquisition and Livelihood Restoration Plan (LALRP) for the Project.
- Local people shall be encouraged to make use of removed vegetation such as to use as garden composts.
- The application of chemicals for vegetation clearing shall be completely avoided.
- Herbicides use in the Project shall be shown to be effective against the target vegetation species, have minimum effect on the natural environment, and be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well for personnel applying them.
- The use of chemicals and herbicides, if any, shall be approved by EST and comply with the Nepalese rules and regulation.
- The Contractor shall replace at her/his own cost the vegetation that was damaged or destroyed outside the areas approved for clearing.

#### *1.2.10.4. Landscape, and Visual Impacts*

The construction activities of the Project shall be executed in phases, particularly in those locations where severe or high landscape and visual impacts are expected.

- Construction shall be programmed in sequence so that the scale of earth moving activities and area of exposed surface can be minimised.
- Revegetation shall start at the earliest opportunity and appropriate local species of vegetation shall be used.
- Topsoil stripped from the work areas shall be used for landscaping works.

- Appropriate grass or other erosion control material (such as jute) shall be planted on high embankment slopes to recover vegetable cover and protect from erosion.
- The requirement of compensatory planting shall be included in the design and Project contract. A Master Landscaping Plan and requirements of ecological monitoring or survey during different stages of the Project shall be prepared during the design stage, which shall be implemented during construction and maintained during operation. These planning and monitoring requirements shall be integrated into the overall Reforestation Plan.
- The Contractor shall use mulch, blankets, and mats, along with native grass seeds, in situations when disturbed soil is difficult to stabilise, such as bare or exposed soil, steep slopes, (generally steeper than 1:3), slopes where the erosion potential is high, disturbed areas where plants are slow to develop, channels with flows exceeding 1 metre per second, stockpiles, and slopes adjacent to water bodies and other sensitive resources.
- Spoil heaps and excavated slopes shall be re-profiled to stable batters, and shall be vegetated to prevent erosion.
- At the highly sensitive scenic zones, the construction shall be scheduled where possible at the low tourist seasons. The construction trucks shall operate at night when possible and shall be maintained and covered when shipping bulk materials.
- The construction sites shall be surrounded with opaque fence or treelines if located at the scenic zones to avoid direct visual sights of the construction sites. Temporary fences shall be of a recessive visual appearance in both colour and form.
- Spoil disposal sites, quarries and borrow sites shall avoid environmentally sensitive areas such as nature reserves, scenic spots, forests, water source protection areas, agricultural land, etc.
- Existing roads shall be used as access road if possible to minimise the need for development of new access roads which leads to damage to the existing land form and/or greens.

## 1.2.11. Spill Prevention and Response Management Plan

Environmental emergency procedures relate primarily to the event of accidental leaks, spills, emissions and other unforeseen impacts or issues. By definition, the nature of such emergencies cannot be known. Therefore, the Contractor shall respond on a case-by-case basis to such emergencies and shall initiate event-specific measures in terms of notifications and reactions.

### *1.2.11.1. Accidental Leak/Spill of Fuel/Chemicals/Waste*

In the event that accidental leakage or spillage of diesel/chemicals/chemical wastes takes place, standard response procedures shall be followed immediately by the Contractor such as:

- The person who identified the leakage/spillage shall immediately check if anyone is injured and then inform the SEO and EST.
- The Contractor shall ensure that all injured persons, if any, are treated and assess the nature of the substance that has spilled/leaked.

- Whenever the accidents/incidents generate serious environmental pollution or potential risks resulting in serious environmental pollution problems (e.g. spillage/leakage of toxic or chemicals, large scale spillage/leakage, or spillage/leakage into the nearby water bodies which are used for irrigation / portable water), the SEO shall immediately inform the EST.
- In such cases, the Contractor shall take immediate action to prevent the spillage/leakage and divert the spilled/leaked liquid to a nearby non-sensitive area.
- The Contractor shall arrange maintenance staff with appropriate protective clothing to clean up the chemicals/chemical waste. This may be achieved through covering the area with sawdust (if the quantity of spillage/leakage is small), or sand bags (if the quantity is large); and/or using a shovel to remove the topsoil (if the spillage/leakage occurs on bare ground).
- Contract Environmental Health and Safety team shall identify the possible accidental leak/spill of fuel/chemicals/waste as per the type, nature of materials to be handled at site and detailed procedure for spill prevention and management to be prepared and awareness training on the same to be imparted to all responsible personal;
- Spilled chemicals must not be flushed to local surface drainage systems. Instead, government approved clean-up and disposal procedures shall be carried out.
- Depending on the nature and extent of the chemical spill, evacuation of the activity at the site may be considered. The Contractor/SEO has the authority to make the final decision.
- The Contractor shall prepare a report with root cause analysis for the spill or incident, remedial action taken, consequences/damage from the spill, and proposed corrective actions. The incident report shall be submitted to the EST for review and shall be maintained in the records.
- Workers shall receive training on environmental emergency procedures, so that they are fully aware of the various possible emergency situations in construction activities and the relevant emergency response procedures, as well as the danger and potential damages caused by the emergency to the environment and the people.

### 1.2.12. Spoil Management and Disposal

The Contractor shall follow the following for spoil disposal:

- Spoil disposal sites should not be located where they can cause future slides, interfere with agricultural land or any other properties, impact endangered/rare flora or sensitive areas, or cause soil from the dump to be washed into any watercourse. Garland drains need to be dug within and around the spoil disposal site.
- Spoil disposal sites shall not be located near residential areas, in unstable lands, on flood plains, and shall not affect drainage and irrigation ditches.
- Spoil disposal sites shall be constructed in locations that are not susceptible to water erosion and be designed and constructed to be stable during and subsequent to construction.

- The Contractor shall include provisions for incorporating the most appropriate stabilization techniques for each disposal site and determine the selected spoil disposal sites do not cause unwanted surface drainage.
- If the disposal site is located near a river or water course, a retaining wall and/or interception ditch or settling ponds shall be built prior to the initiation of the construction activities to prevent the deposits from being washed away by the monsoon waters. The surface runoff shall be retained and settled first before allowed discharge into the receiving water.
- The Contractor shall use excavated materials for filling purposes in the powerhouse site and remaining quantity for filling access road and regulating poundage to minimise the spoil dumps requirement.
- Spoil and excavated material generated from Project footprint shall be utilized for the following construction purposes: (1) Suitable rocks from the excavations can be used as aggregate; (2) road construction; (3) backfilling of quarries and borrow pits, and for land reclamation.
- The construction of disposal sites and transportation of spoils at night is strictly prohibited near residential areas. The sites shall be watered for dust suppression during their operation.
- The disposal sites shall be fully rehabilitated as soon as the disposal operation is completed. The rehabilitation shall include a complete cover of the site with native soil and fully landscaped/vegetated. The stability of the sites shall be inspected and measures such as retaining walls shall be constructed as needed.
- Disposal sites close to patches of natural vegetation shall be limited in size to avoid cutting vegetation and disturbing any existing wildlife.
- Access roads, if needed, to the disposal areas shall be handled in the same manner as the construction of new access roads.

### 1.2.13. Traffic Management Plan

The Contractor shall:

- Make sure construction vehicles comply with speed limits.
- Use only selected routes to the Project site, appropriately sized vehicles suitable to the class of roads in the area, and restrict loads to prevent damage to local roads and bridges used for transportation purposes as agreed upon with the ESMC.
- Maintain adequate traffic control measures throughout the duration of the construction activities. Such measures shall be subject to prior approval of the EST.
- Clearly mark pedestrian-safe access routes.
- Promote and distribute traffic safety information to local residents.
- If school children are in the vicinity, include traffic safety personnel to direct traffic during school hours.

- Ensure traffic safety at intersections, especially near sensitive areas (schools, markets, hospitals, and historical, cultural and religious places).
- Maintain a supply for traffic signs (including paint, easel, sign material, etc.), road marking, and guard rails to maintain pedestrian safety during construction.
- Use signs and flagmen for traffic control.
- Be held responsible for any damage caused to local roads and bridges due to the transportation of excessive loads, and be required to repair such damage to the approval of the ESMC.

## 1.2.14. Waste Management Plan

During the construction stage, the Contractor shall prepare a Waste Management Plan before commencement of Project work. The Plan shall include the following Sub-Plans:

### *1.2.14.1. Solid Waste*

**Disposal of Construction Debris**

The Contractor shall carry out the following activities:

- The disposal of construction debris shall be carried out only at sites previously identified and approved by EST.
- Debris generated due to the dismantling of existing structures shall be suitably reused, to the extent feasible, in the proposed construction program (e.g. as fill materials for embankments).

- Trash and debris shall not be buried within fill or backfill areas.
- All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, where necessary, shall be considered incidental to the work and should be planned and implemented by the Contractor as approved and directed by the ESMC and the EST.
- Once the work is completed, all construction -generated debris shall be removed from the site.

**Domestic Solid Waste**

The Contractor shall carry out the following activities:

- The Contractor shall submit a method statement detailing a solid waste control system (storage, provision of bins, site clean-up schedule, bin clean-out schedule, etc.) to the ESMC and the EST for approval.
- The Contractor shall ensure that all facilities are maintained in a neat and tidy condition and the site shall be kept free of litter.

- Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work, the Contractor shall provide litter bins, containers, and refuse collection facilities for later disposal.
- Solid waste may be temporarily stored on site in a designated area approved by the EST. The storage area shall have a cover to avoid direct contact with surface runoff, and be fenced off to prevent wind-blown litter. Waste storage containers shall be covered, tip-proof, weatherproof, and scavenger proof.
- The Contractor shall identify and demarcate disposal areas clearly indicating the specific materials that can be deposited in each waste container.
- Waste containers shall be strategically placed in visible locations easily identified and marked. For example, recycle, organic waste, unusable waste, hazardous waste, paper, glass, etc.
- Recyclable materials (e.g. wooden plates for trench works, steel, scaffolding material, site holding, packaging material, paper, empty cement bags and containers, glass, wood, junk), shall be collected and separated on-site from other waste. Collected recyclable material shall be re-used or sold to a waste collector for recycling.
- The Contractors shall be required to separate construction waste from domestic waste. Where possible, the construction waste shall be recycled for landfilling. If possible, the domestic waste shall be transported off site-at least once a week for disposal in covered containers or trucks, by an environmental sanitary authority or by a licensed waste collector.
- In remote locations where collection of waste is not practical, the Contractors shall be required to bury the solid waste in the designated landfill areas approved by the EST. Organic waste and kitchen wastes shall be disposed into soak pits.
- Burning solid waste in open air conditions shall be strictly prohibited.
- Random disposal of solid waste in within and outside the Project areas shall be strictly prohibited.
- Employees shall be educated on segregation of waste with demarcated bins for recyclables and perishables placed in common areas.

**Hazardous and Chemical Waste**

The Contractor shall carry out the following activities:

- All hazardous and chemical waste (including bitumen, disposable lubricating oil, mineral oil, organic solvent, acid and alkali, oil paint, etc.) shall be properly stored, handled and disposed of in accordance with the environmental standard, regulation and management policies of Nepal, and the producers of the chemicals.
- Only authorized personnel shall handle hazardous and chemical waste.
- The Contractor shall inform all employees of the emergency measures to be taken in case of spills or accidents due to improper use of these substances.

- Hazardous waste shall be stored separately from other waste and warning signs shall be posted around the site.
- The Contractor shall provide disposal certificates to the EST.
- The removal of asbestos-containing materials or other toxic substances shall be performed and disposed of by trained workers.
- Used oil and grease shall be removed from site and sold to an approved used oil recycling company.
- Under no circumstances shall the spoiling of tar or bituminous products, or any other chemical or hazardous waste be allowed on the site, over embankments, in borrow pits or any burying, water bodies, agricultural land, or sensitive areas.
- Hazardous wastes shall be kept in isolated place away from active working zone.
- Ensure proper covered shed is provided with impervious floor for storage of used oil and any other identified hazardous wastes to avoid any soil contamination;
- Unused or rejected tar or bituminous products shall be returned to the supplier's production plant.
- Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery shall be collected in holding tanks and sent back to the supplier or removed from site by a specialist oil recycling company for disposal at an approved hazardous waste site.
- Transportation of hazardous waste off the site shall be done in cooperation with an approved and authorized partner. All this material shall be regularly collected, stored and transported to disposal or reuse in accordance to the regulations of Nepal.

### 1.2.15. Wastewater Management Plan

The Contractor shall be responsible for compliance with the relevant Nepalese legislation relevant to wastewater discharges, including tunnel process water, into watercourses. Contractor shall ensure the following processes are implemented for wastewater management:

- Sewers shall be designed and installed by the Contractor in accordance with the national design code of Nepal.
- The Contractor shall submit a method statement to the EST detailing how wastewater will be collected from all wastewater generating areas, as well as storage and disposal methods. If the Contractor intends to carry out any on-site wastewater treatment, this should also be included.
- Groundwater intercepted from tunnelling area shall be collected through sump and treated prior to discharge to the river or tributaries;
- Wastewater from mixing stations, concrete batching plants, crushing plants, warehouses, material washing, and tunnel construction shall be collected into settling tanks, treated, and disposed according to national rules and regulations.

- Runoff from fuel depots/workshops/machinery washing areas, concrete batching plants, mixing station, and similar areas shall be collected into a settling basin and disposed of at a site approved by the EST.
- Domestic sewage from site office and chemical toilets for construction workers shall either be collected by a licensed waste collector or treated by on-site treatment facilities. Discharge of treated wastewater must comply with the discharge limit according to Nepalese wastewater discharge standards.
- Wastewater shall not be discharged into water bodies without treatment.
- Water usage shall be optimised by creating awareness among the labour force through construction supervisors;

#### *1.2.15.1. Site Drainage System*

The Site Drainage System Plan shall contain details regarding the following:

- A review of the preliminary site drainage design prepared during the detailed design.
- An update of the preliminary design based on the actual construction program and the site specific conditions (e.g. the geographical conditions, location of slopes and the nature of construction work).
- A detailed implementation program, approved by ESMC and EST, of the proposed drainage system shall need to be maintained.
- Detailed design including drawings, location maps, and specifications of drainage collection channels, pumping systems, temporary water pipes, and wastewater treatment facilities shall need to be prepared.
- Proposed discharge locations and treatment standards.
- As part of the design of the site drainage system, surface runoff within the construction site shall be diverted in order to avoid flushing away soil material. The runoff water shall be treated by device such as sediment trap before discharge.
- Storm water and wastewater systems shall be separated. The rainwater shall be collected through a ditch and discharge into any adjacent body of water. The maximum flow velocity for a rainwater ditch shall be determined in accordance with flood prevention measures.

### 1.2.16. Water Quality Management Plan

The Contractor shall be fully responsible for any contamination to the existing water quality within the Project site. The Contractor shall ensure that the following mitigation measures are implemented:

- Contractor shall ensure that the effluents released from the operations of the crusher and other sources will be settled into a sedimentation tank, before being released into water sources.

- An appropriate drainage system shall be established in and around the spoil and muck disposal area to ensure that it does not impact the water quality.
- Liquid waste discharged from the labour camp shall be treated as per the standards set in the regulations of Nepal.
- Washing, bathing, urination, and toilet facilities shall be provided at the worker camps to ensure there is no open urination or defecation in open areas and water bodies by the workers.
- The Contractor shall establish a solid waste management system to ensure proper collection, segregation, and disposal of solid waste so that there is no contaminated surface run off from the waste.
- Liquid waste generated on site such as lubricants, paints, cleaning chemical, and other aqueous oil-based materials, shall be collected separately, stored in a suitable storage tank (i.e. on a concrete platform with secondary containment), and disposed of in a government approved facility.
- Semi-liquid waste generated from the batching plant shall be settled in a sedimentation tank before realised into a water source.
- The Contractor shall ensure that there is no haphazard disposal of waste on site.
- Sufficient and suitable toilet facilities for workers shall be maintained for proper standards of hygiene.
- Bund shall be provided around excavated soil or loose construction material to prevent runoff to nearly water bodies.
- Storage area shall be kept away from the water course to prevent any washes away.
- All the debris resulting from construction activities shall be removed from the site on regular basis to prevent their runoff.

### 1.2.17. Rock Cuttings Management Plan

The post-earthquake revised Project design involves significant tunnelling, the rock cuttings from which have not been tested to see if they are potentially acid generating. A Rock Cuttings Management Plan will be prepared by the contractor to manage the risk of acid rock drainage. The Contractor shall ensure that the following mitigation measures are implemented:

- During the tunnelling process, the Contractor shall perform a visual geological/geotechnical evaluation of the rock type for a preliminary determination of its acid generating potential.
- Sample collection should be done from the interior of every tunnel (for example, every 500 meters) during excavation, and from every area where there is a significant change in rock type, and sent to an accredited laboratory for analysis.

- The Contractor should test the pH of the seepage water on a regular basis, and have a contingency plan in order to contain and treat the water if it exceeds the discharge standards set forth in the MP.
- Material disposal (source and final disposal location) shall be monitored and documented daily.
- Material shall be disposed off based on the visual inspection; however, all material's disposal locations shall be recorded until lab results have been obtained and the geologists initial assessment verified.
- The Contractor shall establish a cuttings disposal plan so that materials with acid drainage potential are not disposed of in areas for inert materials.
- Material with potential acid drainage shall be disposed of in areas where they are not exposed to conditions where they can generate acid leachate and where leachate can be collected and treated/disposed off appropriately.

## 1.2.18. Worker Accommodations Management Plan

### *1.2.18.1. Site Selection*

The number and exact location of worker camps is being re-evaluated after the 2015 earthquake and future susceptibility to landslides due to earthquake induced or heavy rain induced landslides.

The Contractor shall plan, design and build workers' camps and work sites to meet the following requirements:

- The Contractor shall submit for approval the designs and location of the proposed camps and work sites including details of all buildings, facilities, materials used, the construction methodology and work schedule, at least two months before the start of the construction works.
- The sites for the labour camps shall be identified keeping in mind the risk of landslides. For this purpose, the geological survey results of the Technical Team of Ministry of Federal Affairs and Local Development shall be taken into account.
- The permits and approvals shall be obtained in accordance with relevant local laws and regulations, applicable standards and environmental requirements in order to meet legal obligations for the construction of the camps and work facilities of Nepal.
- Camps, work sites, and access roads shall be located so as to avoid clearing as many major trees and vegetation as possible from the areas and to avoid important aquatic habitats. These areas shall be located to allow effective natural drainage.
- Offices and workers' camps shall be located at least 50 metres from watercourses and operated so that no pollutants enter watercourses, either overland or through groundwater seepage, especially during the rainy season. This can be achieved by recycling lubricants and

building a ditch or canal around the area with an oil separator or settling pond/oil trap at the outlet of the ditch.

- Offices and workers' camps be located at least 100 metres from residential areas and shall never be located near schools or hospitals.
- Offices and workers camps shall not be located in environmentally sensitive areas such as nature reserves, forests, water source protection areas, agricultural land, etc.
- Effective sediment and erosion control measures shall be implemented during construction of the camps and work sites in accordance with the environmental requirements of the Project especially near watercourses.
- Drainage systems, wastewater treatment and solid waste disposal shall be carried out according to Nepal national laws and regulations and the Waste Management Plan.

#### *1.2.18.2. Facilities*

- The Contractor shall provide suitable, safe, and comfortable facilities for the labour force.
- The facilities shall include dormitories, rest areas, lavatory facilities, and canteens adequate for the numbers of workers in the camps.
- The Contractor shall present the design of the facilities, to ESMC for approval and shall be in general conformance with the IFC Guidance Note on Worker Accommodations (IFC 2009).
- The Contractor shall provide adequate and suitable facilities for washing clothes and utensils for the use of contract labour employed therein.
- The Contractor shall provide recreational facilities to the workforce. Such facilities shall help reduce potential conflict and impact on the local population as the incentive to go outside the camp shall be reduced.
- Adequate power, heating, air conditioning and telecom system shall also be provided.
- The Contractor shall provide nutritious meals that shall take into account ethnical and cultural differences of the workforce.

#### *1.2.18.3. Potable Water*

- It shall be the Contractor's responsibility to carry out all the works necessary for the provision of a water supply system. A gravity flow water supply system can be constructed using water sources from the upper ridges. In any case, the water supply system shall be approved by ESMC.
- The Contractor shall verify the availability of water in the area to determine the scope of the works to be done.
- The Contractor shall supply water to the camps without impacting the water supply of neighbouring towns and villages.
- Water at sources shall be tested and treated as necessary.

- The Contractor shall provide potable water for food preparation, drinking, and bathing in all labour camps, administrative offices, medical facilities, canteens, etc. Potable water shall comply with the Nepal national standards for human consumption.
- Public taps shall be installed at appropriate locations
- The drinking water system shall be cleaned and maintained on a regular basis by the Contractor.

#### *1.2.18.4. Sanitary Facilities*

- Separate and adequate toilet and bathing facilities shall be provided for the use of male and female workers. Notices shall be displayed outside each block of latrines and urinals, in the language understood by the majority of the workers stating "For Men Only" or "For Women Only" as the case may be.
- Toilet and bathing facilities shall be provided with adequate supply of running water, soap, toilet paper, and drainage.
- Such facilities shall be conveniently accessible and shall be kept in a clean and hygienic condition on a regular basis. Latrines shall also be constructed in areas that are likely to be visited frequently by the construction workers.
- The Contractor shall provide portable toilets in all construction sites in the following scale: one latrine for maximum 15 women and one latrine for maximum 15 men.
- A dry system of sewage disposal, such as ventilated improved pit latrine, shall be appropriate for the Project area. It is easy to construct and does not require a flushing system. The latrines shall be located at a distance of at least 10 metres away from residential areas and at least 50 metres away from water sources.
- If septic tank systems are used for any residential labour camps, the seepage pits shall be located at a safe distance from water sources to avoid contaminating them. Wastewater shall not be disposed into water bodies without treatment.
- The wastewater treatment plants shall be designed, installed, operated and maintained in accordance with the regulations and specifications of Nepal.

#### *1.2.18.5. Medical Facilities*

The Contractor shall establish a medical centre located at the main construction camp for the diagnosis and treatment of communicable diseases, simple medical complaints, and the handling of medical emergencies and accidents, prior to transportation to the hospital. The medical centre shall have:

- A 7 to 10 bed health facility fully equipped to provide emergency medical care to stabilize emergency patients before they can be referred to district or provincial hospital.
- Essential medical equipment for the centre to provide emergency care.
- Short term care of patients requiring hospitalization.

- Isolation room (one bed) for any infectious disease patient (in epidemic situations, district and provincial facilities shall have to be used).
- An ambulance or an appropriate motor vehicle to transport patients to the nearest health care centre or hospital.
- One medical officer, one trained nurse of senior level, two medical auxiliaries, and one laboratory technician (who may be also responsible for monitoring water quality in construction camp areas).

In addition, the Contractor shall ensure the following:

- The smaller construction camps shall have first aid posts staffed by either a trained nurse or a locally trained personnel, as required.
- All biomedical waste from the medical centre and the first aid posts shall be packed in containers designated for that purpose and discarded according to the rules and regulations established for the disposal of medical waste.
- All the facilities shall be provided with first aid kits that are regularly checked for medicine expiry, etc.

#### *1.2.18.6. Maintenance of Camp Facilities*

The Contractor shall implement the following measures to ensure that the construction camp and its facilities shall be organized and maintained to acceptable and appropriate standards:

- Meals and drinks shall be provided in the areas designated for this purpose (canteens) and during the established schedule. Cooking or preparation of food shall be prohibited in accommodation quarters.
- Designated rest times and recreational hours shall be established.
- Appropriate areas shall be designated for smoking. NO SMOKING signs shall be placed in areas where smoking is prohibited, for example, in the dormitories and medical facilities.
- The dormitories, medical and health facilities as well as canteens, kitchens, administrative offices, and other facilities shall be kept clean and free of debris, solid wastes and contaminants.
- The latrines and urinals shall be adequately lighted and shall be maintained in a clean sanitary condition at all times.
- Reserve water shall be kept in drums or barrels in or near the latrines and urinals.
- The Contractor shall establish a grievance redressal mechanism to receive and respond to complaints from the construction camp residents regarding the maintenance of facilities and services provided (food, medical care, recreation, etc.). This mechanism shall be in compliance to the principles identified in the GRM for the Project

### *1.2.18.7. Security*

Some security measures shall be put into place to ensure the safe and secure running of the camp and its residents. Some of these security measures include:

- Adequate, day-time night-time lighting shall be provided.
- The construction site shall be properly fenced and guarded to restrict access to public. The perimeter security fence shall be at least 1.8 metres in height and constructed from appropriate materials. The type of fence and the materials used must be approved by ESMC.
- Access to the camp shall be limited to the residing workforce, construction camp employees, and those visiting personnel on business purposes.
- Visitors and relatives of the camp residents must obtain written permission to enter the camp. This permit shall be approved by the construction camp manager.
- Guided tours shall be arranged whenever required to inform people about construction activities of the Project to avoid local people from gathering and crowding near the construction sites.
- Camps shall have emergency equipment such as first-aid kits, flashlights, firefighting equipment, portable fire extinguishers, audible warning devices such as a siren, water rescue equipment, emergency vehicle and phone on site at all times, with workers well informed about the proper use of such equipment.

## 1.2.19. Stockpiles, Quarries, and Borrow Pits Management Plan

The Contractor shall prepare an overall Stockpiles, Quarries and Borrow Pits Management Plan for the total work. Operation of a new borrowing area, on land, in a river, or in an existing area, shall be subject to prior approval by ESMC and the operation shall cease if so instructed by the EST. Stockpiles, Quarries and borrow pits shall be prohibited where they might interfere with the natural or designed drainage patterns. River locations shall be prohibited if they might undermine or damage the river banks, or carry too much fine material downstream. Rock or gravel taken from a river shall be limited to the depth equal to one-tenth of the width of the river at any one location, and not disrupt the river flow, or damage or undermine the river banks. The Plan shall include:

- A map showing the extent of the area to be developed.
- A method statement defining the proposed working methods shall be developed and approved by EST/ESMC.
- The proposed access and haulage routes between the borrow pits and the destination for the extracted materials shall be developed and approved by EST/ESMC.
- A justification for the quantities of materials to be extracted, an estimation of the waste material to be generated and disposal details for such waste materials.
- Details of the drainage system (ditches, culverts, etc.) to be submitted to EST.
- Details of the measures taken to minimise the borrow pit areas and their visual impact on the surrounding area.
- Details of the measures to be taken for the long-term rehabilitation of the borrow pit areas to avoid situations that could constitute a threat to health and safety and cause environmental pollution.

In general terms, the Contractor shall:

- Identify and demarcate locations for stockpiles and borrow pits, ensuring that they are 50 metres away from critical areas such as steep slopes, erosion-prone soils, and areas that drain directly into sensitive water bodies.
- Not locate borrow pits also close to roads.
- Locate stockpiles, quarries and borrow pits in non-productive land to the maximum extent possible and as approved by EST.
- Locate stockpiles, quarries, and borrow pits so as to avoid sensitive areas such as nature reserves, scenic spots, forest parks, water source protection areas, woodlands, or grasslands, etc.
- Locate stockpiles, quarries, and borrow pits in non-productive land to the maximum extent possible, and avoid agricultural land
- Limit extraction of material to approved quantity and demarcated borrow pits area.

- Stockpile topsoil when first opening the borrow pit. After all usable borrow has been removed, the previously stockpiled topsoil shall be spread back over the borrow area and graded to a smooth, uniform surface, sloped to drain. On steep slopes, benches or terraces shall be used to help control erosion.
- Stabilize and revegetate excess overburden. Wherever appropriate, organic debris and overburden shall be spread over the disturbed site to promote revegetation. Natural vegetation is preferred to the extent practicable.
- Keep existing drainage channels in areas affected by the operation free of overburden. These shall be cleaned regularly.
- Ensure that all borrow pits used are left in a trim and tidy condition with stable side slopes, re-establishment of vegetation, restoration of natural water courses, and avoidance of flooding of the excavated areas wherever possible so no stagnant water bodies are created which could breed mosquitoes.
- When the borrow pits or the local depressions created by the construction activities cannot be refilled or reasonably drained, consult with the local community to determine their preference for reuse such as fish farming or other community purposes.
- Reinstate areas affected by stockpiling to the satisfaction of EST.

## 1.2.20. Maintenance Management Plan

### *1.2.20.1. Maintenance of Site during Construction*

The Contractor shall carry out the following activities:

- Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for debris.
- Collect construction, demolition, clearing, grubbing debris, and other trash weekly for disposal off–site. No on-site burning shall be permitted.
- Maintain silt fence and other temporary erosion and sediment controls in working order throughout the Project.
- Remove and properly dispose of excess sediment behind silt fences and Bio Rolls of when sediments reach one-third the height of the structure.
- Maintain construction entrances/exits daily.
- Remove all remaining temporary and accumulated silt fences 30 days after site has undergone final stabilization.
- In the event any debris or silt from the sites is deposited on adjacent land, immediately remove debris or silt and restore the affected area to its original state to the satisfaction of the EST.

### *1.2.20.2. Maintenance of Equipment during Construction Phase*

To ensure the maintenance of equipment during construction, the Contractor shall:

- Identify and demarcate equipment maintenance areas (50 metres from rivers, streams, lakes, or wetlands). Fuel storage shall be located in proper areas approved by EST.
- Ensure that all instruments, machines, and construction equipment meet quality standards before they are put into use.
- Maintain the equipment and machinery used for earthmoving activities s in very good operating conditions, and periodically revises them for controlling emissions and avoiding possible mechanicals faults during operation that could lead to oil, lubricant, or fuel leaks.
- Ensure that all equipment maintenance activities, including oil changes, are conducted within demarcated maintenance areas.
- Never dispose spent oils on the ground, in water courses, drainage canals or in sewer systems.
- Dispose of all spills and collected petroleum products in accordance with standard environmental procedures/guidelines. Fuel storage and refilling areas shall be located at least 50 metres from all cross-drainage structures and important water bodies or as directed by the EST.
- Maintain and wash vehicles and other transport equipment only at sites having impermeable protective layers and collection system for oils, lubricants, detergents, solvents. The use of solvents and detergents shall be avoided to a minimum.

# 2. OPERATION ESMMP

## 2.1. KEY HIGHLIGHTS OF OPERATION PHASE MITIGATION MEASURES

This section describes the requirements for Operational Phase ESMMP. Table 2.1-1 lists the Management Plans required for this phase, which should be prepared by NWEDC or its facility operator. This operational phase ESMMP shall be implemented in addition to, and in keeping with, the other management plans prepared for the Project and the requirements of the applicable reference framework.

## Table 2.1-1: Operation Phase ESMMP

| S.N | Resource area | Mitigation /Safeguard Measures | Responsibility | Timing |
|---|---|---|---|---|
| 1 | Land and soil | Routes for movement of Operations and Maintenance (O&M) vehicles shall be in designated areas to avoid soil compaction in other areas. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Ensure hazardous waste (used oil, transformer oil, and oil soaked cloths) is properly labelled, stored onsite at a location provided with impervious surface, shed and secondary containment system, and ultimately transported offsite to an approved disposal facility. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Lubricants, oils, grease, chemical shall be stored at designated area with impervious surface and a secondary containment system. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Solid waste generate from the powerhouse, dam, and accommodations areas shall be collected through proper collection system and stored at designated locations. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Maintenance of vehicles, machineries and equipment's shall be carried out only at designated area. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Random disposal of waste shall not be allowed. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Appropriate training shall be conducted for all workers responsible for handling hazardous waste. | NWEDC/O&M contractor | Quarterly/half yearly |
| | | Sludge generated from a wastewater treatment plant shall be used in garden and landscaping. | NWEDC/O&M contractor | Regularly during operation phase |
| 2 | Water resources and quality | Regular inspection for identification of water leakages and preventing waste of water from water supply tankers. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Recycle/reuse water to the extent possible. | NWEDC/O&M contractor | Regularly during operation phase |
| | | No treated /raw sewage shall be discharged to any waterbodies. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Spill Prevention and Response Plan shall be implemented for immediate cleaning of spills and leakages. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Manpower engaged during O&M phase onsite shall be sensitised about water conservation and encouraged for optimal use of water. | NWEDC/O&M contractor | Quarterly/half yearly |
| | | Employees shall be given training towards proactive use of designated areas/bins for waste disposal and encouraged for use of toilets. Open defecation and random disposal of sewage will be strictly restricted. | NWEDC/O&M contractor | Quarterly/half yearly |
| | | Provision of appropriate drainage shall be implemented along all access roads, quarry site, soil stockpiles and other construction sites. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Wastewater treatment plant shall be provided for treatment and disposal of wastewater generated from accommodations and office and PH area. | NWEDC/O&M contractor | At the beginning of the operations phase |

| S.N | Resource area | Mitigation /Safeguard Measures | Responsibility | Timing |
|---|---|---|---|---|
| | | Efficient operation of wastewater treatment plant shall be ensured. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Regular monitoring of treated wastewater quality. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Provision of oil and grease trap at vehicle, machinery and equipment maintenance area and regular upkeep and removal. | NWEDC/O&M contractor | Monthly |
| | | Monitor success of tree planting to compensation for Project tree clearing. | NWEDC/O&M contractor | Monthly |
| 3 | Reservoir water quality | Regular monitoring of reservoir water quality. | NWEDC/O&M contractor | Monthly |
| | | Removal of dead vegetation or debris on regular basis. | NWEDC/O&M contractor | During monsoon /snow melt |
| 4 | Hydrology | Installation of flow measuring gauges (meter with recording provisions) both electronic and manual measurement basis to measure E flow. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Controlled flushing of sediment from reservoir and desanders. | NWEDC/O&M contractor | As needed |
| 5 | Air Emission | Vehicles used in O&M Phase shall be regularly maintained and idling time reduced to minimise emissions. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Vehicle emitting significant black smoke in their exhausts shall be serviced/ replaced. | NWEDC/O&M contractor | As and when required |
| | | Regular maintenance of vehicles shall be undertaken. | NWEDC/O&M contractor | As per the manufacturer guideline |
| 6 | Noise | Restriction on unnecessary honking. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Use of Personal Protective Equipment (PPE) by all the employees to minimise adverse impact of occupational noise generation. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Use of rubber padding underneath high noise and vibration generating machines. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Employees working within powerhouse shall be provided with earplugs and other required PPE. | NWEDC/O&M contractor | Regularly during operation phase |
| 7 | Occupational Health and Safety | Alternating work schedule to avoid continuous exposure of workers to higher noise levels. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Appropriate PPEs and fall protection equipment shall be used by all employees in keeping with their work profile. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Cranes and other lifting equipment shall be operated by trained and authorised persons. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Training to the workers on climbing techniques, and rescue of fall-arrested workers. | NWEDC/O&M contractor | Regularly during operation phase |

| S.N | Resource area | Mitigation /Safeguard Measures | Responsibility | Timing |
|---|---|---|---|---|
| | | Use of appropriate tool bag for raising or lowing tools to workers on elevated structures. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Lifting devices, including equipment, slings, ropes, chains, and straps, shall be inspected, certified, and labelled to confirm their weight capacities. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Drinking water to the workers at residential accommodations and other facilities shall be supplied after maintaining drinking water quality norms (Nepal drinking water quality standard and WHO drinking water quality standards). | NWEDC/O&M contractor | Regularly during operation phase |
| | | Adequate sanitary facilities shall be provided to prevent any health ailments and to meet the emergency needs. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Induction training for new employees shall be conducted prior to starting the work at site. | NWEDC/O&M contractor | At the time of Joining |
| | | Tunnel and other underground area shall be properly illuminated. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Provision of all the PPE's such as safety boots, helmets, goggles, illumination jacket, ear muffs (plugs) etc. shall be made available to the employees and regular check shall be undertaken to ensure their use. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Details of health and safety related incidence shall be recorded and maintained. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Lock out and Tag out procedure shall be developed and permit system shall be adopted. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Sufficient number of employees shall be provided with first aid training to respond emergency | NWEDC/O&M contractor | At the beginning and thereafter annually |
| | | Periodic review and update of Emergency Response Plan (ERP). | NWEDC/O&M contractor | annually |
| | | Proper marking shall be made for identification of locations of flammable storages. | NWEDC/O&M contractor | Regularly during operation phase |

| S.N | Resource area | Mitigation /Safeguard Measures | Responsibility | Timing |
|---|---|---|---|---|
| 8 | Natural Disasters and Other Emergencies | During operation phase, potential risks will be mainly related to accidental fire from leaks of flammable material from tanks, valves, maintenance activities by working at height, and movement of traffic. Ensure adequate Fire Fighting system is established onsite prior to commissioning of the Project as per the Fire Fighting Plan covering the following aspects:<br>• Fire Prevention Measure and Systems<br>• Signage<br>• Fire Detection and alarm System<br>• Fire Fighting System and devices<br>• Annually, update Emergency Response Plan (and ensure organization available for its implementation.<br>• The ERP covers following responses to:<br>• Flash floods or inundation<br>• Earthquake<br>• Landslide<br>• Spill/leak/fire of fuel or toxic gas<br>• Electrical Emergency<br>• Medical emergency<br>• Bomb threats<br>• Road accidents<br>• Responsibilities of Emergency Response Co-ordination Team members shall be provided in the ERP | NWEDC/O&M contractor | Half yearly/annually |
| | | Implementation of emergency response plan in case of flash flood, cloud burst etc. | NWEDC/O&M contractor | Monsoon season/snow melt |
| | | Warning system on water level fluctuation shall be installed at major locations/communities downstream of the proposed dam site. | NWEDC/O&M contractor | At the beginning of the operations phase with regular monitoring and physical verification of the functioning of the system |
| 9 | Aquatic Resources | Implement the environmental flow (Eflow) Management Plan | NWEDC/O&M contractor | Regularly through the operation phase through Installation of flow measuring gauges (meter with recording provisions) both electronic and manual measurement basis to measure E flow. |

| S.N | Resource area | Mitigation /Safeguard Measures | Responsibility | Timing |
|---|---|---|---|---|
| 10 | Terrestrial Resources | • Transmission lines.<br>• Regular checking of the vacuums or holes in the towers to avoid nesting by the birds.<br>• Monthly monitoring of bird carcasses electrocuted and records of any threatened or migratory species maintained. Any spurt in mortality shall need consideration of design modifications to reduce mortality. | NEWDC/O&M contractor | Once a week during breeding season for nesting in vacuums or holes.<br>Monthly monitoring for electrocution of threatened species |
| | | • Signage and speed humps shall be used in areas where wildlife crossing is likely.<br>• Training of vehicle drivers regarding the driving risks through biodiversity sensitive areas and along remote roads.<br>• Any spurt of in mortality shall require review of location of signage and training efficacy of drivers. | NEWDC/O&M contractor | All incidences of road kills to be recorded routinely |
| | | • Awareness raising among site management staff and O&M contractors to desist from extracting or exploiting floral and faunal resources within construction areas or LNP. Access will not be permitted in the LNP and this needs to be communicated to workers and staff.<br>• Include terms in contracts with O&M contractors indicating that exploitation of biodiversity resources will result in penal action. | NEWDC/O&M contractor | Awareness raising to be carried out once in 6 months and for all new staff who join the Project |
| 11 | Labour | Ensure adequate labour accommodation in keeping with the requirements of the applicable reference framework. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Provide adequate training to the workers in the Project, especially in terms of interaction with the local community. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Implement a code of conduct for the workers in the Project. | NWEDC/O&M contractor | At the beginning |
| | | Ensure access to a grievance redressal mechanism for the workers. | NWEDC/O&M contractor | Regularly during operation phase |
| 12 | Stakeholder Engagement | Ensure access to a grievance redressal mechanism for the local community. | NWEDC | Regularly during operation phase |
| | | Ensure adequate and timely disclosure of information to the local community in terms of Project activities and available opportunities, in keeping with Stakeholder Engagement Plan formulated for the Project. | NWEDC | Regularly during operation phase |
| 13 | Grievance Mechanism | In order to manage and address any complaints, queries or issues raised by the community, the Project team will need to maintain and implement the Grievance Redress Mechanism. The same will need to be communicated to the nearby settlements. | Project proponent | During operation phase |

| S.N | Resource area | Mitigation /Safeguard Measures | Responsibility | Timing |
|---|---|---|---|---|
| 14 | Future Land Procurement | Avoid culturally and religiously significant sites for the locals. | NWEDC | At the time of land identification |
| | | In case of any additional land requirement, undertake land procurement in keeping with the principles identified in the Land Acquisition and Livelihood Restoration Plan. | NWEDC | At the time of land procurement |
| | | In case of any additional land requirement, ensure proper documentation of consultation with impacted communities for future land requirements and agree on an acceptable option in terms of managing impacted sites. | NWEDC | At the time of land procurement |
| | | Implement a Chance Finds Protocol that is widely socialized and understood by the Project contractors. | NWEDC/O&M contractor | Regularly during operation phase |
| | | Ensure access to a grievance redressal mechanism for the local community | NWEDC | At the time of land procurement |
| 15 | Traffic | Contractors shall ensure that the transport of labour and material of maintenance is planned so that it does not increase traffic on the existing roads. | Contractor | Regularly during operation phase |
| | | Signs and warning signs shall be placed properly. | Contractor | Regularly during operation phase |
| | | Use appropriate safe and decent transportation mode to transport workers to Project sites, during the operation phase. Labourers shall be provided with transportation in vehicles equipped with canopy (closed vehicles) and seating facility. | Contractor | Regularly during operation phase |
| | | The contractor shall undertake to increase the level of public awareness prior to commencement of the plant operation to advise all road users of the impending construction work, the time taken for such work, and the road conditions likely to be encountered. | Contractor | Regularly during operation phase |
| 16 | Community Health and Safety | Contractor will ensure to display warning signs in the areas where there is high risk due to electric works etc. | Contractor | Regularly during operation phase |
| | | Security personnel will be posted around the site to ensure that there are no unauthorised personnel within the Project site. | Contractor | Regularly during operation phase |
| | | Any trainings, workshop, skill development and vocational program as proposed in the Nepal employment and Skill Training plan shall be implemented. | Project proponent and Contractor | During operation phase |

# 3. GENERAL ESMMP

## 3.1. BIODIVERSITY MANAGEMENT PLAN

### 3.1.1. Purpose

Where biodiversity values of importance to conservation are associated with a project site or its AoI, the preparation of a Biodiversity Management Plan (BMP) provides a useful means to facilitate implementation of a project's mitigation and management strategy. The development of a BMP might be required under a company's own biodiversity policy, or International Finance Institutions (IFI or "Lenders") might request a BMP to help document compliance with Lender standards. Other parties, such as government agencies, conservation organizations or Affected Communities, might also be interested in the development of a BMP to address a specific topic of concern.

This BMP has been prepared to support the corporate commitments of the Nepal Water and Energy Development Company (NWEDC) for conserving aquatic and terrestrial biodiversity in the Trishuli River Basin.

### 3.1.2. IFC Performance Standard 6

IFC applies the Performance Standards (PS) to manage social and environmental risks and impacts and to enhance development opportunities in its private sector financing. IFC PS 6, Biodiversity Conservation and Sustainable Management of Living Natural Resources, aims at protecting and conserving biodiversity, the variety of life in all its forms, including genetic, species, and ecosystem diversity and its ability to change and evolve. This PS addresses how projects will avoid or mitigate threats to biodiversity arising from their construction and operations as well as incorporate sustainable management of renewable natural resources.

IFC PS6 categorizes habitats as follows:

- Modified Habitat: are areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition.
- Natural Habitat: are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition.
- Critical Habitat: are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.

#### *3.1.2.1. Objectives of The BMP and Compliance to IFC PS6.*

In accordance to PS 6, Projects affecting areas of Natural Habitat, the client will not significantly convert or degrade Natural Habitats, unless all of the following are demonstrated:

- No other viable alternatives within the region exist for development of the project on Modified Habitat;
- Consultation has established the views of stakeholders, including Affected Communities, with respect to the extent of conversion and degradation; and
- Any conversion or degradation is mitigated according to the mitigation hierarchy

Furthermore in areas of Natural Habitat, mitigation measures will be designed to achieve no net loss of biodiversity where feasible. Appropriate actions include:

- Avoiding impacts on biodiversity through the identification and protection of set-asides
- Implementing measures to minimize habitat fragmentation, such as biological corridors;
- Restoring habitats during operations and/or after operations; and
- Implementing biodiversity offsets

The BMP initially classifies all habitats into modified, natural or critical by assessing the prevailing state of habitat modification by human use and presence of threatened, endemic or migratory species. For Modified Habitat, the BMP discusses minimization of impacts. For Natural Habitat, the BMP assesses whether any project alternatives are possible and whether stakeholders have been adequately consulted. It subsequently discusses how the mitigation hierarchy has been used to minimize impacts or compensate residual impacts through biodiversity offsets. The Project does not directly affect Critical Habitat, but the BMP describes measures to avoid or minimize indirect impacts on Critical Habitat.

### 3.1.3. Impacts on Terrestrial Habitat and its Mitigation

#### *3.1.3.1. Terrestrial Habitats Classification*

The Project will directly impact approximately 108 hectares (ha) of land as summarized in Table 3.1.

**Table 3.1-1: Project Effects on Land Cover and IFC Habitat Classifications**

| Land Cover[a] | Area (ha)[a] | Natural Habitat | Modified Habitat | Critical Habitat |
|---|---|---|---|---|
| Forest | 80.9 | 2.6 | 78.3 | 0 |
| Cultivated Land | 20.6 | 0 | 20.6 | 0 |
| Cliff | 0.8 | 0 | 0.8 | 0 |
| River Banks (bagar) | 5.5 | 0 | 5.5 | 0 |
| Total | 107.8 | 2.6 | 105.2 | 0 |

The Project will directly impact biodiversity by the loss of vegetation and habitat and injuring wildlife; and indirectly by increased human activity (i.e. influx of workers, noise, vehicular

traffic, potential for illegal hunting and plant collection) and the loss of habitat connectivity. The transmission line will pose electrocution threats to bird species.

### Potential Impacts to Natural Habitat

Project construction and operation will directly impact approximately 2.6 ha of Natural Habitat, as defined in the International Finance Corporation's Performance Standards. This small area is located on the east bank of the Trishuli River near the proposed dam/headworks and is part of Langtang National Park (LNP).

The small impact to Natural Habitat associated with the Project cannot be avoided or further minimized because of engineering constraints. In accordance with IFC PSs, NWEDC is required to mitigate this residual impact to achieve no net loss. NWEDC will achieve no net loss by working with the LNP to identify a suitable area of cleared/degraded land and reforest it using a 1:2 ratio. Species used will maintain parity with the impacted area. Additionally, NWEDC will enhance riparian vegetation by developing a Riparian Vegetation Restoration Program which describes existing conditions, restoration design, and monitoring and maintenance activities.

### Potential Impacts on Modified Habitat

The Project will impact approximately 105.2 ha of Modified Habitat, as defined by the IFC PSs. Modified terrestrial habitats on the west bank of the Trishuli River, where most of the Project components will be built, consist mostly of forest under management by local communities (78.6 ha) and agricultural or marginal lands. The forests are highly intervened and degraded by human activity (e.g. extraction of forests products, cattle grazing). Much of this land will only be temporarily disturbed, and NWEDC will stabilize and revegetate approximately 76 ha with only approximately 31 ha permanently converted to Project facilities and the reservoir.

### Potential Impacts to Critical Habitat

According to the IFC Performance Standard 6, Critical Habitat is defined as "areas with high biodiversity value, including (1) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes (*Error! Reference source not found.*). We assess the potential presence of Critical Habitat below.

*Species Criteria*

There are no IUCN Critically Endangered, Endangered, or endemic flora or fauna species within the Project AoI, so no Critical Habitat is identified based on IUCN listed species. There are, however, some fauna species that are endangered or endemic in Nepal, which are evaluated below.

- Isisbill – is classified as Endangered in Nepal and is thereby assessed under Criteria 1 Tier 2 e. The species is widely distributed in Southern Central Asia and numbers in the

Modified Habitat of the project's AoI are not nationally or regionally significant. The Critical Habitat criteria are therefore not triggered.

- Assamese monkey *(Macaca assamese)* - is endemic to Nepal and relegated to a single population there. The Nepal population of the species is threatened due to its restricted distribution of less than 2,200 square kilometres extent of occurrence and 914 square kilometres areas of occupancy and continuing decline in area, extent and quality of habitat, the number of locations and in the number of mature individuals. Given its restricted extent of occurrence, threats on its population and habitat, and small numbers in fragmented patches, the Nepal population of this macaque is categorized as Endangered (Boonratana et al. 2008). The species will be affected by habitat loss within the Modified Habitat. However macaque species are highly adaptable and will either move to areas (if competition from other neighbouring troops is limited) or adapt within the cleared area which will be human dominated in the future. Given the wide range of the species in South and Southeast Asia, and that the numbers in the Modified Habitat in the Project's AoI are not nationally or regionally significant, Criteria 1 Tier 2 e is not triggered.
- Asiatic black bear (*Ursus thibetanus*) - is classified as EN in Nepal and is thereby assessed under Criteria 1 Tier 2 e. The species is widely distributed in South and Southeast Asia and numbers in the Modified Habitat of the project's AoI are not nationally or regionally significant. The Asiatic black bear is unlikely to be found in the Modified Habitats which are to be cleared, preferring the more forested and remote areas in the LNP. This criterion is therefore not triggered.
- Smooth coated otter (*Lutrogale perspicillata*) – is classified as EN in Nepal, but is largely confined to protected areas in the Terai. This aquatic species prefers slower moving rivers with deeper pools and is more likely in downstream areas. It is unlikely to be present in the project area (Jnawali et al. 2011) in any significant numbers and Criteria 1 Tier 2 e is not triggered.

*Protected Areas Criteria*

LNP is an IUCN Category II protected area (Bhugu et al. 2007) and is recognized as an Important Bird and Biodiversity Area (Birdlife 2013). It is not a World Heritage Site or a Biosphere Reserve. IFC PS6 states that internationally and/or nationally recognized areas of high biodiversity value will likely qualify as Critical Habitat; examples include the following:

- Areas that meet the criteria of the IUCN's Protected Area Management Categories Ia, Ib and II, although areas that meet criteria for Management Categories III-VI may also qualify depending on the biodiversity values inherent to those sites.
- The majority of Key Biodiversity Areas (KBAs), which encompass inter alia Ramsar Sites, Important Bird Areas (IBA), Important Plant Areas (IPA), and Alliance for Zero Extinction Sites (AZE).

Therefore, the LNP is considered Critical Habitat. The LNP, however, is divided into a "core area" and a "buffer zone," which is technically outside the park, but within the park boundary. Much of the buffer zone is developed with roads, villages, and farmland. In fact, more than 80,000 people were estimated to live within the park in 2012 (Langtang National Park and Buffer Zone Management Plan 2012). The buffer zone lands need to be assessed on a case-by-case basis as to whether they would qualify as Critical Habitat.

The Project will disturb approximately 6.77 ha of land within the LNP boundary—2.61 ha for construction of the dam and 4.16 ha for the construction of the new worker camp (2.8 ha owned by the government and 1.36 ha privately owned). The new worker camp needs to be relocated from the previously approved Mailung School site for safety reasons in the aftermath of the 2015 earthquake.

Both sites (i.e. the entire 6.77 ha) are designated buffer-zone land along the edge of, but still within, the LNP boundary (Langtang National Park and Buffer Zone Management Plan 2012). The LNP Management Plan recognizes the potential for development of hydroelectric projects near the LNP, specifically mentioning the Upper Trishuli Project, and encourages use of alternative energy as a buffer zone objective.

The 2.61-ha site required for the dam is forested and identified above as Natural Habitat. This site, however, is designed buffer-zone land, which is isolated from the remainder of the LNP by steep cliffs. It does not provide habitat of significant importance to Critically Endangered or Endangered, endemic, restricted range, or restricted-range species; does not support globally significant concentrations of migratory or congregatory species; is not a highly threatened or unique ecosystem; and is not associated with any key evolutionary processes. Therefore, we do not consider this site to be Critical Habitat.

Although within the LNP, the 4.16-ha site required for the worker camp is designated buffer zone land, is also disturbed and not forested, and is isolated from the remainder of LNP by the Betrawoti-Mailung-Syabrubesi Road. As with the 2.61-ha parcel, this site also does not meet any of the applicable criteria, so is not considered Critical Habitat.

Although these sites are not considered Critical Habitat and the Project will not directly impact any Critical Habitat, there is the potential for the Project to indirectly impact core areas of the LNP, which are considered Critical Habitat. This is less of a risk for the 2.61-ha site because the camp for the dam construction workers is on the west bank, with the Trishuli River and the extremely steep slopes on the east bank serving as a barrier limiting access to the LNP core areas.

The 4.16-ha site near the powerhouse, however, poses a greater risk because it will be used as the worker camp, and is located on the east bank of the river with roads providing easy access to the LNP's core areas. The introduction of this workforce in close proximity of Critical Habitat presents several risks, including illegal hunting/poaching and the collection/trade of natural or wildlife products.

NWEDC has agreed to adopt the following measures to minimise indirect Project impact on LNP, Critical Habitat, as well as impacts to Community Forests:

## Table 3.1-2: BMP Mitigation Measures

| Mitigation Measures | Responsibility |
|---|---|
| Ensure compliance with all applicable NWEDC commitments and the Biodiversity Management Plans are included in the EPC contracts | NWEDC |
| Demarcate in the field the approved limits of clearing to ensure no additional Natural Habitat or Community Forest is disturbed. | EPC |
| Install fencing around the dam site to prevent unauthorized worker access to LNG forest. | EPC |
| Collect and store topsoil for use in restoration. | EPC |
| Adopt a Worker Code of Conduct that prohibits unauthorized entrance to LNP or Community Forests; illegal hunting, fishing, and poaching; and the collection/trade of natural or wildlife products. Clearly indicate that these activities could result in the termination of their employment. | EPC |
| Provide awareness training to construction workers, operations and maintenance (O&M) staff, and site management employees regarding the elements of the Worker Code of Conduct. | EPC |
| Prohibit use of wildlife meat at the worker camps. | EPC |
| Provide staff to monitor/patrol activities in the LNG buffer zone at the dam site and powerhouse worker camp to ensure no illegal activity by construction workers. | EPC |
| Use signage and speed humps in areas where wildlife crossing is likely. | EPC |
| Train vehicle drivers regarding the driving risks through biodiversity sensitive areas and along remote roads. | EPC |
| Stabilize and rehabilitate/reforest temporarily disturbed areas, especially community forest. In accordance with the Nepal Ministry of Forest requirements, NWEDC will compensate for the loss of trees on a 2:1 basis in accordance with its PDA agreement. | EPC |
| Visually monitor number of trees felled within 1 km of dam, access road and switchyard as well as baseline plots, as part of a Biodiversity Evauation and Monitoring Program (BEMP) to be developed | NWEDC |
| Provide funding to LNP to recruit additional staff to monitor UT-1 construction activities | NWEDC |
| In accordance with Nepal Ministry of Forest requirements, as mentioned earlier, NWEDC will acquire, reforest, and donate at least 2.6 ha of similar land to be annexed into the LNP to offset the Project's permanent acquisition of parklands. | NWEDC |
| Provide funding to local forest user groups for monitoring and surveillance to protect wildlife | NWEDC |
| Protect the LNP from further losses of land due to shifting river course and from easy access to the park though dewatered zones during operation | NWEDC/ECP |
| Limiting disturbance and educating construction workers on steps to prevent damage to the park and/or its wildlife | NWEDC/EPC |
| Enhance riparian vegetation by developing a Riparian Vegetation Restoration Program which describes existing conditions, restoration design, and monitoring and maintenance activities | NWEDC |
| Regular ecological monitoring on the fauna, flora and specific habitats within the impact areas. | NWEDC |
| Raise the transmission poles with suspended insulators in order to reduce the electrocution of bird species or fixing insulated caps made of plastic. | EPC |
| Require bird-safe strain poles with insulating chains of at least 60 cm length. | EPC |
| Check for vacuums or holes in the towers to avoid nesting by any of the birds; | EPC |
| Monitor bird carcasses electrocuted on a monthly basis and record any threatened or migratory species observed. Any spurt in mortality will need consideration of design modifications to reduce mortality | NWEDC |

Considering the relatively minor impacts on terrestrial biodiversity, and implementation of these mitigation measures, NWEDC should achieve no less loss of terrestrial Natural Habitat at the UT-1 Project, and should not result in any significant impacts to terrestrial habitat.

## 3.1.4. Aquatic Biodiversity

The Project will affect aquatic habitat and fish differently upstream of the dam, in the diversion reach, and downstream of the powerhouse. This section summarizes the types of impacts that will occur in each of these river segments and proposed mitigation and management measures.

### *3.1.4.1. Upstream of the Dam*

The Project should have negligible impacts on aquatic habitat upstream of the reservoir. No in-water construction will occur upstream of the dam that would modify riverine habitat, with the exception of the temporary coffer dam using to divert water around dam construction. The Project dam will permanently convert riverine habitat to lacustrine (lake) habitat, which results in changes in water depths and velocities, light penetration, physical water quality (e.g. temperature), sediment deposition, and substrate material, all of which modifies the suitability of that habitat for various aquatic species.

In the case of the UT-1 Project, however, the reservoir will only be 2.1 ha in surface area, which effectively limits the impacts on upstream aquatic habitat. Common snow trout, which is one of only two species of fish found upstream of the dam site and by far the most abundant, is known to inhabit lakes (Petr and Swar 2002; Petr 1999), and would be expected to colonize the small UT-1 reservoir.

The existing baseline ecological condition of the Trishuli River upstream of the UT-1 dam is considered “Natural” to “Slightly Modified.” The Downstream Response to Imposed Flow Transformation (DRIFT) Model (S.A.N. Engineering Solutions 2017) results found that the Project would slightly reduce the overall ecological integrity of the Trishuli River upstream of the dam to a “Moderately Modified” condition. This reduction in the integrity rating is largely attributable to the “barrier” effect of the dam on upstream migration of Common snow trout. The magnitude of Project effects on Common snow trout populations upstream of the dam will be largely dependent on the effectiveness of the proposed fishway in facilitating the movement of these fish from their over-wintering areas downstream of the dam to their breeding areas upstream of the dam.

### *3.1.4.2. At the Dam*

The UT-1 dam will interfere with the ability of fish to move upstream or downstream past the dam, which could affect the abundance of Common snow trout and its ability to reach upstream spawning grounds. NWEDC proposes to construct a fish ladder at the UT-1 dam, which would allow Common snow trout and potentially other species to move upstream past the dam.

Fish surveys conducted in 2011, 2014, and 2016 collectively indicate that Common snow trout migrate upstream of the UT-1 dam site in the early Spring (March and April to spawn. Most of these fish remain in the upper portion of the river through the summer, with a large downstream

migration of some adults, but predominantly juvenile fish, from May through September. Some Common snowtrout were found to overwinter above the dam site, but this population is relatively small.

These data demonstrate that different portions of the Project Area provide important habitat for various life stages of the Common snowtrout at different times of the year, and therefore the importance of maintaining connectivity between aquatic habitat upstream and downstream of the dam.

NWEDC has committed to providing fish ladder at the UT-1 dam, and contracted with SWECO, a Norwegian company with extensive fishery experience in Nepal, to develop a conceptual design for fish passage at the UT-1 dam. In this case, the Common snowtrout was selected as the target species because it is the dominant species found in the Project area and its IUCN status as Vulnerable. Based on the Common snowtrout's size and swimming ability, SWECO proposed a fish ladder design with the following features (see Figure 3.2):

- Fish ladder flow of 1 $m^3/s$;
- An additional attraction flow of 1 $m^3/s$;
- The remainder of the Eflow will be routed into the entrance pool at the base of the ladder;
- Entrance pool at the base of the ladder equipped with hiding places for fish and water velocities of less than 0.6 metre per second (m/s);
- Approximately 100 steps with an approximate height of 0.3 metre, based on a dam height of approximately 30 metres;
- Water velocity through the vertical slots connecting the various steps with a maximum velocity of 0.7 m/s (slightly higher velocities are allowed in the lowest nine steps;
- Exit from the fish ladder at the top of the weir will be located as far as possible from the powerhouse intake where water velocities are less than 0.3 m/s to minimize the risk of the upstream migrating fish being entrained into the turbines.

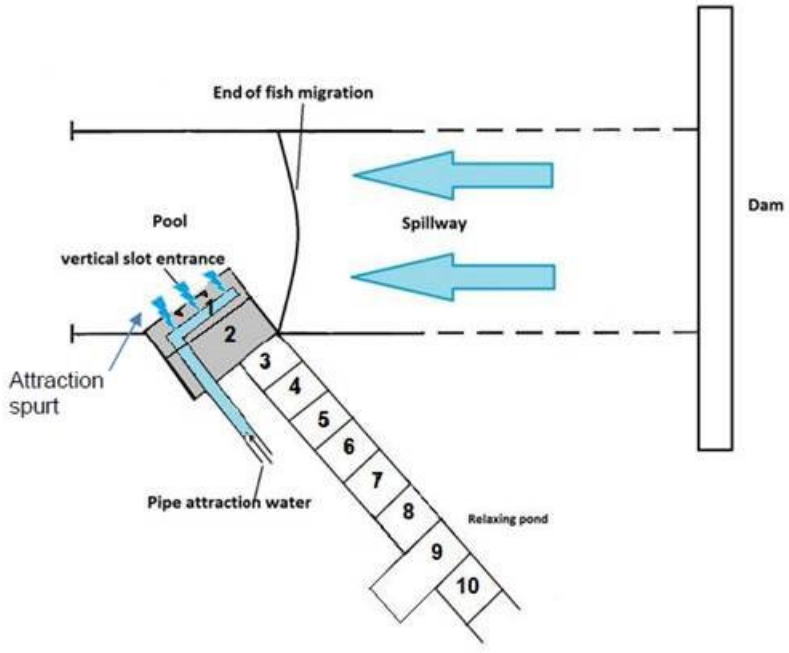



**Figure 3.1-1: Fish Ladder Design**

SWECO notes that there are some other upstream migration challenges unrelated to the fish ladder itself, and recommends that NWEDC:

- Ensure conditions at the powerhouse tailrace are such that the upstream migrating fish are attracted to the flow from the diversion reach and are not diverted to the powerhouse tailwaters;
- Ensure that the reduced flows in the diversion reach do not create any barriers or obstacles to upstream migration; and
- Ensure the channel in the river section just downstream of the dam leads the fish to the fish ladder entrance.

SWECO also makes several recommendations regarding the management of the fish ladder, including:

- Monitor flow and temperature (preferably on an hourly basis) to have the data needed to optimize fish ladder functionality; and
- Monitor fish movement to detect the beginning of the upstream migration period and ensure proper functioning of the fish ladder entrance.

Facilitating the safe upstream passage of migrating Common snowtrout above the dam is important, but ensuring the safe downstream passage of migrating fish is equally important. Most adult and juvenile Common snowtrout will migrate downstream in late summer and autumn as river temperatures gradually decline. Fish migrating downstream would either be entrained into the powerhouse turbines, with high levels of injury or mortality, or pass with spillage water over

dam falling 15 to 30 metre. SWECO provided the following recommendations regarding downstream fish migration:

- Monitor fish movement to detect the beginning of the downstream migration period and ensure fish are guided away from the powerhouse intake;
- Ensure the main river current in the reservoir directs fish toward the spillway rather than the powerhouse intake;
- Provide a guidance mechanism to help direct adult and juvenile fish away from the powerhouse intake;
- Ensure a smooth spillway and a deep pool at the base of the dam to minimize injury to fish migrating through the flap gates with spillage water; and
- Preferably spill water via the spillway at the left side of the weir.

The fish ladder design has been peer reviewed by the IFC and ERM and found acceptable. SWECO has provided advice and coordinated with the Project engineers on the fish ladder to ensure its design is technically feasible and economically viable. This fish ladder design has been incorporated into the overall dam design drawings.

Based on NWEDC's commitment to fully implement SWECO's recommendations, and assuming the fish ladder operates effectively, we conclude that impacts to upstream and downstream migrating fish have been appropriately managed consistent with international good practice.

As indicated by SWECO, additional monitoring is required to ensure the proper operation of the upstream and downstream fishways. NWEDC has committed to contracting an international fish scientist with expertise in Nepal fish to oversee the following actions:

- During Project construction:
    - Develop and oversee implementation of a aquatic biodiversity monitoring plan, including fish, water quality, and sediment, which would be implemented prior to the initiation of construction to provide a solid baseline against which to measure Project effects on fish populations, especially the Common snowtrout, and to help better understand the timing of Common snowtrout upstream and downstream migration, the extent to which Common snowtrout spawns in the Trishuli River mainstem versus tributaries in the Project area, and the relative population of Common snowtrout in the diversion reach;
    - Monitor construction of the fish ladder and dam to ensure it is consistent with the SWECO design; and
    - Develop a more detailed design for the fish guidance mechanism.
- During the initiation of Project operations:

- Inspect the diversion reach to ensure no barriers or obstacles exist to upstream migration under Eflow only conditions, and if any are identified, recommend measures to mitigate them;
- Ensure the channel in the diversion segment just below the dam leads the fish to the fish ladder entrance;
- Establish a flow and temperature monitoring program to optimize fish ladder performance;
- Establish a program and train NWEDC staff to monitor and report on the effectiveness of the fish ladder for upstream fish passage and the effectiveness of downstream fish passage measures;
- Establish a program and train NWEDC staff to monitor and report on the populations of Common snowtrout upstream of the dam, in the diversion reach, and downstream of the powerhouse relative to baseline conditions; and
- Evaluate the effectiveness of the current Eflow program and determine whether further actions are warranted in accordance with the Environmental Flow Adaptive Management Program.

The intent of this monitoring is to demonstrate no net loss of Common snowtrout in the Project area. It should be noted that there are several other hydropower projects under construction and proposed both upstream and downstream of the Project area. There is potential that decreases in the numbers of migrating Common snowtrout passing through the UT-1 Project area, and the populations of Common snowtrout found in the Project area, could occur, and not be attributable to the UT-1 Project. NWEDC is participating in a Trishuli River Basin Cumulative Impact Assessment funded by IFC, and has committed to participate in a Trishuli Basin Co-Management Platform to facilitate collaborate monitoring and management of cumulative impacts (see Section 7.12 for more details on Cumulative Impacts).

#### *3.1.4.3. Diversion Reach*

The Project will divert up to 76 cubic metres per second ($m^3/s$) of flow from the 10.7-kilometre segment of the Trishuli River between the dam and the powerhouse (i.e. the diversion reach). This flow diversion will reduce the width and depth of water in the diversion reach, thereby potentially impacting aquatic habitat and fish. During nearly six months of the year (November through April), this diversion would represent much of the Trishuli River flow.

In Nepal, hydropower projects are required to release 10 percent of the minimum monthly average flow or an alternative environmental flow (Eflow) recommended in the project's EIA, whichever is higher. The purpose of the Eflow is two-fold: to preserve the minimum habitat required to support fish and other aquatic life in the diversion reach and to preserve flow continuity for fish movement/migration through the Project Area. As Table 3.2.1 shows, 10 percent of the minimum monthly average flow for the UT-1 Project would equate to a required minimum flow of approximately 3.9 $m^3/s$ (i.e. 10 percent of 38.6 $m^3/s$, which is the average flow during the river's lowest flow months of February and March at the Project site).

NWEDC has proposed an Eflow that is higher than that required by Nepalese regulations, essentially providing 10 percent of the average monthly flow for each month, rather than the minimum average monthly flow. Actual flow in the diversion reach would typically be higher than this Eflow from May to October (e.g. the spring snowmelt and monsoon period) as river flow would exceed the hydraulic capacity of the Project and excess water would be spilled into the diversion reach. Table 3.2.1 below shows the existing, required minimum, proposed minimum, and the proposed actual diversion-reach flow regimes by month.

**Table 3.1-3: Flows into the Diversion Reach Based on Mean Monthly Flows under Regulated and Unregulated Conditions**

| Flow Management Scenarios | Mean Monthly Flow ($m^3/s$) at the Intake Site | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Existing river flow regime | 43.7 | 38.6 | 38.6 | 49.5 | 87.5 | 230.4 | 487 | 557.8 | 370.8 | 160.4 | 79.9 | 54.6 |
| Required minimum diversion reach flow regime | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 |
| Proposed minimum diversion reach Eflow regime | 4.4 | 3.9 | 3.9 | 5.0 | 8.8 | 23.0 | 48.7 | 55.8 | 37.1 | 16.0 | 8.0 | 5.5 |
| Proposed actual average diversion reach flow regime[a] | 4.4 | 3.9 | 3.9 | 5.0 | 11.5 | 154.4 | 411.0 | 481.8 | 294.8 | 84.4 | 8.0 | 5.5 |
| % of mean monthly flow | 10% | 10% | 10% | 10% | 13% | 67% | 84% | 86% | 80% | 53% | 10% | 10% |

Source: Modified from ESSA 2014

[a] Includes flows above the hydraulic capacity of the powerhouse (76 $m^3/s$) that would be spilled.

The data indicate that some, but relatively few Common snowtrout overwinter in the diversion reach. This is attributed to both the high velocities and cold winter water temperatures found in this reach, which approach the tolerance threshold of Common snowtrout. The Eflow analysis indicates that the relatively few Common snowtrout that may overwinter would likely vacate the diversion reach during the winter primarily because of the low flows (assumed to be 3.9 $m^3/s$) provided by the Project. There is available habitat downstream below the powerhouse where winter water temperatures remain warmer, so the reduced diversion reach flow is not expected to result in any loss of Common snowtrout or reduction in their population.

The other important purpose of Project Eflow is to provide sufficient flow conditions to enable upstream migrating adult Common snowtrout to navigate through the diversion reach to the proposed fish ladder at the dam. If the Eflow does not provide appropriate water depths and velocities, the Common snowtrout will not be able to reach the fish ladder or its upstream spawning areas. The literature reports a range of minimum depths for the species. The final Eflows assessment for the Project reported a preferred depth for adults of 1 to 3 m (S.A.N. Engineering Solutions 2017) based on one study from the 1970s (Shrestha and Khanna 1976),

but more recent studies indicate a minimum depth of 0.8 m for spawning adult Common snowtrout (Mathur and Kapoor 2015).

Table 3.2.2 compares the estimated flows, based on hydraulic calculations, required to provide average depths of 0.8 to 1.0 m through the diversion reach, assuming a trapezoidal channel and the average Trishuli River gradient through the diversion reach. These calculations likely underestimate actual flow required to achieve these critical water depths as true trapezoidal channels do not typically occur in nature.

**Table 3.1-4: Comparison of Minimum Flows Required to Achieve Critical Depths for Common Snowtrout (S. richardsonii) in the Diversion Reach**

| Depth (m) | Manning Coefficient (n) | Gradient (m/m) | Flow ($m^3s$) |
|---|---|---|---|
| 0.8 | 0.04-0.08 | 0.03 | 3.45-6.90 |
| 1.0 | 0.04-0.08 | 0.03 | 5.79-11.57 |

The Project fishery studies and the scientific literature suggest that most Common snowtrout spawn from March to May in the Project Area, NWEDC's proposed Eflow for these months (3.9 to 11.5 $m^3$/s, see Table 7.2-1 above) would just provide the minimum depth required in the diversion reach if the 0.8 m critical depth is accepted, but would not provide the minimum depth during March and April if the 1.0 m critical depth is used. In either case, the proposed Eflow during March and April appear to be marginal, which could prevent Common snowtrout from reaching the proposed fish ladder at the dam and access to upstream spawning areas, which in turn could significantly impact reproductive potential, spawning success, and ultimately population levels of Common snowtrout both upstream and downstream of the Project.

There are many uncertainties inherent in this analysis, including the relatively weak scientific basis for establishing the critical flow depth required to support the upstream migration of Common snowtrout, the flow required to achieve this critical flow depth, the timing of the Common snowtrout's spawning, among others. Discussions with NWEDC indicate constraints on their ability to increase Eflows, especially during the critical early migration months, if monitoring indicates water depths are insufficient to allow the Common snowtrout to reach the fish ladder. These constraints include the terms of their Power Purchase Agreement and the economic impact of increasing Eflows, which means decreasing flows available for power generation. NWEDC has agreed to perform an in-depth river connectivity analysis during the 2018 pre-monsoon by collecting additional fish and invertebrate sampling, surveying the cross-section of the diversion reach, and using these data to develop a hydraulic model of the diversion reach to complement the DRIFT model. This analysis will enable a more robust assessment of the adequacy of the proposed Eflow releases to support Common snowtrout's upstream migration.

In addition, NWEDC will implement an Adaptive Management Program based on intensive monitoring during the 5 years of construction and the Project's first few years of operation to confirm whether upstream migrating Common snowtrout are able to reach the UT-1 fish ladder.

The Adaptive Management Program includes the following elements:

- Implement an intensive fish monitoring program during construction and the first few years of operation to ensure most upstream migrating Common snowtrout are able to reach the Project's fish ladder, especially during the early portion of the migration period (i.e. March and April) when the proposed Eflows are relatively low.
- If monitoring indicates that a meaningful percentage of Common snowtrout are not able to reach the fish ladder (i.e. sufficient to achieve the "no net loss" standard in IFC PS 6), then NWEDC will evaluate the potential for channel improvements to effectively increase water depths and guide the fish to the fish ladder.
- If monitoring indicates that, even with channel improvements, a meaningful percentage of Common snowtrout are still unable to reach the fish ladder, then NWEDC either (1) initiate a trap and haul program to capture upstream migrating Common snowtrout and transport and release them upstream of the dam, or (2) establish a hatchery for Common snow trout, possibly in combination with other hydropower developers in the area, and release sufficient numbers of hatchery-bred fish upstream of the dam to maintain fish populations in the Project area.

In addition to these measures, NWEDC and IFC are implementing a "connectivity study," which will include an enhanced hydraulic analysis and DRIFT modelling of the diversion reach to better evaluate Common snowtrout's upstream migration flow requirements, and an eDNA analysis of the Upper Trishuli River Basin to establish a robust baseline regarding fish biodiversity in the river.

Implementation of this Adaptive Management Program, informed by the results of the connectivity study, provides assurance that Project effects on flow will not prevent Common snowtrout from reaching spawning grounds upstream of the UT-1 dam.

#### *3.1.4.4. Downstream of the Powerhouse*

Impacts on aquatic habitat and fish downstream of the powerhouse will be relatively minor for the following reasons:

- Flow - The Project will operate in a true run-of-river regime and should have no effect on flow downstream of the UT-1 powerhouse;
- Sediment – The Project is designed to pass, rather than trap, sediments using a desander, which will be periodically flushed out several times a year to maintain a reasonably natural sediment balance along the Trishuli River;
- Physical Water Quality - The Project has a very small impoundment (2.1 ha) with negligible water retention, so the Project is not predicted to have any effect on physical water quality (e.g. water temperature, dissolved oxygen) that could affect downstream fishery habitat; and
- Chemical Water Quality - The Project will provide wastewater treatment for both its construction and operation workforce, ensure proper handling and storage of all hazardous materials, will implement an emergency preparedness and response plan in the

event of any spills of hazardous materials, will manage slope stability and sediment control, and will stabilize and landscape disturbed areas.

The existing baseline ecological status of the Trishuli River downstream of the powerhouse is considered "Slightly Modified" (S.A.N. Engineering Solutions 2017). The DRIFT Model results confirm that the Project would have little effect on the overall ecological integrity of the Trishuli River downstream of the powerhouse, with the predicted ecological integrity remaining as "Slightly Modified," assuming effective fish passage.

Overall, Project operational design and proposed upstream mitigation measures should be adequate to ensure that the Project will not adversely impact fishery habitat downstream of the Project powerhouse.

#### *3.1.4.5. Aquatic Habitat Classification*

Based on the physical habitat and water quality conditions documented by Project baseline studies, the aquatic habitat in the Project Area meets the IFC's definition of Natural Habitat (IFC 2012). Although the concentrations of several metals (notably iron, manganese and zinc) as well as oil and grease were elevated during the monsoon period, the physical habitat in the diversion reach currently retains its natural ecological function and supports a viable aquatic community.

The Trishuli River is fragmented by the downstream Devighat and Trishuli hydropower projects, which have affected the ecological continuity of the river, but the prevalence of migratory species such as Common snowtrout in the UT-1 Project area demonstrates that the ecosystem is still functionally intact and capable of supporting migratory species. It should be noted, however, that the Upper Trishuli 3A and 3B hydropower projects are under construction immediately downstream of the UT-1 site, and the Rasuwagadhi

Hydropower Project is under construction upstream of the UT-1 site. An additional risk to the local fishery is the introduction of the exotic species Rainbow trout from fish farms. The Common snowtrout population in the Project area appears robust at this time and the Rainbow trout population has not substantially altered the aquatic community to date.

The Upper Trishuli River does not meet the definition of Critical Habitat because it does not support any Critically Endangered, Endangered Species, endemic, or restricted range species; or any highly threatened or unique ecosystems; nor is associated with any key evolutionary processes. The Upper Trishuli River does support migratory species (e.g. Common snowtrout),

but does not support globally significant concentrations of these species.

#### *3.1.4.6. Achieving No Net Loss of Natural Habitat*

Pursuant to the IFC Performance Standards, the goal for Natural Habitat is no net loss. As indicated above, the Project is predicted to impact aquatic habitat upstream of the dam and along the diversion reach, but not downstream of the powerhouse because the Project will operate in a true run-of-river regime. IFC's Performance Standard 6 requires Project's to avoid "significant" conversion of Natural Habitats unless:

- No other viable alternatives within the region exist for development of the project on Modified Habitat;
- Consultation has established the views of stakeholders, including Affected Communities, with respect to the extent of conversion and degradation; and
- Any conversion or degradation is mitigated according to the mitigation hierarchy.

The Project has been designed to take advantage of the generation potential offered by the specific set of hydrologic conditions at the Project site and the entire Upper Trishuli River Basin would be considered Natural Habitat, so there are no other viable alternatives for the Project in Modified Habitat. NWEDC has also engaged with stakeholders and communities within the Project area. The major habitat impacts (e.g. impoundment of riverine habitat, reduced flow, and fragmentation of the river) are inherent in the design of the Project and cannot be avoided without fundamentally altering the design and purpose of the Project.

The next step in the mitigation hierarchy is minimization. Although the construction of the dam is an inherent component of the Project's design and an unavoidable impact, NWEDC has minimized Project impacts by:

- Minimizing the size of the Project impoundment (2.1 ha); and
- Operating the Project in a true run-of-river mode.

Mitigation follows minimization in the mitigation hierarchy. Although the Project does not propose any measures to compensate for the loss of riverine habitat that will occur upstream of the dam within the reservoir footprint, Common snow trout is expected to persist in the reservoir, and may expand given the amount of new habitat that will be available within the reservoir and the incrementally warmer water temperature of the reservoir, so the loss of Natural Habitat upstream of the dam is negligible. As indicated above, the Project will not impact Natural Habitat downstream of the powerhouse.

Project impacts on the diversion reach relate to a net reduction in flow that will decrease available habitat for the Common snow trout and other species. As discussed above, even under existing conditions, the diversion reach only supports a small population of Common snow trout. Therefore, the impact of the Project on the value of aquatic habitat in the diversion reach is likely small. The critical issue for the diversion reach is the provision of sufficient flow to enable upstream migrating Common snowtrout to navigate the diversion reach and access the fish ladder.

NWEDC proposes the following measures to mitigate these impacts:

- Diversion Reach Eflow
    - Provide an Eflow sufficient to maintain habitat connectivity and support upstream fish migration through the diversion reach;
    - Implement the Adaptive Management Program described in Section 2.2.7 above to ensure the reduced flows in the diversion reach do not create any barriers or obstacles to upstream fish migration;

  - Adopt a Worker Code of Conduct that prohibits fishing in the Trishuli River. Require the EPC to provide awareness training of this requirement. Clearly indicate that this activity could result in the termination of their employment.

- Upstream Fish Passage
  - Install a fish ladder in accordance with the approved design to enable upstream migration of snow trout;
  - Ensure conditions at the powerhouse tailrace are such that the upstream migrating fish are attracted to the flow from the diversion reach and are not diverted to the powerhouse tailwaters;
  - Ensure the channel in the river section just downstream of the dam leads the fish to the fish ladder entrance.
- Downstream Fish Passage
  - Ensure the main river current in the reservoir directs fish toward the spillway rather than the powerhouse intake;
  - Provide a guidance mechanism to help direct adult and juvenile fish away from the powerhouse intake;
  - Ensure a smooth spillway and a deep pool at the base of the dam to minimize injury to fish migrating through the flap gates with spillage water; and
  - Preferably spill water via the spillway at the left side of the weir.
- Contract with an international fish scientist with expertise in Nepal fish to develop a fish monitoring plan to enhance the understanding of the timing and location of Common snowtrout spawning, design and oversee a fish aquatic monitoring program to demonstrate No Net Loss per IFC's PS6, oversee construction of the fish ladder to ensure it is consistent with the approved design, and inspect flow conditions in the diversion reach during initial operations to ensure no barriers or obstacles exist to upstream migration under Eflow-only conditions;
- Monitor and report on the effectiveness of the fish ladder for upstream fish passage and the effectiveness of downstream fish guidance measures; and
- Actively participate in the Trishuli River Basin Cumulative Impact Assessment and the Trishuli Basin Co-Management Platform to facilitate collaborative monitoring and management of cumulative impacts

NWEDC will also develop and implement a robust and comprehensive Biodiversity Evaluation and Monitoring Program, which will include an integrated water quality, sediment, and fish monitoring program, as well as a terrestrial biodiversity monitoring program.

The combined objective of the Eflow and fish passage will be to support a stable population of Common snowtrout in the Project area by achieving and demonstrating No Net Loss of aquatic biodiversity per IFC's PS6 requirements, so the comparative analysis and trend analysis will be

conducted to identify patterns in year-over-year changes in the Common snowtrout population. The details of the metrics and analysis will be developed and guided by the fish expert to be hired by NWEDC. Particular attention will need to be paid to the changes not only in overall population but also in the life stage composition of the population because changes in the relative abundance of life stages within the population may indicate certain deficiencies in the Eflow or fish passage program. For example, a decrease in the number of juveniles occurring in the dataset that cannot be explained by a corresponding decrease in spawning adults the prior year may indicate that juveniles are experiencing high mortality due to passage through the turbines and that the exclusion devices at the dame need to be adjusted or replaced.

With the implementation of these measures, NWEDC should achieve no less loss of aquatic Natural Habitat at the UT-1 Project.

## 3.2. STAKEHOLDER ENGAGEMENT/GRIEVANCE REDRESS MECHANISM

To be provided pending NWEDC review of the draft Plan.

## 3.3. LAND ACQUISITION AND LIVELIHOOD RESTORATION PLAN

Provided as Attachment 1 to this ESMMP.

## 3.4. INDIGENOUS AND VULNERABLE PEOPLES DEVELOPMENT PLAN

To be provided pending NWEDC review of the draft Plan.

## 3.5. LABOUR INFLUX MANAGEMENT PLAN

This document presents the Labour Influx Management Plan (LIMP) for the Upper- Trishuli 1 (UT 1) Hydropower project in Nepal. This plan has been prepared in the keeping with the requirements of the applicable reference framework for the project. The following sections provide an understanding of the purpose of the LIMP, the institutional framework put in place for its implementation, the scope of the LIMP, the measures included in the LIMP and the monitoring, reporting and reviewing process for the same.

### 3.5.1. Purpose

The UT1 project is expected to employ approximately 1090 skilled, semi-skilled and unskilled workers over a 60 month construction period. The skilled workforce will be recruited either directly by NWEDC or by its EPC contractors and the subcontractors hired by EPC Contractors. The semi-skilled and unskilled workforce, will however, be subcontracted, to local Nepali subcontractors or local petty contractors in the Rasuwa district or the nearby districts. Based on the project skill requirement and the present skill level of the local community, it is understood that most of the skilled and semi- skilled workforce will be migrant population from other districts of Nepal and expats.

As part of the ESIA for the project, an assessment was undertaken of the potential environmental and social impacts from labour influx due to the project in the construction phase. In keeping with this impact assessment, certain mitigation measures were identified, and included in the

Construction phase ESMMP for the project. However, in keeping with the socio-economic profile of the local community in the Project Area of Influence (AoI), a need was identified for a detailed Labour Influx Management Plan (LIMP).

This LIMP is thus aimed at putting in place measures and processes, to allow for avoiding, minimizing and mitigating the risks identified due to influx of labour from outside the AoI.

The CSE/OE shall in turn report the status of the LIMP implementation and any key areas of concern to the Project Management Office (PMO) and EHS Head. The PMO and E&S Managers shall in turn be responsible for the overall review and assessment of LIMP in terms of the requirements of the applicable reference framework. The final decision making authority in regards to the provisions of the LIMP shall lie with the PMO, who shall be supported in their decision by the E&S Manager.

### 3.5.2. Institutional Framework

The implementation of the LIMP thus formulated, shall be undertaken by the NWEDC Environmental and Social Management Cell (ESMC), ESST and the EPC Contractors and sub-contractors for the project.

The EPC contractors and sub-contractors shall be responsible for ensuring the everyday implementation of the LIMP and ensuring that their labourers and workers comply with the same. On the other hand, the CSE/OE for the project (assisted by the site level ESMC representatives) shall be responsible for the overall monitoring and review process of the LIMP implementation and ensuring that the plan is implemented in keeping with the requirements of the applicable reference framework and the principles identified.

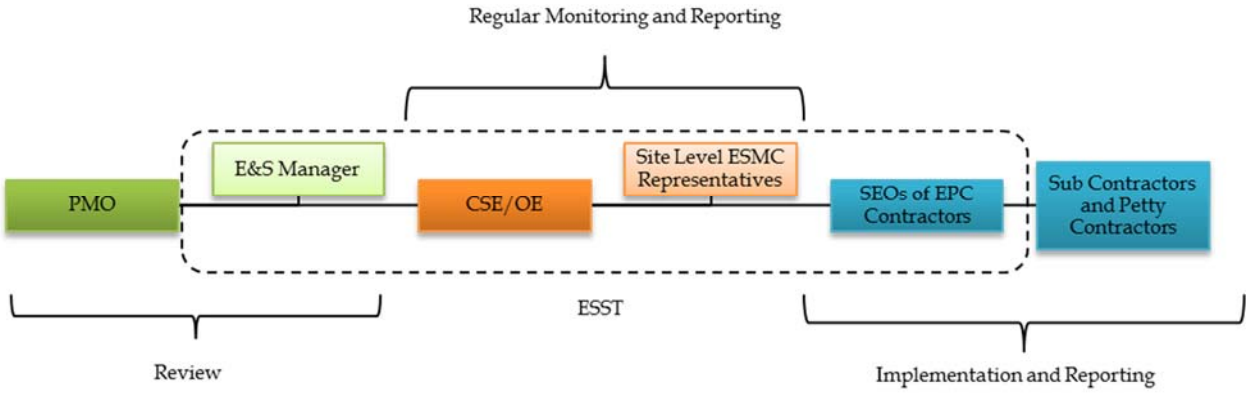



**Figure 3.5-1: Institutional Framework for the LIMP Implementation**

The CSE/OE shall in turn report the status of the LIMP implementation and any key areas of concern to the PMO and EHS Head. The PMO and E&S Managers shall in turn be responsible for the overall review and assessment of LIMP in terms of the requirements of the applicable reference framework. The final decision making authority in regards to the provisions of the LIMP shall lie with the PMO, who shall be supported in their decision by the E&S Manager.

### 3.5.3. Scope

The LIMP is applicable for the entire UT-1 project and its associated facilities. This plan has been formulated for the mitigation of social impacts from project induced in-migration into the AoI during the construction phase of the project. This plan has to be read in conjunction with the other management plans such as the Stakeholder Engagement Plan (SEP), Grievance Redressal Mechanism (GRM) and the Construction Phase ESMMP.

### 3.5.4. Potential Environmental and Social Impacts from Labour Influx

The ESIA for the project identifies the following potential environmental and social impacts due to labour influx during construction phase of the project.

**Table 3.5-1: Potential Impacts from Labour Influx**

| Social Impacts | Environmental Impacts |
|---|---|
| • Increased competition for the direct and indirect economic opportunities created due to the project and potential resentment amongst the local community<br>• Increased pressure on and competition for infrastructure and services in the AoI<br>• Increased waste and sewage generation and possible community health and safety risks due to inadequate waste disposal<br>• Risk of social unrest and conflict due to increased presence of migrant population in the AoI<br>• Risk of spread of communicable diseases, especially sexually transmitted diseases in the workers and local population<br>• Risk of Change in Community dynamics and potential for community conflict<br>• Additional influx of population seeking economic gains from presence of migrant population (through establishing small businesses and enterprises)<br>• Increased risk of illicit behaviour and crime, especially gender based violence<br>• Increased risk of child labour and school drop outs due to increased opportunities for host community to engage in economic activities<br>• Increased risk of inflation and increase in expenses for the local community due to a general increase in prices in the AoI | • Increased pressure on and competition for natural resources in the AoI<br>• Risk of pollution of water resources in the AoI due to lack of appropriate wastewater discharge<br>• Risk of disturbance to wildlife due to presence of labour camp and movement of labour |

It should be noted that, during the discussions with the local community, the representatives did not report any apprehensions or concerns regarding the presence of migrant workers in the area. The community reported to appreciate the presence of migrant workers in the area as they allowed for economic opportunities to be created. The representatives did not report any instances of conflict or violence due to the presence of the migrant workers involved in the access road construction.

- There are no reported existing issues or tension with the migrant workers in the area

- The community see the labourers as a positive presence and did not report an issue with migrant labourers coming into the area
- However, if the locals don't get employment opportunities from the project or general economic opportunities it may lead to resentment
- Furthermore, cultural conflict can arise if labourers do not respect the local traditions of the community
- Workers on infrastructure projects are predominantly young and male. Those who are incoming are single or are separated from their family or spouse, and are outside their habitual sphere of social control. Further, in rural settings, where the presence of law enforcement is often low, the risk of sexual harassment for local women is likely higher, in particular for younger women and girls, but also boys.

### 3.5.5. Labour Influx Management Measures

In keeping with the impacts identified, the following mitigation measures have been put in place as part of the LIMP.

## Table 3.5-2: Labour Influx Management Measures

| Potential Impact | Contractor Responsibility | NWEDC responsibility |
|---|---|---|
| Overall Impact | • Undertake regular engagement with the workers and sub-contractors through workshops, training sessions and tool box talks to ensure understanding and compliance to the LIMP requirements<br>• Put in place a detailed Code of Conduct, based on the LIMP and ensure its implementation<br>• Undertake regular internal monitoring to ensure compliance to the contract agreement and the overall requirement of the LIMP<br>• Ensure that the workers have all required documentation as follows: employment contract, insurance, routine check-ups, vaccinations, occupational health training, etc. | • Undertake regular and timely engagement with the local community in keeping with the SEP formulated<br>• Undertake timely information disclosure, to ensure the community is aware of the project activities, opportunities in the same and potential adverse impacts from the project<br>• Implement the GRM for the project and ensure the community is aware of the same<br>• Ensure the inclusion of relevant clauses in all sub-contract agreements<br>• Undertake a training of the EPC contractors, sub-contractors and petty contractors to ensure understanding and compliance of the LIMP<br>• Undertake regular monitoring of the compliance of the contractors to the LIMP |
| Increased competition for the direct and indirect economic opportunities created due to the project and potential resentment amongst the local community | • To the extent possible, recruit local population in keeping with the Employment and Skill Trainings plan for the project;<br>• Undertake timely information disclosure, to ensure the community is aware of the project activities, opportunities in the same and potential adverse impacts from the project. | |
| Increased pressure on and competition for infrastructure and services in the AoI | • Put in place a detailed Code of Conduct, based on the LIMP and ensure its implementation<br>• Ensure the worker camp has adequate provisions for water, electricity and sanitation facilities<br>• Identify an authorized water supply source for the worker camp and prohibit of use from other community sources; | • Investment in and capacity building of local public service providers<br>• Put in place contingency plans for temporary rise in demand for utilities and public service provision. |
| Increased waste and sewage generation and possible community health and safety risks due to inadequate waste disposal | • Ensure adequate waste and sanitation facilities in worker camp<br>• Ensure workers' camp and associated facilities are connected to septic tank or other wastewater systems which are appropriate and of sufficient capacity for the number of workers and local conditions. | • Undertake community sensitization campaigns to build awareness about public health impacts from labour influx.<br>• Undertake regular inspections and monitoring of the worker camps and associated facilities in terms of the adequacy of sanitation provisions and their maintenance |

| Potential Impact | Contractor Responsibility | NWEDC responsibility |
|---|---|---|
| Risk of social unrest and conflict due to increased presence of migrant population in the AoI<br><br>Risk of Change in Community dynamics and potential for community conflict | • Ensure the worker camp has adequate facilities for entertainment and basic provisions to reduce the need for workers to use local community facilities and resources;<br>• Ensure the code of conduct has adequate provisions for the interaction of the labourers with the local community | • Undertake community sensitization campaigns to build awareness about potential impacts from labour influx Undertake regular and timely engagement with the local community in keeping with the SEP formulated<br>• Ensure adequate security provisions across project area, including worker camp and associated facilities |
| Risk of spread of communicable diseases, especially sexually transmitted diseases in the workers and local population | • Undertake a health and fitness to work assessment of each worker prior to initiation of work;<br>• Ensure all workers have required vaccinations against common and locally prevalent diseases;<br>• Implement HIV/AIDS education program for all workers;<br>• Undertake information campaigns on STDs and transmission of diseases among the workers;<br>• Establish a health centre at the camp and construction sites, which should include<br>– Free testing facilities;<br>– Regular health check-ups;<br>– Database of all the worker health records<br>– Provision of condoms | • Undertake community sensitization campaigns to build awareness about public health impacts from labour influx;<br>• Undertake community sensitization campaigns towards STDs<br>• Ensure access to GRM;<br>• Hold community health camps and check-ups on a regular basis with a focus on the presence and spread of communicable diseases;<br>• Ensure an HIV service provider is available on-site; |
| Additional influx of population seeking economic gains from presence of migrant population (through establishing small businesses and enterprises) | • Hire workers through recruitment offices and avoid hiring “at the gate” to discourage spontaneous influx of job seekers.<br>• Hire workers in keeping with the employment and skill training plan | • Undertake regular and timely engagement with the local community in keeping with the SEP formulated<br>• Undertake timely information disclosure, to ensure the community is aware of the project activities, opportunities in the same and potential adverse impacts from the project |

| Potential Impact | Contractor Responsibility | NWEDC responsibility |
|---|---|---|
| Increased risk of illicit behaviour and crime, especially gender based violence | • Pay adequate salaries for workers, in keeping with the prevalent wage rates in the country to reduce incentive for theft;<br>• If possible, Pay salaries into workers' bank accounts rather than in cash; however access to banking system need to be looked into.<br>• To the extent possible, recruit local population in keeping with the Employment and Skill Trainings plan for the project<br>• As part of the Code of Conduct, include sanctions (e.g. dismissal) for workers involved in criminal activities;<br>• Introduce substance abuse prevention and management programs and undertake worker sensitization programs on the same<br>• Undertake regular training for workers on required lawful conduct in host community and legal consequences for failure to comply with laws;<br>• Ensure cooperation with law enforcement agencies investigating perpetrators of gender-based violence;<br>• allow for opportunities for workers to regularly return to their families;<br>• Ensure the worker camp has adequate facilities for entertainment and basic provisions to reduce the need for workers to use local community facilities and resources; | • Support and assist local law enforcement agencies investigating perpetrators of gender-based violence;<br>• Monitor the Contractor and worker performance in keeping with the local law requirement in terms of drug abuse and traffic;<br>• Ensure access of local community to the GRM in place |
| Increased risk of child labour and school drop outs due to increased opportunities for host community to engage in economic activities | • Ensuring that children and minors are not employed directly or indirectly on the project. | • Monitor the contractor performance and ensure compliance to local labour laws, pertaining to child labour |
| Increased risk of inflation and increase in expenses for the local community due to a general increase in prices in the AoI | • Undertake procurement of law material and goods in keeping with the industrial benefits plan in place | • Ensure compliance to the Industrial benefits plan in place |

| Potential Impact | Contractor Responsibility | NWEDC responsibility |
|---|---|---|
| Increased pressure on and competition for natural resources in the AoI | • Ensure the worker camps and associated facilities have adequate provisions for water conservation and recycling of water, including potential for rainwater harvesting<br>• Ensure workers' camp and associated facilities are connected to septic tank or other wastewater systems to avoid contamination of fresh water sources.<br>• Ensure that only wood from commercial sources is used on the project;<br>• prohibit use of wood for fuel in worker camp;<br>• put in measures to reduce energy demand, noise and light generation in labour camp<br>• Minimise land use change and use of other natural resources to the extent possible due to worker camp and associated facilities<br>• Avoid deforestation and cutting of trees around camp area; | • Ensure inclusion in contract of requirement for rainwater capture, use of non-potable water for construction works, etc.<br>• Cooperation with environmental organizations in the area to seek their advice and allow for early feedback on adverse impacts.<br>• Undertake regular monitoring of impact on natural resources with enforcement of contract or legislative options. |
| Risk of pollution of water resources in the AoI due to lack of appropriate wastewater discharge | • Ensuring workers' camp and associated facilities are connected to septic tank or other wastewater systems which are appropriate and of sufficient capacity for the number of workers and local conditions. | • Regular inspection to ensure proper functioning of the systems in place |
| Risk of disturbance to wildlife due to presence of labour camp and movement of labour | • Ensure placement of workers' camp away from environmentally sensitive areas to avoid impacts on the local wildlife;<br>• Ensure routing of new access routes for workers' camp to avoid/minimise environmentally sensitive areas. | • Inclusion in contract of requirements for camp locations. |

A major concern during the construction of large hydroelectric projects is the potential negative impacts that might arise from the interaction of outside workers with local communities. For this reason, it is important that the Contractor establish a Code of Conduct that emphasizes the importance of appropriate behaviour, respect for local communities and customs, and compliance with all Nepalese laws and regulations. Each employee/worker shall be informed of the Code of Conduct, once she/he has signed the contract to work for the Project. The Code of Conduct as well as all other ESMMP requirements of the contractor also apply to all subcontractors and should be referenced by the main contractor in all subcontracts. The Code of Conduct should be available to local communities at the Public Information Centres (PIC) established for the Project. The Code of Conduct should address at least the following topics:

- Expectations for workers to carry out their work in a safe manner, and to look after the safety of others.
- Expectations of workers to look after, be aware of, and minimize their impacts on the environment.
- All the workers/labourers shall comply with the laws and regulations of Nepal.
- All illegal substances, abuse of drugs and alcohol, carrying of firearms, as well as pornographic material and gambling shall be prohibited.
- Fighting (physical or verbal), creating nuisances and disturbances in or near communities, disrespecting local customs and traditions shall be prohibited.
- Smoking shall only be allowed in designated areas.
- Workers must follow appropriate standards of dress and personal hygiene while visiting local communities and in the accommodation quarters.
- Workers visiting the local communities must behave in a manner consistent with the Code of Conduct.

The following activities (which must be included in the Code of Conduct) are prohibited on or near the Project site:

- Cutting of trees outside the approved designated areas.
- Hunting, fishing, trapping and trade of wildlife especially endangered species and collection of flora.
- Caging wild animals.
- Purchase of wild animals for food.
- Illegal hunting and poaching of any kind.
- Fishing in any river of water body within the Project area
- Use of unapproved toxic materials such as lead-based paint, asbestos, etc.
- Damage to any property with architectural or historical value.

- Building of unapproved fires.
- Wood collection for cooking or heating and as a fuel for heating during the processing or preparation of any materials forming part of the works.
- Burning waste or vegetation.
- Use of firearms (except authorized personnel).
- Use of alcoholic beverages during working hours.
- Washing machines, vehicles or clothes in rivers, streams or lakes.
- Maintenance of machinery and vehicles outside designated areas.
- Disposal of trash or construction waste outside designated areas.
- Driving vehicles or equipment improperly or under the influence of drugs or alcohol on local roads or in the Project area.
- Working without the proper protective equipment (including helmets and boots).
- Spilling potential contaminants such as petroleum products.
- Defecation or urination outside designated sanitary facilities. The Contractor shall provide portable toilets on all work fronts.
- Any construction worker, office staff, Contractor's employees, the project's employees or any other person related to the project found violating the Code of Conduct, the prohibitions established in these specifications, or the rules, regulations, and procedures implemented at the construction camp shall be subject to disciplinary actions that can vary from a simple reprimand to termination of employment, depending on the severity of the offense.

### 3.5.6. Monitoring

In order to ensure proper implementation of the LIMP, regular monitoring shall be undertaken by the site level ESMC representatives and the CSE/OE. The monitoring shall be undertaken on a weekly, monthly and annual basis. The key aspects to be covered in the monitoring and the means of monitoring are provided in the table below.

**Table 3.5-3: Monitoring Requirements**

| Type of Monitoring | Frequency | Aspects to be covered |
|---|---|---|
| Internal Monitoring by CSE/OE | • Weekly | • Adequacy of provisions in labour camp |
| | • Monthly | • Compliance to code of conduct<br>• Review of Records required to be maintained by law and as part of the LIMP |

| Type of Monitoring | Frequency | Aspects to be covered |
|---|---|---|
| | • Annually | • Records of GRM and community engagement activities<br>• Compliance to code of conduct<br>• Review of Records required to be maintained by law and as part of the LIMP<br>• Review of records of previous monitoring undertaken at weekly and monthly basis and the status of the action items identified in the same |
| Internal Monitoring by ESMC Representatives | • Monthly | • Records of GRM and community engagement activities |
| External Monitoring by Third Party | • Annually | • Records of GRM and community engagement activities<br>• Compliance to code of conduct<br>• Review of Records required to be maintained by law and as part of the LIMP<br>• Review of records of previous monitoring undertaken at weekly and monthly basis and the status of the action items identified in the same |

### 3.5.7. Reporting, Record Keeping, and Auditing

The EPC contractors, sub-contractors shall maintain detailed documents of the implementation of the LIMP. Some of the records to be maintained (but not limited to) are as follows:

- Detailed code of conduct and any action/ sanction against any worker in keeping with the same;
- Records of trainings, programs, workshops and tool box talks held;
- Compliance to the local laws and regulations;
- Records of the workers, age, their health records, vaccination records etc.;
- Records of the health centre and visitation by workers;
- Records of wage payment ; and
- Records required as part of the employment and skill training plan and industrial benefit sharing plan, GRM and any other management plans in place

In addition to this, the CSE/OE shall maintain detailed records of the monitoring activities undertaken and those required as part of the employment and skill training plan and industrial benefit sharing plan, GRM and any other management plans in place.

### 3.5.8. Adaptive Management System

It should be noted that the LIMP presented above is based on the present understanding and resource requirement available. This resource requirement or the socio-cultural dynamics in the AoI are susceptible to change during the construction phase. In keeping with this, it is important that the LIMP is a live document and is reviewed and revised in a timely manner. This is important to ensure that the LIMP remains relevant throughout the construction phase of the

project. This will also allow for the inclusion of any additional measures in the LIMP, which may be identified as part of the monitoring exercise.

### 3.5.9. Funding

NWEDC will ensure that the budget formulated for the purpose of the LIMP implementation is sufficient to meet the expenses of the same.

## 3.6. PLANS REQUIRED BY THE PDA

### 3.6.1. Introduction

The Upper Trishuli (UT-1) Hydropower project is a 216-MW green field runoff-river hydropower facility to be located in the upper part of the Trishuli watershed, in the Rasuwa District in central Nepal, 80 km northeast of Kathmandu. Once commissioned, the project will account for sizeable portion of Nepal's current installed capacity and will sell power under a long-term power purchase agreement (PPA) with Nepal Electricity Authority ("NEA"), the national utility company.

As a part of the Project Development Agreement (PDA) signed between - Nepal Water & Energy Development Company (hereinafter referred to as "NWEDC"), as well as Government of Nepal (hereinafter referred to as "GoN"), the parties (NWEDC and GoN) are committed to maximize the positive impacts and manage and mitigate the negative outcomes of the project to the extent possible.

The PDA requires the following in terms of Benefit sharing:

- The Local Benefit Sharing Plan, including
  - Local Share for the people from affected Project Area;
  - Rural Electrification
- The Nepal Employment and Skills Training Plan;
- The Nepal Industrial Benefits Plan;

The common discourse however does not segregate these interventions and are usually clubbed together under the umbrella of 'benefit sharing' to capture the whole gamut of benefits which can potentially be shared with the community. These benefits are based on differentiated entitlements, achieved through consultations with the various stakeholders as well as complying with the regulatory requirement of GoN and especially the PDA for the Project.

The detailed plan preparation will be undertaken in due course of time. As a part of the present scope, an annotated outline is being developed for each of the relevant plans. Each of the plans has been segregated into separate chapters; however in some cases some of the requirements have been consolidated into a single plan. The annotated outline will provide a framework for the benefit sharing plan. This will include brief description of the following:

| | | |
|---|---|---|
| Section 3.6.1 | Introduction: | This section provides an understanding of:<br>• Purpose of the benefit sharing plans;<br>• Context of the plan;<br>• The legal framework governing the plan;<br>• Existing benefit sharing mechanisms in Nepal;<br>• Guiding principles to be followed by NWEDC; and<br>• The implementation mechanism to be followed by NWEDC. |
| Section 3.6.2 | Local Benefit Sharing Plan | This includes guidelines & benefit sharing plan mechanism, including:<br>• Benefit Sharing guideline;<br>• Benefit Sharing Program Identified including Rural Electrification;<br>• Reporting and documentation requirements;<br>• Monitoring and review; and<br>• Schedule and budget for implementation. |
| Section 3.6.3 | Employment and Skill Training plan | This includes the employment and skill training plan for the project, which includes the following:<br>• Skill set requirement for the project;<br>• Recruitment Process;<br>• Trainings to be provided;<br>• Monitoring and review process;<br>• Reporting and documentation;<br>• Schedule and budget for implementation. |
| Section 3.6.4 | Industrial Benefit Plan | This section will provide a detailed industrial benefit sharing plan, in keeping with the requirements and guidance of the PDA, which will include:<br>• Resource requirements of the project<br>• Vendor strategy and principles<br>• Procurement plan<br>• Monitoring and review mechanism<br>• Reporting and documentation<br>• Schedule and budget for implementation |

### *3.6.1.1. Purpose of the Plan*

The PDA specifically asks for the local benefit sharing to be undertaken by NWEDC through different means as mentioned in Table 3.6.1-1 below.

**Table 3.6.1-1: Benefit Sharing Requirements as per PDA**

| PDA provisions for Benefit Sharing | Relevant Sections of the PDA |
|---|---|
| Local Share | Section 10.17 of the PDA |
| The Local Benefit Sharing Plan | Section 11.3.2 (A)<br>Schedule 11 (Local Benefit Sharing Plan- Guidance Note) |
| The Nepal Employment and Skills Training Plan | Section 11.3.2 (B)<br>Schedule 12 (Nepal Employment and Skills Training Plan- Guidance Note) |

| PDA provisions for Benefit Sharing | Relevant Sections of the PDA |
|---|---|
| The Nepal Industrial Benefits Plan | Section 11.3.2 (C)<br>Schedule 13 (Nepal Industrial Benefits Plan- Guidance Note) |
| Rural Electrification | Section 11.8 |

The parties also commit that systems and plans will be put into place to ensure that the skill level and level of employment of the local community is maximized. While the Land acquisition & Livelihood Restoration plan (LALRP) will specifically address the management of socio-economic impacts from the displacement (economic and physical) resulting from the project land requirements, the ESMP will address the management of environmental and social impacts from the construction and operation of the project.

The present document provides an annotated outline of the various plans required to be prepared as part of the benefit sharing which Local Benefit Sharing Plan (hereafter referred to as the "LBSP"). These plans will be supported and will be implemented in coordination with the LALRP and other management plans formulated for the project.

The plan will be implemented for all phases of the Project lifecycle and will be limited to the locals situated within the project impacted VDCs and district, with priority being given to those who have been directly impacted by the project due to land procurement. With the current administrative reorganisation, the Gaunpalikas will be used for deciding the area within which these plans will need to be rolled out.

Note: While some of the benefits like rural electrification will be undertaken based on the PDA requirements and also reflects Supreme Court of Nepal judgement in another HEP Project in Nepal. However, for the sharing of the equity shares, NWEDC will need to coordinate with GoN to agree on the area of influence.

Here clarity is required on the manner in which the scope of the plan will change due to the change in the administrative structure. Based on the discussion with the GoN, the scope of the plan will have to be revised. There may also be instances, where specific components of the plan (such as employment opportunities, rural electrification and skill trainings etc.) have different applicability and scope. For instance, the present employment opportunity may be focused on the PAFs and local community members who received training as part of earthquake relief, but skill trainings may be expanded to the entire population in the VDCs. The detailed plan will identify the specific scope of each mechanism identified in the following sections. This section will provide an overview of the scope in terms of the plan itself.

#### *3.6.1.2. Context Setting*

**Project Overview**

The Upper Trishuli (UT-1) Hydropower project is a 216 MW green field runoff-river hydropower facility to be located in the upper part of the Trishuli watershed, in the Rasuwa District in central Nepal, 80 km northeast of Kathmandu. The geographical coordinates of the project are longitude (between 85°12′40″E and 85°18′03″E) and latitude (between

28°04′27.50″N and 28°07′42″N). The details of the project can be referred to in the Detailed Project Report (DPR) of the project. The location of the project is depicted in Figure 3.6.1-1.

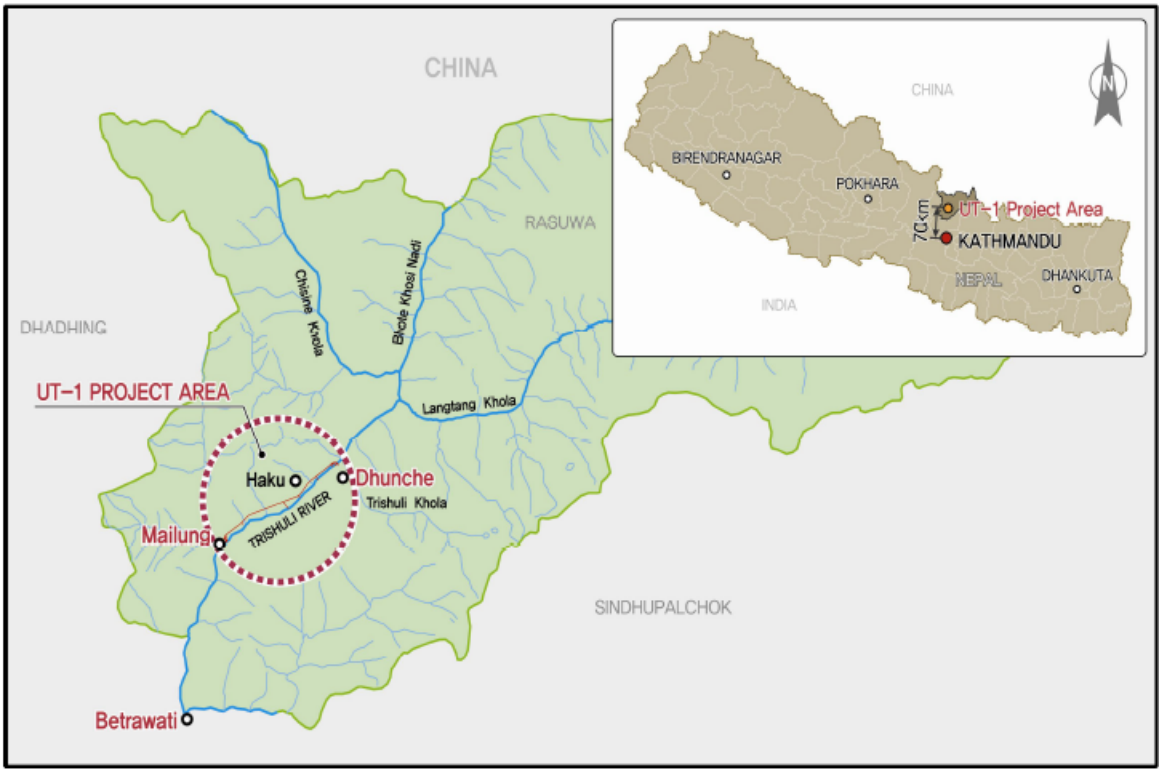



**Figure 3.6.1-1: Upper Trishuli 1 Project Location**

The intake site is located near the confluence of Bhotekoshi river at Dunche and Haku VDC on the east bank of Trishuli River, about 70 km directly north of Kathmandu. The dam will be located about 275m downstream of the junction with the Bhotekoshi River. The direction of the valley is mostly south-west. The dam site can be viewed on Google Earth at 28-07-36.61N and 85-17-52.42E. Apart from the dam and spillway, all structures are located underground on the east bank of the river. The Pasang-Lhamu highway passes on the left bank of the river, and is the primary access route for the development.

### Land Requirement for the Project

A total of 99.79 ha of land was earlier required for the project. Of this amount, 26.15 ha were required on a temporary basis during the construction phase of the project. Post the earthquake, an additional 1.2 ha of land has been identified in Mailung for the new camp site. The following table (Table 3.6.1-2) provides an understanding of the main components of the project and their land requirement.

**Table 3.6.1-2: Land Requirement for the Project**

| Project Component | Land requirement (in ha) | Habitation Impacted |
|---|---|---|
| Permanent Land Take | 73.64 | |
| Private Land | 3.96 | • Mailung<br>• Gogone<br>• Tiru |
| Trust (Guthi) Land | 15.53 | • Haku Besi<br>• Budget Farm<br>• Thanku<br>• Phoolbari |
| Community Forest and other Government land like Flood plain | 51.54 | • Gogone<br>• Tiru<br>• Mailung<br>• Haku Besi<br>• Gosumba<br>• Budget Farm |
| Langtang National Park[1] | 2.61 | NA |
| Temporary Land Take | 26.15 | |
| Community Forest and other Government land like Flood plain | 25.13 | • Gogone<br>• Tiru |
| Mailung HEP land ( 5 year lease) | 1.02 | • Mailung |
| Total | 99.79 | |

Source: NWEDC 2014

1. An additional 2.8 ha of already disturded/deforested LNP land will be temporarily used for the workercamps; however, returned once construction is completed.

Note: the Government land includes the forest land apart from the community forest land and the flood plain land

However, in keeping with the design changes caused by the 2015 earthquake, NWEDC is in the process of procuring the additional 1.2 ha of land required, and is presently in negotiations with 7 private land owners for the same.

### Impact of the Gorkha Earthquake

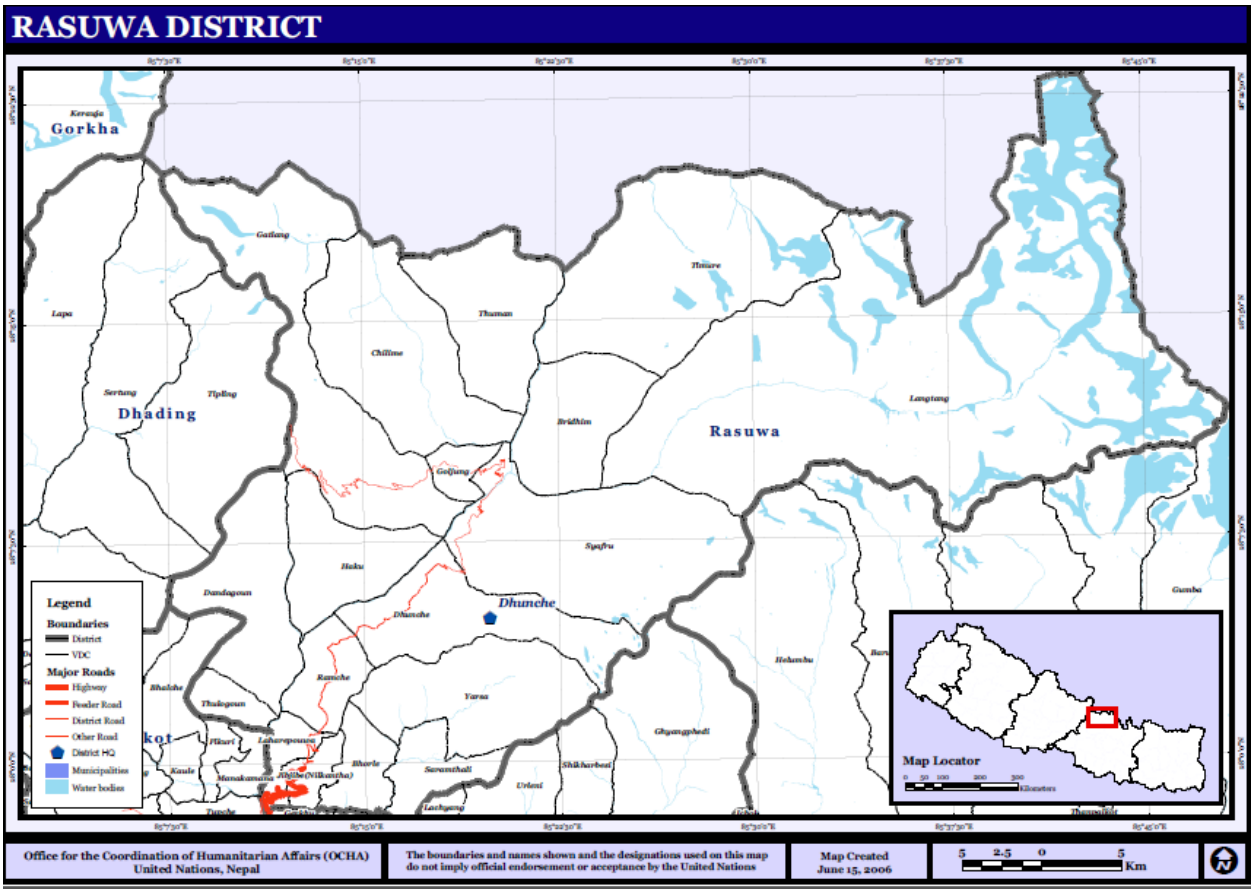
Nepal was struck by 7.8-8.1 magnitude earthquake; the 'Gorkha Earthquake', on 25th April 2015. This earthquake, was the worst natural disaster to strike this country since the 1934 Nepal-Bihar earthquake, and killed nearly 9000 people and injured over 22,000. The epicentre of this earthquake and its aftershocks was located east of the Gorkha District at Barpak, Gorkha; less than 100 kilometres from the UT-1 project site.

The Rasuwa District was one of the worst hit districts from the 2015 Gorkha Earthquake. The earthquake damaged more than 80% of the houses in the project footprint area (3 village development councils- VDCs- accounting for about 500 households) and resulted in more than 200 deaths in the area (43 on the project site) and the access road to the project was totally compromised.

The post-earthquake scenario led to wide spread influx of NGOs in the area and relief support in the form of livelihood and skill related trainings. The present livelihood and skill profile in the area is thus based on the pre-earthquake profile of the community, the impacts of the earthquake led displacement and the relief activities undertaken by NGOs/INGOs in the area.

## Rasua District Socioeconomic Profile

The Rasuwa District is located in the north central part of Nepal with a population of 43,300 individuals and 9,778 households and is one of the districts with the lowest population in the country.




Source: United Nations Nepal Information Platform, http://www.un.org.np/attachments/district-map-rasuwa

**Figure 3.6.1-2: Rasuwa District Map**

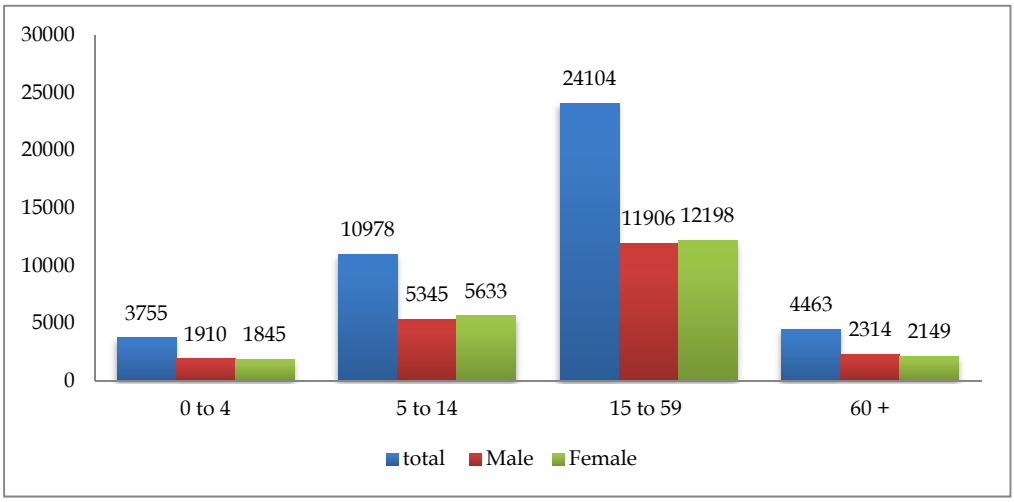
The district has an average household size of 4.43 individuals, and a sex ratio of 1016 females per thousand males, which is higher than but comparable to the national average (1050 females per thousand males). Covering approx. 1,544 sq. km. the district has a population density of 53.6 persons per sq. km as can be seen from the following table.

**Table 3.6.1-3: Rasuwa District Demographic Profile**

| Variables | Value |
|---|---|
| Total Population | 43,300 |
| Total Area (sq. km) | 1,544 |
| population density | 53.6 |
| Total Households | 9,778 |
| Sex Ratio | 1016 |
| Average Household Size | 4.43 |

Source: UT-1; Complementary Social Baseline, NESS, July 2014

However, post-earthquake, the district is expected to have undergone a shift in terms of the overall population, average household size and population density. This is primarily understood to be resultant from a portion of the population getting displaced and seeking refuge in VDCs such as Dhunche, Lahare Pahuwa etc. This is expected to have increased in the population and its density in the urban areas and in settlements in the valley. Similarly, the families are also understood to have split up post the earthquake, due to space issues in temporary housing and also to gain maximum benefit from relief support given by NGOs/INGOs.



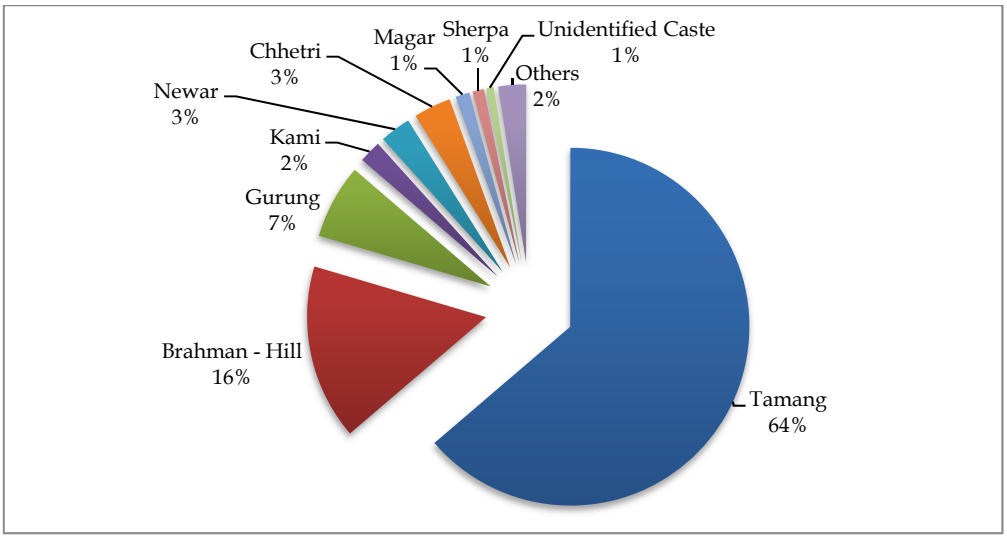

Source: UT-1; Complementary Social Baseline, NESS, July 2014

**Figure 3.6.1-3: Classification According to Age Groups**

According to the information available, 34% of the district is reported to be in age group of 0-14 years, while the age group between 15 to 59 (the productive age group) represent 56% of the population. The figure above showcases the age classification of the population in the district.

*Social Groups*

The population in the district is reported to be comprised of 18 ethnic groups, with the Tamang group (an indigenous group) comprising of the majority of the population (63.75%). The other main ethnic groups in the area are Hill Brahman, Gurung, Kami, Newar, Chhetri, Magar and Sherpas amongst others. The following figure provides an understanding of the ethnic composition of the district.




Source: UT-1; Complementary Social Baseline, NESS, July 2014

**Figure 3.6.1-4: Ethic Composition of the District**

The main religion in the area is Buddhism (69% of the total population), followed by Hinduism (25.4%) and Christianity (4%). The other religions in the area comprise of Islam, Kirat, Prakriti, and Bon. From the discussions with the local community, it is understood that over the last years, there has been an increase in the number of conversions to Christianity. This is primarily reported to be resultant from the high presence of NGOs/ INGOs in the district and an increase in the number of children studying in Catholic boarding schools.

The district is characterised by 9 languages, the most prominent of which is Tamang (60%), followed by Nepali (31.67%). The other languages spoken in the area are Newari, Magar, Gurung, Sherpa, Maithali, Tharu and Tibbetan.

*Gender*

While the female population constitutes 50.4% of the total population in the district, their access to education, property ownership and participation in social organization and economic activities is lower than in the case of their male counterparts. Compared to the 60.58% male literacy rate, 46.5% of the women are reported to be literate and only 8% of the women have legal ownership of property. However, the life expectancy of women at 54 years is lower but comparable to that of men at 55 years. The following table provides an understanding of the ownership of assets by women.

**Table 3.6.1-4: Female Ownership of Assets**

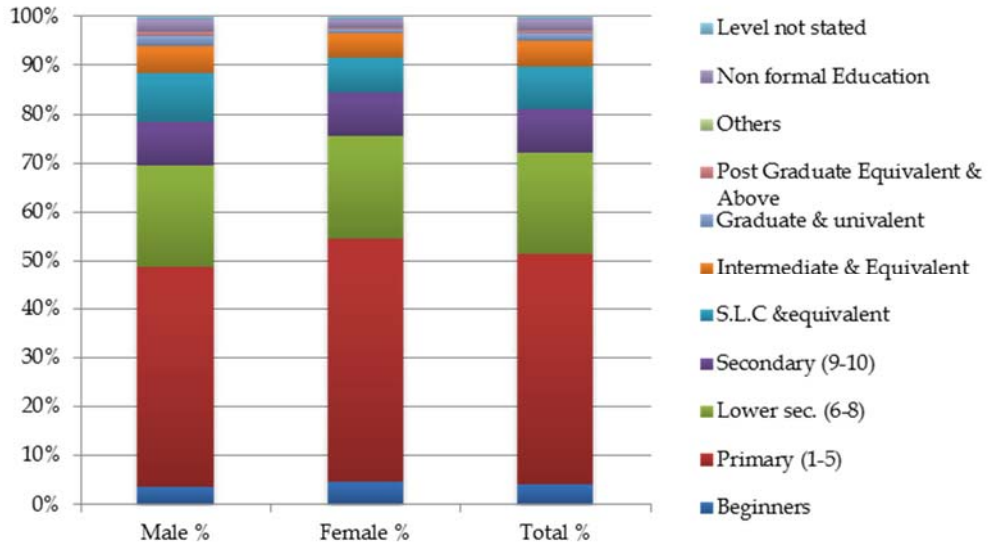
| Asset | HHs No. | Percentage |
|---|---|---|
| Both House and Land | 460 | 5 |
| Land only | 322 | 3 |
| Neither house nor land | 8892 | 91 |
| Not stated | 67 | 1 |
| Total | 9741 | 100 |

Source: UT-1; Complementary Social Baseline, NESS, July 2014

While involved in income generating activities such as agriculture and small businesses, women are reported to be mostly involved in household activities including child care, animal husbandry, water fetching, and looking after the welfare of family members.

*Education Profile*

The district is characterised by a literacy rate of 53.6%, with the male literacy rate being 60.58% and the female literacy rate being 46.5%.




Source: UT-1; Complementary Social Baseline, NESS, July 2014

**Figure 3.6.1-5: Educational Profile for the Rasuwa District**

Of the literate population, 50% is reported to have education till the primary level while only 16% of the population is reported to have received the School Leaving Certificate and 7.18% has education above the intermediate level.

This literacy profile of the district is undergoing a change in the post-earthquake scenario. This is reported to be resultant from a larger population moving towards urban areas and thus having better access to educational infrastructure.

The district is reported to have 129 educational institutions, of which 123 are managed by the community and 6 are institutional. The primary education institutions comprise of 80% of the total educational institutions.

*Health*

The district has 18 health care facilities, including 1 hospital at Dhunche. In addition to this, there are 17 health posts and sub-health posts at the VDC level. Apart from this, there are 42 primary health care outreach clinics, 57 Expanded Program on Immunization (EPI) clinics and 24 female and child health volunteers.

The predominant diseases in the district include skin diseases, respiratory problems, diarrhoea, parasitic infections, gastric disorders and eye and ear infections.

*Water Supply and Sanitation*

In the district, 88% of the households are reported to be supplied with tap/piped water, while the remaining are primarily dependent upon nearby springs and rivers. The sources of the water supply in most of the cases are springs.

While 57% of the district is reported to have some type of toilet (predominantly being flush toilets with septic tanks) in their homestead, facilities of storm water drainage and wet sewage drainage do not exist in the district.

As part of the detailed plan, NWEDC will review and update the socio-economic profile put in place. This update shall be based on the understanding of the changed administrative structure and scope of the plan, in discussion with the GoN. Some of the sources of information which may be used include the following:

- Central Bureau of Statistics/UNFPA, Kathmandu, 2002 Population Census 2001, National Report
- CBS/ICIMOD, Kathmandu, 2003 Mapping Nepal Census Indicators 2001 and Trends
- CBS/ Survey Department 2004, The Population and Socio- Economic Atlas of Nepal
- Central Bureau of Statistics 2012, National Population and Housing Census 2011 (National Report)
- Central Bureau of Statistics 2012, National Population and Housing Census 2011 (Tables from form II )
- Department of Education, 2012-2013, "Flash Report 2067"
- Department of Health Services, Kathmandu, Annual Report 2011
- National Planning Commission / UNDP, Nepal Human Development Report 2014
- Central Bureau of Statistics, Kathmandu, 1013 Nepal In Figures 2013
- CBS/ Survey Department 2004, The Population and Socio- Economic Atlas of Nepal

**Context for Developing the Local Benefit Sharing Plan**

The benefit sharing plan has thus been formulated in keeping with the above mentioned understanding of benefit sharing, project context, the impacted area and the impact of the Gorkha earthquake on the district and the project area of influence. Some of the specific points to be kept in mind for this benefit sharing plan are provided below:

*Earthquake-Related Losses and Internal Displacement of People*

- The Project area has been impacted by the 2015 Gorkha earthquake.
- The earthquake of April 2015 caused huge losses to the people residing in Rasuwa district at large; especially in Gogone and Tiru. The local community in the project area suffered impacts pertaining to loss of life and property, loss of livelihood, physical injuries, psychological trauma and damage to agricultural land.
- The earthquake and subsequent landslides resulted in the local community ( Haku Besi, Phoolbari, Gogone, Tiru etc.) vacating their villages and seeking refuge in Internally Displaced People's (IDP) camps, such as Naubesi, Satbise, Bogetitar etc.
- The land of Gogone, Tiru and Mailung, is heavily impacted by the earthquake. The path from these locations to these villages has been severely damaged and only a few families have gone back to Tiru or Gogone because of the highly prevalent risk of landslides.
- In case of Haku Besi, Thanku, Phool Bari and other nearby villages, though there was destruction of residential structures, the agricultural land is reported to have suffered minor damages, most of which can be or have been repaired. Thus, the people of these villages have started going back to their original villages, either for short duration or some families permanently.
- Most households are moving back and forth between the native villages and the IDP camps. From most households, at least a few household members return to the native village for cultivation three times in a year, for usually 10-15 days at a time. The families return to the IDP camps during monsoons and winters. However, none of the households from Gogone have not returned due to extensive damage and continued risk of landslides.

*Permanent Housing and Livelihood Concerns*

- Government has identified resettlement site, but this does not include agriculture land.
- Reconstruction or construction of new house in a safe location is another concern of the HHs living in the IDP. In case of Gogone, Tiru identification of an alternate land is also an issue.
- The people living in the IDP camps have been facing various issues in terms of lack of space for livestock and poultry; unsanitary conditions leading to various diseases affecting people frequently, etc.
- Another issue is safety concerns post-earthquake, due to risk of landslides because of which people are still hesitant to move to their native village locations.
- Majority of the IDP camps are constructed on private land for which the people have to pay rents. There are a considerable number of families which are struggling to meet their basic expenses on account of shrinking savings, erratic employment opportunities and increased expenditure.
- Another issue being faced by the community is the instability and uncertainty associated with the present livelihood options available.

- In the pre-earthquake scenario, the local community was primarily dependent upon agriculture and livestock rearing.
- However, in the post-earthquake scenario, the community has reported a shift towards non-farm based livelihoods. This is understood to be primarily resultant from loss of access to agricultural land, loss of livestock in earthquake, issues with climatic conditions in IDP camps which makes it unsuitable for the high mountain breeds earlier kept by the local community.
- A significant portion of the local community has also started undertaking labour as masons or other construction related activities. however, the opportunities with this are also understood to be reducing due to a general reduction in the construction activities in the district

*Alternative Land Identification for Resettlement of IDPs*

- A government Geological team visited the project villages and assessed the level of earthquake impact in the affected villages. According to the preliminary information available, the areas of Gogone have been identified as High Risk, and resettlement has been suggested for the same; Tiru has not found mention in the draft report. Haku has been considered safe as per the draft geological study.
- For the villages identified as safe, a housing reconstruction grant has been identified. This grant shall be provided to those households, who have lal purza/ tenancy certificates for the land. These households would then be provided with monetary assistance to rebuild houses in keeping with pre-approved designs
- Of the 820 HHs in Haku VDCs, 803 are understood to have been identified as those who were eligible for receiving the grant
- For the villages identified as high risk, resettlement to an alternative land parcel.
- For this purpose, the government has already identified 72/82 ropani of land in Khalte, Lahare Pahuwa for resettlement of the households. This land is understood to have the capacity of accommodating 200 households.
- The ground levelling activities have been initiated by the NGO, Samaritan Purse and entire construction is expected to be completed in 1.5 years.
- Another 65 ropani has been identified in the Uttar Ganga Gaonpalika. However, no activity has been initiated for the same.

*Capacity Building Training by NGOs and Government Agencies Post-Earthquake*

- Over the last two years, however, the skill set of the community has evolved, due to the numerous trainings given by the NGOs/INGOs active in the area as part of the relief activities post-earthquake, including skill training for plumbers, electricians, masons, poultry farming, WASH etc.
- A lot of the NGOs (including Lumanti, Manekor, LaCCoS, Parivartan Nepal) have been involved in the district as a whole in different training- some are women specific and others

are general. In some cases need assessment was done but not always. Cottage department also did training in Rasuwa.

- Some people have benefited but some took trainings only for livelihood and for some it was too basic for sustaining livelihoods so need refresher courses.
- There is also a lack of understanding amongst the local communities in terms of the purpose of the trainings and the possibility of future livelihood opportunities from the same.
- There are also reported to be certain people who attended training just for the sake of being engaged and to earn money being paid to attend trainings;
- The project can build on this base and with people. This can be done keeping in mind the constraint, such as access to land – which was a major source of sustenance.

*Current Livelihood Status*

- One of the most important concerns of people has been the continuous pressure to find enough livelihood sources to help them meet the financial needs of their families, in the present temporary shelter. This has also led to a higher level of diversification of the livelihood dependence of the households;
- The most common sources of livelihoods in the local community presently are labour, stone breaking, Masonry, foreign employment, agriculture and remittance;
- While some households are now returning regularly to the original villages. Some households are also undertaking agriculture on share cropping basis in the vicinity of the IDP camps. However, this is limited to households who can afford the rent/ share in crop. There is also a limitation in the total land available for rent/share cropping
- Activities such as livestock are likely to be restricted in the area due to instability associated with residential status and land availability the company will do this.
- Furthermore, it is understood that the breeds to livestock that were maintained by the communities in the native villages are non-compatible with the climatic conditions of the IDP camps, which are hotter as they are mostly in the plain region.
- There is also reported to be a reduction in the availability of labour work opportunities associated with construction such as Masonry, electricians, plumbers etc. due to a reduction in construction activities in the district.
- The livelihood profile and the present trends, is largely dependent upon the present residence of the population and are likely to change once again, if the population goes back to the original village or changes location of residence.

*Livelihood Expectations of the Project-Affected Population*

- A number of the local community members, especially younger population, are interested in direct employment, petty contracts and daily wage.
- The preference for direct employment pertains to job profiles such as security, housekeeping, general administration, drivers etc.
- There is reported to be a shift, especially amongst the local population, towards foreign employment, as it is perceived as providing better returns and more stable incomes. Thus, there is an interest in the youth to develop skills which would allow them to pursue livelihood opportunities not just in the country but also abroad.
- However, the skill set required by the project, at least in the initial few years, may not be available in the project area. These skill sets however may be available in urban areas such as Battar, Betrawati etc.

*Livelihood Options Likely to be Available from UT-1 Project*

- As a result of this, it is possible, that in the first few years, the project may have to recruitment workers from outside the project area and the district. However, it is expected that through the training plan, the skill set available in the AoI will increase and after a certain number of years, the project will be able to recruitment a majority of its workers from the project area itself.
- However, one of the challenges in recruiting for the project is the remoteness of the site, due to which finding appropriate skill sets becomes a challenge
- The employment and skills training plan thus formulated will put in place a recruitment plan which will prioritize the recruitment of the locals from the project area, followed by the Gaonpalikas being touched by the project boundaries and then the district, and if not available in the district, then a Nepali citizenship.

#### *3.6.1.3. Legal and Regulatory Framework*

The plan implementation will be ensured to be in compliance with applicable requirements/guidelines which as per PDA should comply with Nepal regulations as well as Performance standards (IFC PS and ADB SPS etc. already referred to in the PDA.

**Provisions of the Project Development Agreement (2016)**

As per the Project Development Agreement:

- In addition to the budget committed in the EIA, the Company shall throughout the Term, support community development of affected communities through benefit sharing activities;
- The Company will set up a grievance mechanism to resolve grievances at the community level as per the EIA;
- As part of the Company's obligations regarding Disclosure of Information and Consultation, the Company will disclose all Plans in Nepali and English;

- The Company shall submit reports, every six months up to Commercial Operation Date and every 12 months thereafter, to GON describing in detail the activities undertaken under the Plan, the amounts spent on such activities and impact evaluation of such activities.
- Local community development activities aim to improve the standard of living of the affected communities through livelihood enhancements and support to construction and maintenance of physical infrastructure such as roads, trails, pedestrian bridges, water supply and sanitation schemes, communication infrastructures, community infrastructure development, such as schools, health posts, community centers, women's centers, small enterprise development funds etc. These initiatives should be developed in coordination with local governments to avoid duplication of interventions/support and ensure sustainability of efforts.
- The Local Benefit Sharing Plan shall also include a component detailing local community development activities (as committed in GON approved Environment Reports), that includes a detailed breakdown of specific activities, timeline, budget and implementation modalities.
- This does not preclude the Company from committing additional resources for the above and other benefit sharing activities.
- The Company and GON shall as per Section 11.3.2 (Plans) jointly prepare the Local Benefit Sharing Plan to be implemented within 12 months from the Agreement Date in accordance with this Schedule.
- The Company shall, and shall ensure that its Contractors and Representative shall, in connection with the conduct of the Project:
  - maximise the use of Nepali resources and give first consideration and full and fair opportunity to technically and commercially qualified Nepalese citizens and firms provided that in each case, the use of such Nepali resources meet the quality, quantity and availability requirements of the Company and provided further that use of such resources does not have a material and adverse impact on the costs and the timelines for the Project;
  - ensure that its Nepal Industrial Benefits Plan provides for an outreach programme under which the Company engages with Nepali suppliers for Project-related opportunities;
  - comply with the Laws of Nepal including the Labour Act, 2048 and Labour Regulation, 2050;
  - ensure that its Nepal Employment and Skills Training Plan provides for appropriate training of suitable citizens of Nepal for Project-related opportunities;
  - conduct employee training programmes from time to time, including training in each of the skills used in the Project, including management training;
  - comply with the Nepal Employment and Skills Training Plan, Nepal Industrial Benefits Plan and Local Benefit Sharing Plan and ensure that appropriate programmes are designed to assist suitable Nepali citizens, entities, and firms to meet the Project's requirements for goods and services;

- shall (to the extent applicable) submit reports every six (6) months to GON for the first three (3) years of the Construction Period and every twelve (12) months thereafter, describing in detail (A) its employee training programmes, (B) the implementation of such training programmes, (C) the progress made towards meeting the objectives set forth in· this Section 11 .9 (Use of Nepali resources; training and development) the Nepal Employment and Skills Training Plan, Nepal Industrial Benefits Plan and Local Benefit Sharing Plan.

**Other Applicable Provisions**

*Constitution of Nepal (2015 AD)*

Nepal is governed according to the Constitution of Nepal, which came into effect on Sept 20, 2015, replacing the Interim Constitution of 2007.

- Policies of the State: The state shall pursue a policy of raising the standards of living of the general public through the development of infrastructures such as education, health, housing and employment of people of all regions by equitably distributing investment of economic investment for the balanced development of the country;
- The state shall pursue a policy of making the women participate to the maximum extent in the task of national development by making special provisions for their education, health and employment
- The state shall pursue a policy of making special provisions of social security for the protection and progress of the single women, orphans, children, the helpless, the aged, the disabled, incapacitated persons and tribes on the verge of extinction
- The State shall pursue a policy of making a special provision, based on positive discrimination, for the minorities, landless people, landless squatters, bonded labours, the disabled, backward regions and communities and victims of conflict, the women, Dalit, indigenous people, Madhesi and Muslims, as well.

*Nepal Hydropower Development Policy 2056 BS (2001 AD) Requirements*

The Hydropower Development Policy was implemented by the Department of Electricity, Nepal to ensure supply of electricity to rural and urban areas, to enhance hydro-power development and to motivate the national and foreign private sector investments for the development of the hydropower sector in the country.[1]

The policy species requirements for various works to be undertaken for the development of hydropower in the country, from which, the following specifications are relevant to the Project:

- Foreign entrepreneurs shall be encouraged to be affiliated with local organizations as the cost of hydropower decreases if the project is developed through the domestic construction entrepreneurs and consultants;

[1] Hydropower Development Policy, 2001, http://www.doed.gov.np/policy/hydropower_development_policy_2001.pdf

- The person licensed to build or operate a hydropower project shall carry out or cause to be carried out works such that technology is transferred to the Nepalese citizens in the course of performing the works in accordance with the license;
- The person licensed to build or operate a hydropower project shall utilize Nepalese labor, skills, means and resources to the maximum extent possible and, shall also give priority to utilize local labor. 6.8.4 Development of industries producing construction materials and equipment to be used in the power sector shall be encouraged.

*Land Acquisition, Resettlement and Rehabilitation Policy for Infrastructure Development Projects 2071 BS (2015 AD)*

In September 2015, the Government of Nepal formulated the Land Acquisition, Resettlement and Rehabilitation Policy for Infrastructure Development Projects (2071 BS). The main objective of the policy is to make the process of land acquisition for development projects smooth and scientific. Key features of the policy (relevant to benefit sharing) are as follows:

- Social mobilization income restoration and life skill program: Project affected persons should be given necessary training for development of life skills, income generating schemes, savings and credit schemes so that PAFs can take up self-employment projects at the resettlement zone. Preference should be given to women;
- Vulnerable groups such as Janajati/Adivasi, Dalits, landless, women, especially women-headed households, differently-abled, poverty groups and senior citizens are entitled to special benefit and assistance packages in addition to compensation and resettlement;

*International Reference Guidelines Requirements*

IFC Performance Standards 2012

IFC applies the Performance Standards[2] to manage social and environmental risks and impacts and to enhance development opportunities in its private sector financing to its member countries eligible for financing. Together, the eight Performance Standards establish standards that the Client is required to meet throughout the life of an investment by IFC or other relevant financial institutions. The key requirements of these standards in terms of community development and benefit sharing are as follows:

- The project must improve, or at least restore the livelihoods and standards of living of displaced persons
- the project will offer displaced communities and persons compensation for loss of assets at full replacement cost and other assistance to help them improve or restore their standards of living or livelihoods
- economically displaced persons whose livelihoods or income levels are adversely affected will also be provided opportunities to improve, or at least restore, their means of income-earning capacity, production levels, and standards of living

[2] http://ifcext.ifc.org/ifcext/sustainability.nsf/Content/PerformanceStandards

- The project may also provide alternative income earning opportunities may be provided, such as credit facilities, training, cash, or employment opportunities.

ADB Safeguard Policy Statement

In July 2009, ADB's Board of Directors approved the new Safety Policy statement (SPS) governing the environmental and social safeguards of ADB's operations[3]. The SPS builds upon ADB's previous safeguard policies on the Environment, Involuntary Resettlement, and Indigenous Peoples, and brings them into one consolidated policy framework with enhanced consistency and coherence, and more comprehensively addresses environmental and social impacts and risks. The SPS also provides a platform for participation by affected people and other stakeholders in the Project design and implementation.

The key requirements of these standards in terms of community development and benefit sharing are as follows:

- The project shall at least restore, the livelihoods of all displaced persons1 in real terms relative to pre-project levels; and improve the standards of living of the displaced poor and other vulnerable groups.
- The project shall aim to provide displaced persons with opportunities to share project benefits in addition to providing compensation and resettlement assistance.
- Project shall attempt to ascertain specific opportunities for engaging affected persons as project beneficiaries and to discuss how to spread such opportunities as widely as possible among affected persons
- The project shall prioritize land-based resettlement strategies for displaced persons whose livelihoods are land-based.
- If land is not the preferred option of the displaced persons, or sufficient land is not available at a reasonable price, non-land-based options built around opportunities for employment or self-employment should be provided in addition to cash compensation for land and other assets lost.
- The project will also provide assistance to displaced persons in the form of credit facilities, training, and employment opportunities so that they can improve, or at least restore, their income-earning capacity, production levels, and standards of living to pre-displacement levels
- The borrower/client will also provide opportunities to displaced persons to derive appropriate development benefits from the project.

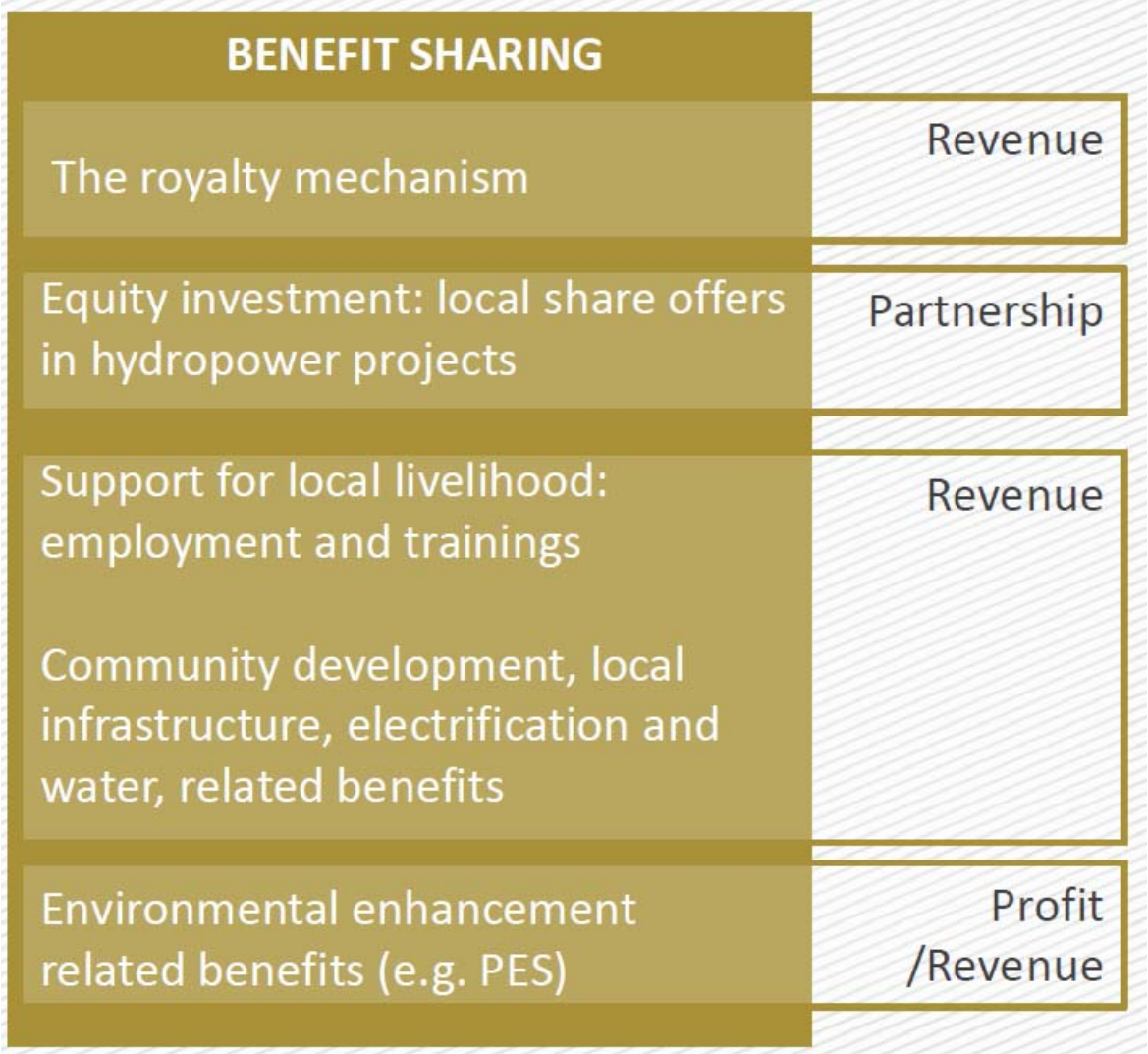
#### *3.6.1.4. Benefit Sharing Mechanism: Practice in other HEP Projects of Nepal*

According to the PDA, "Benefit Sharing is the systematic effort of the Company, as well as GON and GON nominated agencies to equitably share benefits of Project with affected communities through benefit sharing mechanisms beyond mandatory mitigation and

[3] http://www.adb.org/sites/default/files/institutional-document/32056/safeguard-policy-statement-june2009.pdf

compensation measures, including but not limited to the enhancement measures detailed in the environmental reports during construction phase, and continued community development activities that benefit the affected communities throughout the concession term".

The benefits typically include monetary and non-monetary initiatives. The following figure provides an understanding of the typical components of a benefit sharing mechanism.




Source: Rai. N & Neupane S. "Sharing benefits" of Hydropower projects: with special reference to the "Shares model". Advancing Sustainable Hydropower Technical Workshop Series. January 23-24 2017

**Figure 3.6.1-6: Typical Components of a Benefit Sharing Mechanism**

The concept of benefit sharing has been used in many HEP projects in Nepal. While the benefit sharing is used liberally by many, it has also been used liberally in some contexts. The modalities of benefit sharing have definitely evolved over time with communities engaged in continued struggle to get benefits from the Project in their backyard which they consider to be rightfully theirs.

A brief snapshot of how similar HEP Projects in Nepal have implemented benefit sharing in their respective Projects is captured in Table 3.6.1-5.

**Table 3.6.1-5: Examples of Benefit Sharing in Nepal**

| SN | Project name | Royalty | Local project shares | Community development fund | Local livelihoods programme | Electricity support | Water and environment benefits |
|---|---|---|---|---|---|---|---|
| 1 | Kulekhani I | Pays | N/A | No | Local jobs, trainings | Infrastructure provided and no load shedding | Drinking, fisheries |
| 2 | Kulekhani II | Pays | N/A | No | Local jobs, trainings | Infrastructure provided | Drinking |
| 3 | Marsyangdi | Pays | N/A | Yes | Local jobs, trainings | N/A | Drinking, irrigation |
| 4 | Aadhi Khola | Pays | N/A | Yes | Local jobs, trainings | BPC grid distribution | Drinking, irrigation |
| 5 | Jhimruk | Pays | N/A | Yes | Local jobs, trainings | BPC grid distribution | Drinking, irrigation |
| 6 | Khimti | Pays | N/A | Yes | Local jobs, trainings, local union | MHP plant built and local cooperative established | Drinking, irrigation |
| 7 | Upper Bhotekoshi | Pays | 6% private pending | Yes | Local jobs, trainings | Infrastructure provided | Drinking |
| 8 | Kali Gandaki A | Pays | N/A | No | Local jobs, trainings | Connections to some houses | Drinking, irrigation, fisheries |
| 9 | Chilime | Pays | 10% issued | Yes | Local jobs, trainings | Infrastructure provided | Drinking |
| 10 | Middle Marsyangdi | Pays | N/A | No | Local jobs, trainings | Infrastructure provided | Drinking, cultural, environment data |
| 11 | Ridi | Pays | 10% issued | Yes | Provided | Preferential tariff and no load shedding | Drinking, irrigation |
| 12 | Siuri Khola | Pays | 10% issued | No | Provided | Infrastructure provided | None |
| 13 | Mai | Pays | 10% issued | Yes | Provided | Infrastructure provided | Drinking |
| 14 | Upper Marsyangdi | N/A | N/A | No | Provided | N/A | Drinking |
| 15 | Puwa Khola I | N/A | 10% planned | No | Provided | N/A | TBD |
| 16 | Kulekhani III | N/A | N/A | No | Provided | N/A | Drinking, attempted environment scheme |
| 17 | Rasuwagadhi | N/A | 10% planned | No | Provided | Infrastructure provided | Cultural, environment data |
| 18 | Upper Tamakoshi | N/A | 10% pending | No | Provided | Infrastructure provided | Drinking, environment data |

Note: BPC = Butwal Power Company; MHP = micro hydro plant; N/A = not applicable; TBD = to be decided

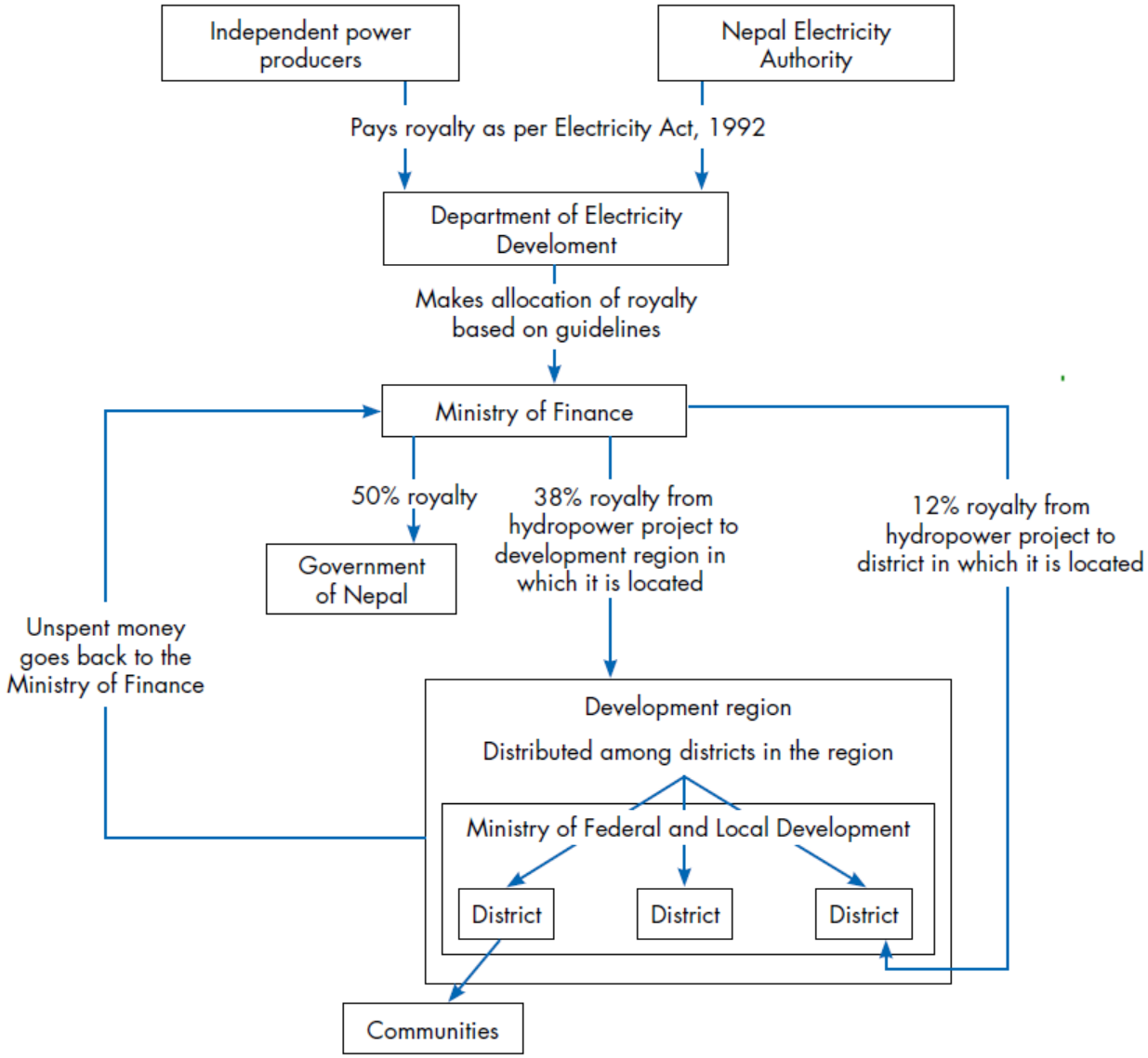
Source: Shrestha, P; Lord, A; Mukherji, A; Shrestha, RK; Yadav, L; Rai, N (2016) Benefit sharing and sustainable hydropower: Lessons from Nepal. ICIMOD Research Report 2016/2. Kathmandu: Nepal

### Royalty Sharing

The royalty sharing mechanism is one of the most common types of benefit sharing and usually works on a system of royalty collection by the government from HEP Projects and distribution to local community through local governments.

Typically, the royalty collected is based on the capacity of the hydropower plant and the annual generation of electricity. The annual capacity royalty amount increases ten times after 15 years and the energy royalty increases by five times after 15 years.

The typical process followed for the royalty sharing mechanism is given in the following figure.




Source: Shrestha, P; Lord, A; Mukherji, A; Shrestha, RK; Yadav, L; Rai, N (2016) Benefit sharing and sustainable hydropower: Lessons from Nepal. ICIMOD Research Report 2016/2. Kathmandu: Nepal

**Figure 3.6.1-7: Royalty Sharing Process**

The table below provides an understanding of some of the projects in which royalties have been collected.

**Table 3.6.1-6: Royalties collected by the Government of Nepal from Hydropower Projects in Fiscal Year 2068/69 BS (2012 AD)**

| SN | Project name | Capacity royalty | Generation royalty | Total |
|---|---|---|---|---|
| 1 | Kulekhani I (60 MW) | NPR 60,000,000 | NPR 77,136,754 | NPR 1,37,136,754 |
| 2 | Kulekhani II (32 MW) | NPR 32,000,000 | NPR 38,531,556 | NPR 70,531,556 |
| 3 | Marsyangdi (69 MW) | NPR 69,000,000 | NPR 240,457,529 | NPR 309,457,529 |
| 4 | Aadhi Khola (5.1 MW) | NPR 5,100,000 | NPR 14,227,684 | NPR 19,327,684 |
| 5 | Jhimruk (12 MW) | NPR 12,000,000 | NPR 34,054,469 | NPR 46,054,469 |
| 6 | Khimti (60 MW) | NPR 6,000,000 | NPR 56,293,747 | NPR 62,293,747 |
| 7 | Upper Bhotekoshi (45 MW) | NPR 4,500,000 | NPR 35,601,380 | NPR 40,101,380 |
| 8 | Kali Gandaki A (144 MW) | NPR 14,400,000 | NPR 92,953,213 | NPR 107,353,213 |
| 9 | Chilime (22.1 MW) | NPR 2,210,000 | NPR 17,843,078 | NPR 20,053,078 |
| 10 | Middle Marsyangdi (72 MW) | NPR 7,200,000 | NPR 45,906,287 | NPR 53,106,287 |
| 11 | Ridi Khola (2.4 MW) | NPR 240,000 | NPR 1,082,686 | NPR 1,322,686 |

Note: Project numbers 1–5 have been in operation for more than 15 years and pay higher royalties as per the Electricity Act, 1992;
USD 1 = NPR 107 as in June 2016
Source: Department of Electricity Development, Government of Nepal

Source: Shrestha, P; Lord, A; Mukherji, A; Shrestha, RK; Yadav, L; Rai, N (2016) Benefit sharing and sustainable hydropower: Lessons from Nepal. ICIMOD Research Report 2016/2. Kathmandu: Nepal

The royalty mechanism is intended to promote development on a district and regional scale by distributing benefits to local government institutions rather than individual beneficiaries. According to the Hydropower Royalty Distribution and Utilization Directive, 2063 BS:

- The district with the hydropower project that receives 12% of royalty has to spend half of that money (that is 50% of the 12%) for environmental restoration work in upstream areas (20%);
- For supporting work in surrounding areas impacted by project's infrastructure like the dam, powerhouse, reservoir, transmission lines, tunnel, etc. (15%);
- For work in downstream dry areas below the dam (15%).
- For the remaining 50% of the 12% royalty and the contribution from the 38% royalty distributed within districts of the development region, DDCs have to give higher priority to electrification, alternate energy, and community electrification in affected areas.

But again, as the local development officers have to deal with multiple needs in a district, they often allocate budgets for purposes other than electricity and beyond the affected areas.

### Equity Shares

This form of benefit sharing involves the provisioning of a percentage of equity or shares to the local stakeholders through both the public and private markets. This mechanism is aimed at allowing the local shareholders to get a direct financial claim to the project's projects. Although similar to the royalty mechanism in that the value of financial transfers to project beneficiaries is linked to project performance (in the form of dividends, bonus shares, or increased equity value).

As per the amended Securities Registration and Issuance Regulation 2008, only a hydropower company that is registered as a public limited company, not a private company can float a minimum of 30% of its shares to public, out of which 5% must be for company staff, 10% for locals, and the remainder for the general public.

The following table provides an understanding of some of the projects that have undertaken equity sharing as a mechanism.

## Table 3.6.1-7: Share offers by Hydropower Projects

| Hydropower project, offering status, and offering year | Allocation of 'local shares' | Share offer details |
|---|---|---|
| Chilime (completed 2008–2010) | 10% to local affected district and 15% to general public | The general initial public offering (IPO) was completed seven years after the completion of the project, post-profitability. The local share offer was conducted in 2010, following the resolution of a court case in which the percentage of shares allocated to the local population was revised from 5% to 10%. Due to this delay in the local offer, shares were offered at par with the IPO price (@ NPR 100) to 'highly-affected' locals in three VDCs and at a backdated share price premium (@ NPR 323) to affected locals. As a result, the company was able to pay dividends to locals immediately following the offer. |
| Mai (completed 2013–2014) | 10% to local affected district and 20% to general public | The general IPO was completed in 2013 and the local share offer was conducted in 2014, both during the construction phase prior to the completion of the project in 2015. The project initially planned to allocate 40% of local shares to affected VDCs, but due to insufficient local demand the project allocated the remaining local shares to other residents of Ilam District. The general IPO was oversubscribed by 29 times. |
| Ridi (completed 2013–2014) | 10% to local affected VDCs and 39% to general public, plus 50% promoter shares to locals | The construction of the project was completed in 2009. The local share offer to affected VDCs was done in October 2013 and the general IPO was done in February 2014. For both the offers, the IPO price was NPR 100 per share. Out of 300 promoters, about 50% are from local affected VDCs. |
| Siuri Khola (2015–2016) | 10% to locals and 20% to general public | The construction was completed in September 2012. Ngadi Power Group completed the local share offer to affected districts in November 2015 and the general IPO in April 2016. |
| Upper Bhotekoshi (in progress/agreement reached) | 6% private-market shares to locals only | Shares were demanded 14 years into commercial operation as a result of local protests following a landslide in August 2014. Following negotiations, project developers committed to provide 6% of 'private-market' shares to locals (distribution still pending). |
| Upper Tamakoshi (pending 2016–2017; delayed) | 10% to local affected district and 15% to general public | The general IPO and local share offer was initiated in early 2015, after roughly 70% of the construction work had been completed. Concerns about eligibility criteria and uneven allocations to different affected areas led to protests and strikes in Dolakha District. Nepali employees of project contractor Sinohydro also organized a labour strike, demanding that workers be allowed to purchase shares in the project. The construction of the project and the share offer have been delayed due to earthquake-related damage. |
| Rasuwagadhi (planned 2018) | 10% to local affected district and 15% to general public | There are plans to offer local shares before completion of construction. |
| Puwa Khola 1 (planned) | 10% to local affected district | There are plans to offer local shares before completion of construction. |
| Khimti (demanded) | N/A | Local demands for shares emerged 14 years into commercial operation (partially a reaction to Bhotekoshi and Upper Tamakoshi protests/demands), but the project has not agreed to any share offer. |
| Upper Marsyangdi (demanded) | N/A | Local demands for shares emerged during the construction phase, but no shares have been issued. |
| Aadhi Khola and Jhimruk projects (demanded) | N/A | Project developer Butwal Power Company (BPC) is a publicly traded company on the Nepal Stock Exchange and, therefore, has not issued shares for its subsidiary projects in the past (although BPC is currently changing its policy by establishing a new project-specific company for its new undertakings). Local people from Aadhi Khola and Jhimruk have demanded shares. |

Source: Shrestha, P; Lord, A; Mukherji, A; Shrestha, RK; Yadav, L; Rai, N (2016) Benefit sharing and sustainable hydropower: Lessons from Nepal. ICIMOD Research Report 2016/2. Kathmandu: Nepal

Note: Although the practice is not mandatory for all projects, shares are still widely offered by many power producers as public companies in order to harness domestic or 'local' capital and to obtain the 'social licence to operate'.

### Community Development

One of the oldest and most common types of benefit sharing is in the form of investment in community development or infrastructure development. This generally includes interventions in key areas such as: Health, Education, Agriculture, Road, Water supply, Religious/ cultural sites. These activities are also undertaken as part of the CSR activities by the project. Some of the community development activities undertaken by hydropower projects are depicted in the table below.

**Table 3.6.1-8: Community Development Areas and Activities in Hydropower Projects**

| Priority areas | Representative activities |
|---|---|
| Health care | Funding management of health care (e.g., Khimti, Upper Bhotekoshi)<br>Construction of health posts (e.g., Kulekhani III, Middle Marsyangdi, Aandhikhola, Upper Marsyangdi, Upper Tamakoshi)<br>Acquisition of ambulances (e.g., Middle Marsyangdi, Chilime, Rasuwaghadi, Puwa Khola I)<br>Organization of health camps (e.g., Mai, Aandhikhola, Middle Marsyangdi) |
| Education | In-kind and cash support to schools (e.g., Khimti, Aandhikhola, Kaligandaki,Upper Tamakoshi)<br>Maintenance of school buildings (e.g., Aandhikhola, Upper Marsyangdi, Kaligandaki)<br>Construction of new school buildings (e.g., Middle Marsyangdi, Khimti, Mai, Kulekhani II, Upper Bhotekoshi)<br>Provision of school bus (e.g., Kulekhani II)<br>Support for teachers' salaries (e.g., Upper Bhotekoshi, Khimti, Aandhikhola)<br>Merit-based scholarships and awards (e.g., Upper Bhotekoshi, Khimti)<br>Tuition fee waivers (e.g., Khimti)<br>Literacy programmes (e.g., Khimti, Aandhikhola) |
| Roads | Opening track of road (e.g., Middle Marsyangdi, Jhimruk, Upper Marsyangdi, Puwa Khola I, Siuri) |
| Cultural sites | Construction of cremation sites (e.g., Kaligandaki, Upper Marsyangdi, Puwa Khola I)<br>Construction/reconstruction of temples (e.g., Andhikhola, Kaligandaki, Upper Bhotekoshi) |
| Mother's group | Financial support (e.g., Upper Marsyangdi, Andhikhola, Jhimruk)<br>Literacy classes (Khimti) |
| Drinking water | One house, one tap programme (e.g., Upper Marsyangdi)<br>Construction of water supply lines (e.g., Middle Marsyangdi, Lower Marsyangdi, Upper Marsyangdi, Jhimruk, Ridi, Kaligandaki) |
| Irrigation | Expansion and improvement of irrigation systems (e.g., Ridi, Aandhikhola, Jhimruk, Khimti)<br>Irrigation canal maintenance (e.g., Ridi, Aandhikhola, Jhimruk)<br>River works and river bank stabilization (Jhimruk) |
| Other | Support for fisheries development (Kulekhani I, Kali Gandaki A) |

Source: Shrestha, P; Lord, A; Mukherji, A; Shrestha, RK; Yadav, L; Rai, N (2016) Benefit sharing and sustainable hydropower: Lessons from Nepal. ICIMOD Research Report 2016/2. Kathmandu: Nepal

### Rural Electrification

Another component of the benefit sharing mechanism is the rural electrification process. This may be undertaken based on the following models:

- Provision of free electricity and distribution infrastructure to the local electricity group, which then manages the distribution;
- Preferential tariff rates for those living in the affected VDCs;

- Provision of distribution infrastructure, but the electricity is purchased by rural electricity groups through NEA; and
- Rural electrification through NEA

The following table provides an understanding of the rural electrification process undertaken by some of the hydropower projects in the country.

**Table 3.6.1-9: Support for Rural Electrification Provided by Hydropower Projects**

| SN | Project name | Rural electrification support |
|---|---|---|
| 1 | Kulekhani I | Infrastructure support for electrification; no load shedding |
| 2 | Kulekhani II | No load shedding |
| 3 | Marsyangdi | Access through regular NEA connection |
| 4 | Aadhi Khola | Electricity connection through BPC distribution at subsidized rate |
| 5 | Jhimruk | Electricity connection through BPC distribution at NEA rates |
| 6 | Khimti | Free electricity (about 1 MW) to rural electricity cooperative through separate micro hydro plan |
| 7 | Upper Bhotekoshi | Some infrastructure support for electrification |
| 8 | Kali Gandaki A | Electricity connection to Bote community houses |
| 9 | Chilime | Infrastructure support for electrification |
| 10 | Middle Marsyangdi | Infrastructure support provided through neighbourhood development programme, complementing electrification policy of Lamjung District |
| 11 | Ridi Khola | Distributed electricity to 60 households at subsidized rate; no load shedding |
| 12 | Siyuri Khola | Infrastructure support for electrification |
| 13 | Mai | Infrastructure support for electrification |
| 14 | Upper Marsyangdi | N/A |
| 15 | Puwa Khola I | N/A |
| 16 | Kulekhani III | N/A |
| 17 | Rasuwagadhi | Infrastructure support for electrification (proposed) |
| 18 | Upper Tamakoshi | Infrastructure support for electrification (proposed) |

Source: Shrestha, P; Lord, A; Mukherji, A; Shrestha, RK; Yadav, L; Rai, N (2016) Benefit sharing and sustainable hydropower: Lessons from Nepal. ICIMOD Research Report 2016/2. Kathmandu: Nepal

NWEDC will try and build case studies on the examples presented, based on the information available as part of the detailed plans. The primary purpose of this section will be to provide learnings for previous experiences, and the key take –away from the same. The key learnings may be in the form of activities/initiatives that were successful and those which were not.

### Employment and Training

The support for local livelihoods is another form of benefit sharing and pertains to employment (usually contractual) of the local community within the project, or development of additional skills through trainings. Typically, the majority of local hiring is unskilled and casual labour, hired formally or informally through the project contractor(s), while the project developer hires a smaller group of locals as drivers or entry-level office staff.

The following table provides an example of some of the hydropower projects that have undertaken local employment as a benefit sharing mechanism.

## Table 3.6.1-10: Local Employment and Priority Hiring Programmes Provided by Hydropower Projects

| SN | Project name | Local jobs | Employment during construction | Employment after construction |
|---|---|---|---|---|
| 1 | Kulekhani I | Yes | Not known | 35 locals<br>NEA recruiting process |
| 2 | Kulekhani II | Yes | Not known | Some locals<br>NEA recruiting process |
| 3 | Marsyangdi | Yes | Preference to people who lost more than 70% of land | Some locals in contract later<br>NEA recruiting process |
| 4 | Aadhi Khola | Yes | Priority to locals | 85 locals |
| 5 | Jhimruk | Yes | Priority to locals | Priority given to locals by Jhimruk Industrial Development Company (JIDCO) – previously established by the project, but later turned into a non-government organization (NGO) |
| 6 | Khimti | Yes | Priority to locals | Priority to affected district |
| 7 | Upper Bhotekoshi | Yes | 17 displaced people<br>Priority to affected VDC | 26 out of 53 are locals<br>Priority to affected VDC |
| 8 | Kali Gandaki A | Yes | Priority to local affected people (especially Bote) | 7 locals in contract |
| 9 | Chilime | Yes | 50/60 people from district | 12–15 local staff |
| 10 | Middle Marsyangdi | Yes | Priority to locals | NEA recruiting process |
| 11 | Ridi Khola | Yes | Priority to affected VDC | 8 local staff |
| 12 | Siuri Khola | Yes | Local contractor for buildings and 8 local workers | 6–7 locals |
| 13 | Mai | Yes | 15–16 locals after training<br>Selected through concerned committee | 10–15 locals<br>Priority to affected VDCs for employment |
| 14 | Upper Marsyangdi | Yes | About 800 locals from affected district | TBD |
| 15 | Puwa Khola I | Yes | 20–25 locals<br>Priority displaced people | TBD |
| 16 | Kulekhani III | Yes | Priority to displaced people | TBD |
| 17 | Rasuwagadhi | Yes | Priority to people from most-affected VDCs | TBD (verbal commitment) |
| 18 | Upper Tamakoshi | Yes | Priority to 'local hiring' of people from Dolakha district, stated preference to hire from most-affected VDCs where possible | TBD (verbal commitment) |

Note: TBD = to be decided

Source: Shrestha, P; Lord, A; Mukherji, A; Shrestha, RK; Yadav, L; Rai, N (2016) Benefit sharing and sustainable hydropower: Lessons from Nepal. ICIMOD Research Report 2016/2. Kathmandu: Nepal

However, one of the issues is that when the project construction is complete, the daily operations of the hydropower project require much less labour input. Hence, most of the jobs directly created by hydropower development are not durable in the long term. For this reason, the quality and duration of project employment are key variables affecting the distribution of benefits from employment. However, while jobs in hydropower construction are rarely sustainable in this sense, it does allow the local community to develop specific skills which may allow them to find employment elsewhere.

In addition to employment with the project, provisioning of skill trainings has also evolved as a benefit sharing mechanism. These trainings are usually aimed at allowing for the local

community to build and expand their skills to allow them to undertake new entrepreneurship opportunities or for finding employment in the country or abroad. The following table provides an understanding of the types of trainings provided by the various hydropower projects in Nepal.

**Table 3.6.1-11: Trainings Provided by Hydropower Projects**

| SN | Project name | Sample trainings to project-affected people |
|---|---|---|
| 1 | Kulekhani I | Watershed management and soil erosion prevention training for women |
| 2 | Kulekhani II | Skill enhancement training on electro-mechanical and 'doko' knitting (for Chepang community) |
| 3 | Marsyangdi | House wiring and plumbing training |
| 4 | Aadhi Khola | Vegetable farming training |
| 5 | Jhimruk | Construction work (welding, plumbing), mobile repair, fruit support programme training |
| 6 | Khimti | Skill development and non-formal education programmes |
| 7 | Upper Bhotekoshi | Income generating training programme for disabled and backward communities |
| 8 | Kali Gandaki A | Fish farming training |
| 9 | Chilime | Women's empowerment, cooking, knitting training |
| 10 | Middle Marsyangdi | Agriculture training (e.g., in beekeeping and herb identification) |
| 11 | Ridi Khola | Converting semi-skilled workers to skilled workers through construction-related training |
| 12 | Siuri Khola | None |
| 13 | Mai | Construction training to 60 workers (later jobs), knitting training to women |
| 14 | Upper Marsyangdi | 70 labours trained in construction works (carpentry and bar bending) at Technical Campus |
| 15 | Puwa Khola I | Agriculture training |
| 16 | Kulekhani III | Driving, computer, stitching, agriculture training |
| 17 | Rasuwagadhi | Culinary training |
| 18 | Upper Tamakoshi | Electrical and plumbing training, driving, agriculture training |

Source: Shrestha, P; Lord, A; Mukherji, A; Shrestha, RK; Yadav, L; Rai, N (2016) Benefit sharing and sustainable hydropower: Lessons from Nepal. ICIMOD Research Report 2016/2. Kathmandu: Nepal

### *3.6.1.5. Guiding Principles: Benefit Sharing*

On the basis of the review of the PDA requirements, and based on understanding from the practices of other HEP Projects in Nepal, NWEDC will develop its own principles finalise in consultation with the GON at the time of formulating the detailed plan.

The Local Benefit Sharing Plan will be based on the following guidelines and principles:

- The Project will ensure compliance to relevant applicable Government of Nepal regulations, IFC Standards and ADB Safeguards Policy Requirements;
- The Project will clearly define and communicate to concerned parties, the areas and populations that qualify for LBS initiatives, with a list of criteria and mechanism for dispute resolution;
- The Project will ensure that the LBS initiatives will include all influenced VDCs and settlements, based on a fair selection process for prioritisation and stage-wise coverage);

- The Project work with credible local institutions and create an enabling environment to promote greater local ownership of initiatives, with the aim of transferring/handing-over operations (where feasible) to ensure both local ownership and long-term sustainability.[4]
- Ownership and user rights will be clearly defined with local participation and involvement of concerned stakeholders for all assets created/enhanced under LBS initiatives;
- The Project will take into consideration all forms of extant ownership and user rights (individual and community) to ensure that these are not involuntarily compromised by the project's initiatives;
- The Project will take into account all the impacts (beyond the 3 VDCs and ensure avoidance or effective management/mitigation);
- The Project will take into account existing schemes and programmes of the Government of Nepal, other plans formulated for the project and schemes and programmes of other multi and bi-lateral lending agencies with the purpose of ensuring complementarities and avoiding conflict or duplication;
- The Project will ensure transparency in disclosing information related to the LBS initiatives (impacts, benefits, eligibility criteria, people's participation, fund-utilisation/expenditure, time-lines etc.), across the project lifecycle;
- With the overall aim of furthering social inclusion, the Project will aim to ensure local participation, (with special care to include marginalised and/or indigenous groups and persons) from the planning stages to implementation and delivery;
- All stages and components of the initiatives will take into account gendered patterns in livelihoods and aim for greater gender equity to ensure practical benefits for women such as necessary safeguards, ensuring access, increased income opportunities and greater financial security;
- Recognising existing social and economic vulnerabilities in the local populations, the Project will build-in additional safeguards to ensure access and up-take of benefits;
- The project-related information dissemination, engagement and disclosure will be through informed consultation and participation (ICP), aiming for the widest coverage and use of the most effective mediums of communication; and
- The implementation of Local Benefit Sharing Plan will be monitored in terms of its impacts, process and outcomes as per agreed and approved indicators and timelines as defined in the Monitoring Plan.

### 3.6.2. Local Benefit Sharing Plan

As per PDA, "Local Benefit Sharing Plan" is understood to refer to the plan through which the Company agrees to benefit sharing through local community development activities reflected in the EIA, and that which the Company as a good corporate citizen will continue throughout the

[4] ICIMOD.Benefit Sharing and Sustainable Hydropower:Lessons from Nepal(2016).

concession period by channelling some of the benefits generated by the operation of the Project to the affected communities beyond mitigation and compensation measures.

As part of this section, the detailed plan will provide the benefit sharing programs based on the finding of the primary and secondary data of the demographic, socio-economic, and development indicators, as well as status of essential infrastructure in terms of housing, schools, hospitals and road networks. The plan will be developed on the following guidelines (but not limited to these guidelines)

#### *3.6.2.1. Objective of the LBSP*

The Local Benefit Sharing plan has been formulated in keeping with the requirements of the PDA signed on 29th December 2016. The primary purpose of the plan is to sustainably benefit local communities affected by hydropower investments.

While the LALRP formulated for the project, is aimed at mitigating the impacts from land procurement for the project, the Local Benefit Sharing Plan (hereinafter referred to as "LBSP"), as per PDA, will be aimed at fulfilling the following objectives:

- Supporting the local development process through direct investments (including local shares, royalty sharing, supply of local rural electrification) as well as collaboration and support of complementary programmes/projects in the area so that communities and other stakeholders benefit from the Upper Trishuli Hydro Power Project;
- Demonstrating good corporate citizenship practices of the NWEDC.

It should be noted that the LBSP shall serve as an umbrella plan, and shall be supported by specific plans including Industrial Benefit Sharing and Employment and Skill training plan formulated for the project.

The plan will be detailed out further by NWEDC in consultation with Government of Nepal (GoN) & GoN nominated agencies.

The objectives of the Plan will be discussed with GoN and any changes in the objectives will be made accordingly.

#### *3.6.2.2. Generic Options under Local Benefit Sharing (Community Development)*

In keeping with the EIA requirements and the understanding of benefit sharing in Nepal, the following options have been identified for the LBSP for UT-1.

## Table 3.6.2-1: Benefit Sharing Programs

| **Monetary Benefits** | **Non-Monetary Benefits** |
|---|---|
| Monetary benefit refers to sharing part of the monetary flows generated by the operation of the hydropower projects with local communities. It includes, but is not limited to, the following mechanisms:<br>• Direct payments/royalty and revenue sharing<br>• Preferential electricity rates<br>• Payments for environmental or ecosystem services<br>• Community development fund<br>• Equity sharing | Non- monetary benefits refers to the approaches adopted by the project entity for ensuring that local communities benefit from construction and operation of a hydropower project in non-monetary terms.:<br>• rural electrification,<br>• improved infrastructure,<br>• support for health and education programs,<br>• improved access to fisheries and forests, and<br>• legal title to land. |
| **Note:** Based on the understanding of the above mentioned benefits, profile of the target district, the guidelines & the PDA, following activities can be included in the benefit sharing plan. | |
| **1. Sharing** | **1. Watershed management** |
| • Allowing the local population an equity stake (i.e. shares). As mentioned previously, current thinking requires moving beyond mitigation and compensation to work with communities to maximize development benefits and engender more equitable outcomes.<br>• Providing the local government a share in the royalties for the project. | • This includes development of an integrated management plan for the river watershed, |
| **2. Community Development Fund/ Plan** | **2. Associated Infrastructure and Public Service Investment** |
| • Community development funds financed from electricity sales can be established to foster economic development in the project areas, including the project-affected communities.<br>• The sources of the fund can also be from the royalties and taxes paid to the government.<br>• The objectives, structure, and duration can be the result of negotiations between local authorities and the hydropower project companies.<br>• An important component of community development is rural electrification | • The investment can cover<br>• Social and environmental investment such as for schools, health facilities, local infrastructure or watershed protection.<br>• Local people will benefit from these investments if efforts can be made to ensure they are an integral part of the local development plan |

The following subsections provide an understanding of the key components of the LBSP.

Based on the programs identified above, during the preparation of the detailed plan, specifics of such mechanism will be put in place, which shall provide details on how each of the initiatives will be rolled out. While finalizing the modalities of such plans NWEDC will;

- Refer to PDA requirements;
- GoN regulatory requirements (including past precedence of Court Judgements in Nepal); and
- Refer to the lenders requirement (already stipulated under PDA).

These plans will provide an understanding of (but not be limited to):

- The specific objectives of each of the mechanisms identified;
- The target groups and population;
- The year wise targets for implementation; and
- The key steps for implementation

A year wise plan of implementation will be put in place for achieving the objectives identified.

These programs will be based on the understanding of the above mentioned benefits, profile of the target district & the guidelines. The section below describe the modalities in brief and suggests the way forward for detailed plans to be prepared to meet PDA requirements.

**Royalty to GoN**

According to the PDA requirements (Section 11.22.2), the royalty payable shall thus be based on the following figure.

11.22.1 The Company shall pay the following royalties to GON:

| From the first Unit Commissioning Date until the fifteenth (15th) anniversary of the Commercial Operation Date | | From the earlier of the Energy Start Date or the Commercial Operation Date until the fifteenth (15th) anniversary of the Commercial Operation Date | For the period commencing on the day falling immediately after the fifteenth (15th) anniversary of the Commercial Operation Date and ending on the last day of the Term |
|---|---|---|---|
| Capacity Royalty Rate (per KW per annum) | Energy Royalty Rate | Capacity Royalty Rate (per KW per annum) | Energy Royalty Rate |
| NPR 200 | 2% of the Energy Receipts | NPR 1,500 | 10% of the Energy Receipts |

Source: UT-1 PDA

**Figure 3.6.2-1: Royalty Payable to the Government**

The capacity royalty chargeable from the project shall be calculated based on the following:

- From and after the first Unit Commissioning Date until the Commercial Operation Date: Capacity Royalty Rate multiplied by the total nameplate capacity (in kW) of the relevant unit(s) of the Power Station that has been commissioned.
- From and after the Commercial Operation Date: Capacity Royalty Rate multiplied by the total nameplate capacity (in kW) of the Power Station.

However, the royalty shall not be payable if:

- If NEA is in default of its payment obligations under the Domestic PPA;

- Any payments received from GON or NEA in the circumstances described in the following PDA sections: Section 6.1 (GON rights and obligations), 12.7 (Staggered Remedies) or 12A.6 (Change in Law) or Local Free Power.

It is further clarified in the PDA that in the event of non-payment of any undisputed amounts due and payable by GON to the Company under this Agreement, the Company shall, at its option, be entitled to set-off such amounts against the Capacity Royalty and/or Energy Royalty payable by the Company hereunder.

Note: In keeping with the requirements of the PDA, the royalty sharing program with the local government shall be identified, in consultation with the GoN.

**Equity Shares**

In addition to royalty sharing, the project shall make available shares to the local community. These shares shall be available for purchase by any member within the local community at a subsidized rate.

As per PDA,

10.17.1 *"At the option of the Project Affected People, the Company agrees that the Project Affected People:*

*(A) Required to be resettled and rehabilitated as a result of the Project; and*

*(B) Who are natural persons and other natural persons residing permanently in the districts of the Project Area at the date on which the construction activities for the Project commence,*

*shall, directly or indirectly, be sold or issued up to a maximum of ten per cent (1 0%) of all the Company Shares with the value of each share determined on the basis of the face value of such shares without applying any premium, which shall be exercised and the total value paid in full in the period from the date of Financial Close until the date which is three years after the Financial Close. GON shall work together with the Company to agree on a local share allocation plan and implement such effective mechanisms and processes that is not cumbersome in the ordinary course of business to the Company to give full effect to the transactions envisaged in this Section 10.17.1 (Local share). For the avoidance of doubt, the Company shall not be required to issue any Company Shares to the general public."*

Note: In discussion with the GoN, the proportion of equity shares to be made available and the rate shall be identified.

Furthermore, the definition of local community for the purpose of making equity shares available shall be established.

**Rural Electrification Plan**

Rural electrification is an important component of the benefit sharing mechanism.

As per the PDA,

11 .8.1 *No later than the Financial Close, the Company in consultation with GON shall identify each household (an "Original Household") within the geographical area described in Schedule 12 (Nepal Employment and Skills Training Plan – Guidance Note) (the "**Free Electrification Area**").*

11.8.2 *From and after the Commercial Operation Date, the Company shall supply (at its own cost) twenty (20) kWh of electrical output ("**Local Free Power**") each Month during the Term without charge to each household within the Free Electrification Area as at the Commercial Operation Date to up to 200% of the number of Original Households identified pursuant to Section 11 .8.1 (Rural Electrification) (each an "**Eligible Household**").*

Schedule 11, Rural electrification section additionally mentions that*:*

*From and after the Commercial Operation Date, the Company shall make available for use by **each Eligible Household within a 500 metre radius of the headworks and the Power Station** as at the Commercial Operation Date as identified by the Company and GON (which shall not be more than 200% of the Original Households), twenty (20) kWh of electrical output free of charge each Month during the Term.*

11.8.3 *Prior to Commercial Operation Date, the Company shall build the distribution network to supply such Local Free Power to each Eligible Household within the Free Electrification Area in accordance with Section 11 .8.1 (**Rural Electrification**).*

11.8.4 *GON shall be responsible for the operation and maintenance of such distribution network at its sole cost.*

11.8.5 *GON and the Company shall jointly prepare a plan (the "Rural Electrification Plan"), based on a pre-feasibility study to be carried out by GON and the Company (at the Company's sole cost) to assess the costs and scope of rural electrification in accordance with this Section 11.8 (Rural Electrification). **The Company shall implement the Rural Electrification Plan.***

Note: The final plan to be submitted by NWEDC will need to consider the following:

- In consultations with GoN, identify each household (an "Original Household") within the geographical area described in Schedule 12 (Nepal Employment and Skills Training Plan – Guidance Note); however, Schedule 12 of PDA does not specify such specific Geographical area;

- Schedule 11, somehow defines, each Eligible Household within a 500 metre radius of the headworks and the Power Station;
- NWEDC will also take part in conducting a pre-feasibility study to be carried out by GON and the Company (at the Company's sole cost) to assess the costs and scope of rural electrification.
- Prior to Commercial Operation Date, NWEDC shall build the distribution network.

To sum it up, NWEDC as part of the detailed plan shall provide an understanding of the manner in which the rural electrification requirements of the PDA will be met.

**Community Development Plan**

The project has undertaken a number of community development and infrastructure development activities in their Area of Influence (AoI) as part of their CSR activities. In addition to this the project was also involved in various relief efforts post-earthquake, an understanding of which is provided in the LALRP. The project is also supporting the rebuilding of two schools in Haku Besi and Dhunche and one health centre.

As per PDA,

Schedule 11

*In addition to the budget committed in the EIA,*

- *The Company shall throughout the Term, support community development of affected communities through benefit sharing activities.*
- *Local community development activities aim to improve the standard of living of the affected communities through livelihood enhancements and support to construction and maintenance of physical infrastructure such as roads, trails, pedestrian bridges, water supply and sanitation schemes, communication infrastructures, community infrastructure development, such as schools, health posts, community centers, women's centers, small enterprise development funds etc. These initiatives should be developed in coordination with local governments to avoid duplication of interventions/support and ensure sustainability of efforts.*
- *The Local Benefit Sharing Plan shall also include a component detailing local community development activities (as committed in GON approved Environment Reports), that includes a detailed breakdown of specific activities, timeline, budget and implementation modalities.*

*EIA Commitment*

There are certain community development initiatives which have been included as part of the commitments in the EIA for the project. The same shall be incorporated into the community development plan thus formulated. The EIA commitments of relevance are:

- Local people will be prioritized for employment in project construction works;
- Local people specifically women will be encouraged in agricultural practice through agricultural enhancement programme;

- The project will assist the school of the Haku VDC to provide education to the children of project staff and workers;
- The project will assist the local health institutions;
- The ethnic group 'Tamang' of the project area will be supported to preserve their, tradition, culture, identity as well as their traditional occupation;
- Dalit group will be prioritized in project works as per their skills and capacities with certain percentage reservation for dalit;
- Local people will be provided training on business and trade;
- Local people will be prioritized in training in project related works;
- The project affected VDCs will be supported for rural electrification;
- Local people will be encouraged for tourism enhancement;

Also, the following measures are suggested in the EIA,

- The erosion of river bank will be minimised by implementing river bank protection measures in susceptible site downstream of weir;
- The area equivalent to occupied forest area (27.20 hectares) for project physical infrastructures will be afforested and protected for 5 years and handed over to concerned stakeholders as per the Forest Guideline for the Allocation of the Forest land to other Development Projects. The afforestation area will be as per the area designated by the respective district forest office and LNP;
- The project will carried out compensatory plantation of 4797 felled trees at a ratio of 25 seedlings for each lost tree equivalent to 119925 numbers as per the Forest Guideline, 2006 in an area as directed by the District Forest office of Rasuwa district and LNP authorities;
- The construction workers will be prohibited to collect firewood, timber and other forest products from the local community forest of Haku VDC and such act will be termed illegal;

Note: NWEDC will finalise these and ensure that these are developed in coordination with local governments and GoN to avoid duplication of interventions/support and ensure sustainability of efforts. These commitments will be further streamlined with clarity on numbers, schedule and budget for implementation across years.

#### *3.6.2.3. Implementation of LBSP*

During the preparation of the detailed plan, an understanding of the overall implementation mechanism for the LBSP, in keeping with the specific programs identified, will be proposed. NWEDC will formulate this implementation mechanism, based on the specific requirements of the programs, the resources available and the requirements of the GoN.

### Organization Structure

The NWEDC and GoN, as per section 11.3.2 (of the project development agreement) jointly prepare the Local Benefit Sharing Plan to be implemented within 12 months from the Agreement Date in accordance with this Schedule.

NWEDC will put in place a team with clear cut roles and responsibilities for the implementation of the detailed plan. NWEDC will provide an understanding the team and the manner in which they will be involved in the implementation. Some key things to be kept in mind and questions which will be answered as part of this section are as follows:

- NWEDC's role;
- GoN's role;
- Stakeholders to be engaged in decision making;
- Decision making in relation to LBSP components;
- Possible implementation partner;
- The role of third parties (if any).

This section will provide a brief description about the effectiveness of the institution/implementation agency for planning, management, monitoring and delivery of the plan. This will also include suggestions for workable linkages with other programs/projects (government-run; multi/bi-lateral agency sponsored).

### Implementing Partners

For the purpose of implementing specific components of the plans, NWEDC shall/ may associate with external third party experts, as required, who have experience in the field and the geographical area.

As part of this, NWEDC will,

- Identify NGOs/civil society and government department/ agencies who shall be involved in the implementation of the plan thus formulated.
- Some of the key agencies identified include Manekor, Parivartan Nepal, LaCCoS, Cottage Industries department, veterinary department, horticulture department etc.
- The NRA may serve as a consolidation point for all the existing NGOs and agencies in the area.
- NWEDC will build on such networks and allow for opportunities to be created for knowledge transfer.

**Interlinkage with other Plans**

The benefit sharing plans thus formulated are part of a larger social impact management framework for the project and shall be implemented in coordination with the other management plans such as the following (but not limited to):

- Stakeholder Engagement Plan;
- Livelihood Restoration Plan;
- Labour influx management plan; and
- Grievance Redressal Mechanism.

**Schedule for Implementation**

This section provides an understanding of the schedule of implementation of the plan thus formulated

As part of the detailed plan, NWEDC will put in place a schedule for implementation of the LBSP, in discussion with GoN. This schedule will provide an itemized timeline for each step of the implementation process.

#### *3.6.2.4. Engagement Strategy*

This section will provide the Engagement strategy for the LBS plan. An essential component of the implementation of the benefit sharing plan is the engagement with the local community and other external stakeholders.

The strategy will specifically explain the key needs and sensitivities viz. communities, government, and other stakeholders who will be associated ort linked to implementation of the LBS plan.

Although this will be in line with the overall stakeholder engagement activities of LALRP /ESIA, it will describe how to position LBS actions and address a larger audience (3 VDCs and beyond).

The engagement strategy as a part of the detailed plan will include the following:

- Aim, objectives of LBS;
- Coverage, potential beneficiaries, thematic areas of intervention, entitlements;
- Engagement mechanism,
- Phased approach, timelines and outcomes;
- Disclosure mechanism;
- Grievance management (as per EIA/ESIA/LALRP); &
- Feedback, documentation, communication, multi-media.

#### *3.6.2.5. Monitoring and Review Mechanism*

The LBSP will serve as a macro plan that will be constantly reviewed and updated on annual basis, throughout the project lifecycle. Micro plans will be developed, that will comply with the major principles identified, and are ready for implementation during the project activities.

As part of the detailed plan, a monitoring and review mechanism will be put in place, which will include the following:

- Provision for internal and external monitoring
- Frequency of monitoring and review
- The KPIs for internal and external monitoring
- Process of reviewing and updating the LBSP based on the findings of the monitoring reports
- Responsibilities of NWEDC, GoN, implementation partners and any third party involvement for monitoring purposes
- Overlaps and integration with project and other reporting timelines (LALRP etc.); and
- Systems and institutional linkages for feedback and mid-course correction

#### *3.6.2.6. Budget*

NWEDC will ensure that adequate budget is allotted for the implementation of the LBSP.

As part of the detailed plan, this section will provide an itemized budget for each step in the implementation of the LBSP

#### *3.6.2.7. Reporting and Documentation Requirements*

As per the agreement, NWEDC shall submit reports, every six months up to Commercial Operation Date and every 12 months thereafter, to GON describing in detail the activities undertaken under the Plan, the amounts spent on such activities and impact evaluation of such activities.

The activities undertaken, observations made and mitigation measures implemented, if any, will be reported to the Government of Nepal on an annual basis by the Project team.

As part of the detailed plan, a reporting mechanism will be put in place, in consultation with the GoN, which will provide an understanding of the following:

1. Requirement for internal and external reporting
2. The frequency of reporting
3. Chain of reporting
4. The format- report, presentation, verbal discussion etc.

### 3.6.3. Employment and Skill Training Plan (ESTP)

This section puts in place the employment and skill training plan (ESTP) for the project. The ESTP shall comprise of following key components, namely:

- Employment opportunities in the project, directly by NWEDC as well as through the contractors and sub-contractors;
- Trainings for skill development of the local labourers, who are employed in the project; and
- Trainings for livelihood development for those who presently do not have the skills required for employment in the project or other hydropower projects in the area.

As per PDA, (Section 11.9) - Use of Nepali resources; training and development:

The Company shall, and shall procure that its Contractors and Representative shall, in connection with the conduct of the Project:

11.9.1 *maximize the use of Nepali resources and give first consideration and full and fair opportunity to technically and commercially qualified Nepalese citizens and firms provided that in each case, the use of such Nepali resources meet the quality, quantity and availability requirements of the Company and provided further that use of such resources does not have a material and adverse impact on the costs and the timelines for the Project;*

11.9.3 *comply with the Laws of Nepal including the Labour Act, 2048 and Labour Regulation, 2050;*

11.9.4 *ensure that its Nepal Employment and Skills Training Plan provides for appropriate training of suitable citizens of Nepal for Project-related opportunities;*

11.9.5 *conduct employee training programmes from time to time, including training in each of the skills used in the Project, including management training;*

11.9.6 *comply with the Nepal Employment and Skills Training Plan, Nepal Industrial Benefits Plan and Local Benefit Sharing Plan and ensure that appropriate programmes are designed to assist suitable Nepali citizens, entities, and firms to meet the Project's requirements for goods and services;*

11.9. 7 *shall (to the extent applicable) submit reports*

- *every six (6) months to GON for the first three (3) years of the Construction Period and*
- *every twelve (12) months thereafter, describing in detail*
  *(A) its employee training programmes,*
  *(B) the implementation of such training programmes,*
  *(C) the progress made towards meeting the objectives set forth in· this Section 11 .9 (Use of Nepali resources; training and development) the Nepal Employment and Skills Training Plan, Nepal Industrial Benefits Plan and Local Benefit Sharing Plan.*

Schedule 12 of the PDA, also mentions the following:

Schedule 12

- *Identify expected labour force (Nepali and Non-Nepali) requirements over the Project life cycle by Year and by skill, both directly by the Company and by each of its expected major Contractors.*
- *identify the expected opportunities for employment and skill development at local levels;*
- *set out the Company's and the major Contractors' planned measures to recruit and train workers over time;*
- *contribute to the development of employable skills and human resources*

*The employment and skills training plan will not restrict itself only to the hydro power related training, but will also comprehensively look into vocational training opportunities to provide impetus to the improvement of living standards of locals e.g.*

- *The area- specific farm (agriculture, animal husbandry;*
- *small orchards and other farm based allied activities) and non-farm linked training;*
- *productivity improvement (knowledge transfer) and*
- *Self-employment program.*

*As far as practicable, the Company shall attempt to transfer the skills of skilled and semi-skilled foreign personnel to Nepalese counterparts during the course of Project implementation.*

#### *3.6.3.1. Objective of the Plan*

The ESTP has been formulated in keeping with the requirements of the PDA signed on 29th December 2016. The plan has been developed by NWEDC and Government of Nepal (GoN) & GoN nominated agencies. The main objective of the plan is:

- To create opportunities for employment, training and skills enhancement in project related activities, or vocational trainings and other trainings.
- Encourage training and employment of local people in Project related activities, which employment will be commensurate with educational qualifications, relevant skills and experience;
- Hydro development will act as a stimulus to bring long term sustainable benefits to Nepal and its people, and that one of the key benefits is improved skill development and employment of the Hydro Property affected people;

- It is expected that the majority of job requirements can be met by Nepalese, and that the project cycle for hydro projects will enable training to be proceeded sufficiently in advance to enhance employment opportunities for the locals; and
- Comply with the Laws of Nepal including the Labour Act, 2048 and Labour Regulation, 2050.

The objectives of the Plan will be discussed with GoN and any changes in the objectives will be made accordingly.

The detailed plan will be developed, in consultation with the GoN, keeping in context the following:

- Literacy and skill profile of the area;
- The skill training programs being implemented in the area by the NGO/INGO and other agencies;
- Skill requirement for the Project during construction and operations stage;
- Potential employment opportunities- existing and during project construction;
- The One Belt One Road (OBOR)/ Belt and Road Initiative (BRI) and other future developments in the area.

#### *3.6.3.2. Context of Livelihood and Associated Skill Set in Project Area*

Preparation of the ESTP will need to be situated in the context of the existing socio economic condition, earthquake induced impacts and the current livelihood practices in the Project area. A summary of the existing livelihood and associated skill profile of the PAFs which could to a great extent reflect the profile of the district (especially the ones affected by the earthquake).

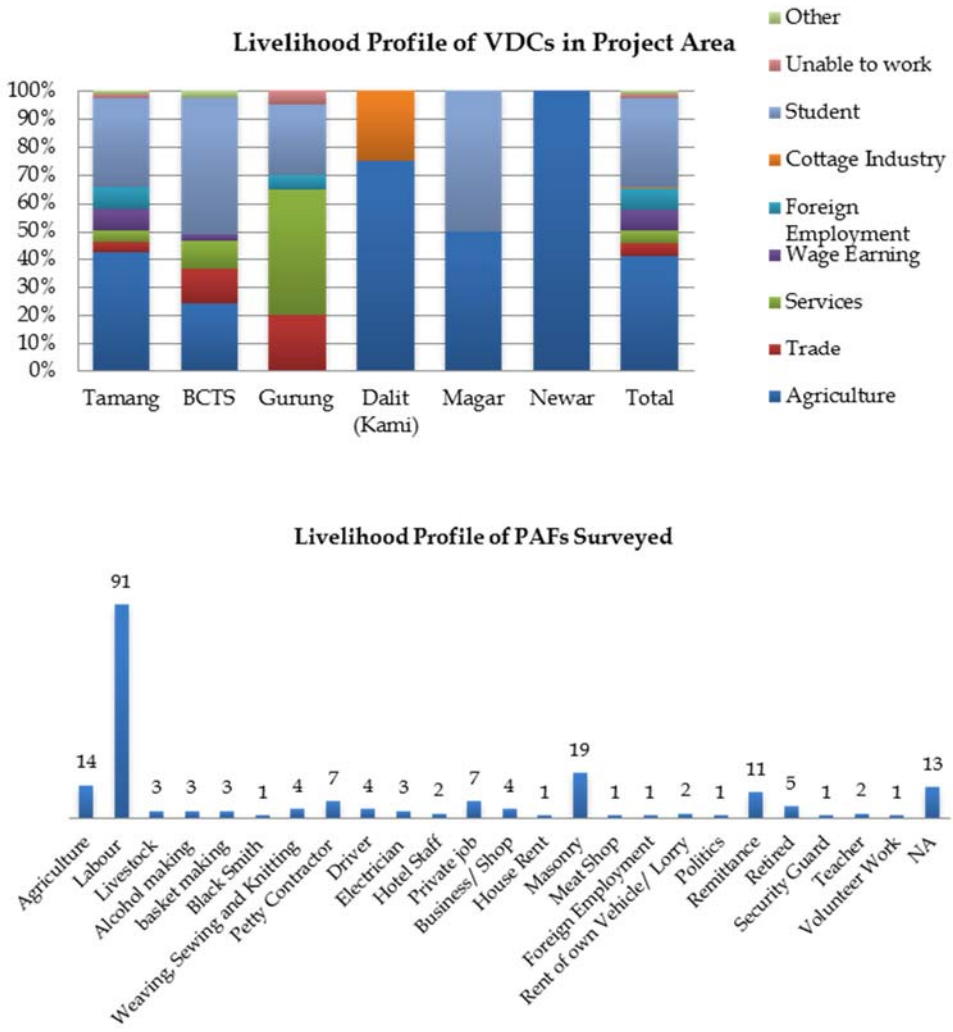
**Existing Livelihood Profile and Associates Skill Set of PAFs**

Subsistence agriculture has been the mainstay of the economy in the Project area. As can be seen from Figure 3.6.3-1, a significant portion of the population (41.3%) within the economically active age group in the project area reported agriculture as the key source of livelihood. Apart from agriculture, the other sources of income identified are as follows:

- Wage labour (7.3%);
- Foreign employment (7.5%);
- Business (4.9%); and
- Service (4.76%).

As can be seen from the Figure 3.6.3-1, within the project area, the social groups such as Kami, Magar and Newar are reported to have the highest dependence on agriculture. On the other hand, wage earnings and foreign employment is primarily undertaken by the Indigenous groups of Tamang and Gurung. From the discussions with the local community, it is understood that post-earthquake, the dependence on agriculture has reduced, due to loss of access to and damage to

agricultural land; this will however slowly build up once people start going back to their villages and repair their land parcels, some of which are affected beyond any repair, while in other cases they can be worked upon. However, post-earthquake, there has been an increase in the dependence upon wage labour in construction sites and stone breaking.




Source: UT-1 Supplemental ESIA Appendix A, 2014 and LALRP HH Survey 2017 based on the responses given

**Figure 3.6.3-1: Livelihood Profile of the Project Area and PAFs**

Amongst the PAFs surveyed for the LALRP, the primary source of livelihood is reported to be labour (45% of PAFs) and Masonry (9% of PAFs). This is followed by Agriculture (7% of PAFs) and remittance (5% of PAFs). The remaining sources of income represent less than 5% of the total PAFs. This is a significant shift in the livelihood profile, in comparison to the pre-earthquake scenario, where approximately 50% of the population reported a dependence upon agriculture as a source of income. The decrease can also be seen in terms of complete dependency on agriculture; in most cases, people have been forced to look out for other options.

Post-earthquake, the situation is still uncertain; while the first year after 2015 earthquake, NGOs came out with some sort of support mechanism, this has gradually reduced with help directed on housing, skill building, education, water supply and sanitation. According to the discussions with the PAFs during the LALRP formulation, in the post-earthquake scenario, the livelihood profile of the community is characterised by a larger variation and uncertainty associated with income sources. The survey conducted in April 2017 provides evidence of the livelihood shift in the community. Of the 129 PAFs, 74 reported to having difficulty in finding sources of livelihood. The people were forced to look for livelihood options after the NGO support started diminishing around a year.

The trainings conducted by NGOs provided some skills and cash based support, but the utilisation of trainings after withdrawal of NGO intervention did not take place. Only some people could translate the trainings provided in having gainful employment/ engagement, which is largely in case of occupations like Masonry. Since the period between January 2016 and April 2017 witnessed a lot of activity on reconstruction and rehabilitation front, thus there was a huge requirement of masons, which was fulfilled by these trained people. However, most of the PAFs involved in labour work, reported to be gainfully engaged for approx. 8-15 days in a month. This has also resulted in the PAFs diversifying their livelihood sources, with income from labour work, being supplemented by livestock/ poultry farming, agriculture, weaving, basket making and sale of homemade alcohol.

Furthermore, 28% of the PAFs surveyed during the LALRP, expressed the desire to return to the original settlements. Also, most of the remaining 72% PAFs, reside in IDP camps, on rented private land or government land. Thus, this livelihood profile and the present trends, is largely dependent upon the present residence of the population and are likely to change once again, if the population goes back to the original village or changes location of residence.

Also, while in the pre-earthquake scenario, most women were engaged in agricultural or livestock farming activities, presently a larger number of women are reported to be engaged in income generating activities, primarily stone breaking. This is understood to be resultant from the fact the loss of agricultural land and livestock holding. Women trained on tailoring, weaving and mat making could not continue with the same after withdrawal of NGO support. The people were trained with basic skills of tailoring and handicrafts, which equipped them enough to manage household needs. However, these trainings could not result in income generating activities because of the following reasons:

- Lack of advanced or specialist skills and the general interest in taking things forward without support;
- There was lack of finishing in the goods produced which restricted them being able to adequately sell in the market; and
- Lack of market linkage provided as part of the training.

Another shift in the post-earthquake scenario has been the increased burden on the younger population. This has resulted from the older generations (50 years and above) losing access to agricultural land and livestock holding and to not having any other skill training or physical

fitness to undertake wage labour. While in the pre-earthquake scenario, the elderly population could sustain themselves, by sustenance agriculture or taking care of the family's livestock holding, they are now forced to depend upon the younger generation for support. There are thus situations where the elders of the family are living in a separate household, in the IDP camp or original village, but are dependent completely upon their sons for maintenance and support in terms of provisions, food and medical care.

The following sub sections provide an understanding of the key sources of livelihood amongst the PAFs, namely wage labour, agricultural production, livestock holdings and foreign employment.

*Wage-Based Labour*

As discussed previously, 7.3% of the population in the project area reported dependence on wage labour as a source of livelihood in the pre-earthquake scenario. However, there is a profound shift in the livelihood profile of the PAFs, from agriculture to wage based livelihoods. 54% of the PAFs reported undertaking wage labour and masonry as the source of livelihood during the LALRP updation survey. This wage labour is primarily daily wage labour and is comprised of both semi-skilled (masonry, plumbing, bag weaving etc.) and unskilled work (stone breaking, labour in shops). The people were trained on construction of houses (both mud and stone) by the NGOs under the "Food for Work" programme.

*Stone Breaking*

A large number of members from the PAFs have reported to be engaged in stone breaking activities, as a primary or secondary source of income. A large number of unskilled women and aged people (above 50 years) are involved in stone breaking activities, earning an amount ranging from 250-500 NPR per day, being paid on a piece per rate basis. This activity is one of the most prominent sources of income because of its proximity to the IDP camps, especially near Farm Camp and Pradhikaran camp in Dhunche.

*Agriculture*

In the pre-earthquake scenario, agriculture was reported to be one of the most important sources of livelihood in the community. The main crops grown in the area include paddy, buck wheat, pulses, oil seeds, maize, potato, corn, millets and vegetables. While crops such as paddy and maize are grown primarily for household consumption, crops such as potato and vegetables are grown both for household consumption and for sale in the market. The households owning irrigated land parcels (Khet) are understood to grow multiple crops (two or more) on their land. On the other hand, those households who own unirrigated land (Bari) primarily understood to grow a single crop, with certain households growing vegetables, pulses and potatoes on small scales. Most of the land parcels are reported to be unirrigated, and depending upon monsoons and rainfall for irrigation.

However, post the earthquake, and the damage to agricultural land, there is a marked shift from agriculture to other sources of livelihood. Another reason, for the shift away from agriculture, is the increased proximity of the PAPs to urban areas and consequently non-farm based livelihoods.

As discussed earlier, only 7% of the 129 PAFs surveyed during the LALRP reported a complete dependence on agriculture as a source of livelihood over the last 2 years. Also, these PAFs are reported to be undertaking agriculture solely for the purpose of self-consumption. The present agricultural practices are comprised of agriculture on rented land in the vicinity of the IDP camps and agriculture in Native villages.

*Livestock Rearing*

The PAFs were understood to have considerable livestock holdings prior to the earthquake, which serves their needs of dairy products, eggs, meat, etc. Of these, the most common livestock holdings were poultry, followed by goats and cattle.

However, the earthquake resulted in deaths/ loss of livestock of the PAFs, leaving the families with no or lesser number of livestock. Furthermore, while most have tried to rebuild their livestock rearing, 75 PAFs (58% of total) report a reduction in the total number of livestock heads owned, while 4 PAFs (3% of total) reported to have same or increased livestock holdings. This is despite training and support being provided to PAFs by NGOs/ INGOs in poultry farming and boar farming as part of relief work post-earthquake.

Some of the reasons for the PAFs not restoring (OR not able to restore) their livestock holdings are as follows:

- Lack of monetary resources for purchasing and maintaining the livestock;
- Lack of space in IDP camps for keeping the livestock heads especially cattle;
- Lack of grazing land, for goats and cattle/bovine especially in Nuabesi, Bogetitar, Satbesi and Battar; and
- Reluctance by PAFs and community to keep larger number of livestock in IDP camps, due to issues such as bad odour and sanitation.

In the present scenario, the livestock holdings comprise of poultry, goats, cattle/bovine, and boars/ pigs. Of the PAFs surveyed, only 2 PAFs reported owning boars. While one household reported owning one boar, the other household reported to owning a pair.

*Small Enterprises*

It has been understood from the consultations with PAFs from Haku Besi and PhoolBari that a lot have families were having small grocery shops, restaurants, tea shops, etc. in their original villages prior to earthquake.

Some people had also bought land in and around Dhunche and had set up small shops in the newly purchased land or land rented land being used for residence. These shops are reported to have comprised of meat shops, tea shops, grocery shops, etc. In this case, the prior experience of managing an enterprise and savings helped restart business enterprises in the new setting. It has also been observed and understood through consultations that new enterprises are also being set up in Nuabesi and Khalde camp areas, but the people venturing in this area for the first time

require some handholding support in terms of technical knowledge of managing an enterprise in order to run their venture profitably.

*Migration to other Countries*

It was understood during the survey and the consultations undertaken in May, 2017, that a lot of young population of the community is increasingly getting interested in foreign employment. Consultations suggested that migration to other countries was existent earlier as well, but the number of people opting for and investing in this option is definitely on the rise with more people thinking around these options. Apart from this, many households also reported having family members, who had gone for wage labour to foreign countries for a few years, and had saved money and subsequently returned back to Nepal. The most common country for migration presently is China (kerung and China-Nepal border) for short term, whereas Malaysia and middle-east countries are considered for long term opportunity (3 years). The most common nature of activity for migrant workers is as masons or labourers.

The primary objective of foreign employment is reported to be the savings from the salaries that can be brought to Nepal and put to productive uses like buying land, construction of house, buying assets like trucks, etc.

**Trainings Provided by NGOs/Government in Project Area/Rasuwa District**

The influx of NGOs began right after the earthquake and the number was at its peak during that period. There have been developmental efforts in areas of provision of supplies, reconstruction, trainings, etc. during the period between May 2015 and May 2016 in the IDP camps; involving the local community in the project area.

The number of NGOs active in Rasuwa district during the first year was reportedly 200 (some of them directly on the ground while others through the local NGO partners) and it reduced to nearly 20-25 in the first quarter of the second year (2017), which also kept decreasing gradually.

The current activities in Rasuwa District are reported to the National Reconstruction Authority (NRA) in quarterly coordination meetings. During the consultations with NRA Project implementation Officer (PIO) in March, 2017, it was mentioned that currently, nearly 18 NGOs and INGOs involved in various interventions which revolve around livelihood, capacity building, house reconstruction, WASH, child care, education etc.

Some of the key NGOs and their area of interest are discussed subsequently. Most of the INGOs and national level prominent NGOs (like Parivartan Nepal), Bilateral and Multilateral agencies are operating in the Rasuwa district through selected local NGO partners who had a long standing presence and resources in the area.

**Table 3.6.3-1: Key NGOs in Rasuwa According to Area of Interest**

| NGO/INGO | Area of Interest |
|---|---|
| Build Change; | Housing Reconstruction |
| Lumanti; (with Parivartan Nepal) | Housing Reconstruction and livelihood restoration |
| Nepal Red Cross; | Housing Reconstruction |
| Batas Foundation; | Housing Reconstruction |
| Manekor. | Housing Reconstruction and livelihood restoration |
| Laccos | Livelihood Restoration |

The key NGOs presently active in the IDP camps of Nuabesi and Batar include Manekor, LACCOS and Lumanti. Lumanti has also been undertaking livelihood restoration trainings in the IDP camps, in collaboration with Parivartan Nepal. Consultations with the NGOs suggested that most of these interventions related to livelihood support and training will be over in the period from June to October, 2017 and there is lack of clarity on further fund availability for these kinds of interventions.

In Dhunche area, where the PAFs of Haku Besi and Phool Bari are residing, not much intervention has been undertaken by above mentioned NGOs. The limited number of trainings provided to PAFs has been through Cottage and Small Industries Board.

*Mode of Operation of NGOs and Training Provided in IDP Camps*

Based on the consultations undertaken with the NGOs such as Manekor, Lumanti and LaCCos, it is understood that the NGOs have identified target areas as women's group, men's group and youth group. The specific skill training for each of the groups was identified keeping in mind the expectations, capacity and practical feasibility of each activity identified for each group.

Consultations undertaken with NGOs and later corroborated with people in the IDP camps suggested that following types of training were provided as enlisted in Table 3.6.3-2.

**Table 3.6.3-2: Livelihood Support by Main NGOs in Rasuwa District**

| Target Group | Manekor | LaCCos | Parivartan Nepal |
|---|---|---|---|
| Men Focused | • Tourism Capacity Building<br>• Sherpa Training<br>• Plumbing training<br>• Electrician Training<br>• First aid Veterinary training | • Training for Tomato farming<br>• Driver training<br>• Electrician training<br>• Mobile repair training<br>• Mechanic training | • Plumbing training<br>• Electrician Training |
| Women Focused | • Machines for Spice grinders<br>• Tailoring training<br>• Sewing Machines | | • Daka making training |

| Target Group | Manekor | LaCCos | Parivartan Nepal |
|---|---|---|---|
| Men and Women Focused | • Bakery and Cooking Training<br>• Infrastructure support<br>• Water Sanitation and Hygiene training<br>• Seed capital for enterprises<br>• Farming equipment<br>• Ground apple cultivation<br>• Coffee machines for tourist lodges<br>• Boar Farming | • Livelihood Promotion Programme<br>• Local Governance Community Development Programme<br>• Sustainable Action for Food Security and Resilience Programme | • Poultry farming training<br>• Vegetable farming training<br>• Boar farming training<br>• Seed capital for poultry and boar farming<br>• Soap making training |
| Other support | • Provision of Accommodation and travel for those attending training<br>• Drinking Water provision for impacted villages<br>• Establishment of user committees<br>• Market linkages | • Financial Assistance immediately post-earthquake<br>• Irrigation and water systems<br>• Construction of training centre<br>• Market place for vegetables and other produce<br>• Water Supply to local schools | • Reconstruction Assistance to NRA |
| Funding Support | • UNDP<br>• DfID<br>• LWF<br>• Save the Children | • USAID | NA |

Source: Limited consultations with NGO

The NGOs have undertaken the livelihood trainings in order to train the people in their areas of operation in Rasuwa district on certain skills on basic level, such that it could prove as an entry point of livelihood activities for people, who needed initial thrust to move out of the stalemate developed due to earthquake. The Table 3.6.3-3 provides an understanding of the manner in which Parivartan Nepal provided various trainings for people residing in Nuabesi camp.

### Table 3.6.3-3: Details of Training (Earthquake-Affected Families Residing in Naubise Camp)

| Training | Number of People per Batch | Duration per batch | Support Provided to beneficiaries through Parivartan Nepal |
|---|---|---|---|
| Poultry Farming | No batch size limitation | 7 days | • Accommodation<br>• Meals<br>• Travel Allowance based on the following:<br>– 1 hour of walking: NPR 100<br>– Bus travel: ticket refund |
| Vegetable Farming | No batch size limitation | 7 days | |
| Driving | ~20 | 21 days | |
| Plumbing | ~20-25 | 390 hours/ 65 days | |
| Masonry | ~25 | 7 days | |
| Electrician | ~20 | 390 hours/ 65 days | |
| Daka Making | ~20-25 | 390 hours/ 65 days | |

Note: Consultations with PAFs in Nuabesi IDP camp

The NGOs have been very active in areas near Nuabesi, Bogetitar, Satbise and Battar, where one or more people from each PAF have been reported to have attended one or more skill trainings. However, the scenario in Dhunche is remarkably different where skill trainings have not been received by a considerable number of PAFs.

*Effectiveness of Training Programmes*

The discussions with the local community on the trainings have helped in understanding their takeaways from the training and the challenges in fully utilising the learning which are enlisted below:

- A lot of households in the IDP camps (except Battar and Satbise) have received one or more livelihood trainings;
- The number and range of trainings by NGOs was larger in Nuabesi and Bogetitar areas, as compared to Dhunche;
- Most of the training is on basic skills, which were scaled up and utilised for their benefits by certain people and could not prove helpful for many others; In certain cases the training was useful for the people who had existing skills in that particular area such as masonry;
- Some of the people trained on masonry skills have reported to be trained on construction earthquake resistant houses, which they think is an essential skill in Nepal;
- The people who got trained as carpenters reported that the training has been essential for building a new skill, but the demand of this skill is not in profusion and hence earnings are irregular.
- People having received masonry, plumbing, and electrician trainings have been able to gain some employment in the nearby areas and to a very limited extent in urban centres; however there is not much opportunity in the District itself. Masonry demand was there as a lot of reconstruction work was being undertaken; and
- Women of some families have engaged in small collective vegetable gardens to meet their daily family requirements. The seeds are provided the NGOs and the entire operation is also presently regulated by NGO representatives. However, the independent functionality and success of these groups will be understood, after the NGO support will be withdrawn.

*Key Learnings from Training Outcomes Provided by NGOs Post-Earthquake (2015)*

It has been understood from the consultations and focus group discussions that not everyone has been able to utilise their trainings in livelihood / income generating opportunities. The reasons for this varied across the trainings, depending upon the skill set in question.

It has been understood from the consultations and focus group discussions that not everyone has been able to utilise their trainings in livelihood / income generating opportunities. The reasons for this varied across the trainings, depending upon the skill set in question. The understanding of some of the general reasons identified for the trainings being unsuccessful is as follows:

- Apparent lack of willingness of individuals to pursue regular employment;

- There are certain people who attended training just for the sake of being engaged and to earn money being paid to attend trainings;
- A large part of the community people don't want females to go out and work in case of less wages;
- People have limited understanding and awareness on scope and possibilities of employment and need elongated period of hand holding;
- People tried initially, though stopped once they did not get desired outcome in terms of financial gains.
- In some PAFs, the people are engaged in foreign employment, which fetches comfortable money which is required for sustenance. The family members of such families are less interested in making an effort even after receiving trainings.

The following table provides an understanding of some of the reasons identified for the specific trainings being unsuccessful or not yielding intended results.

**Table 3.6.3-4: Reasons for Skill Training not being Successful**

| S. No | Type of Training | Reasons for not being successful |
|---|---|---|
| 1. | Poultry | While some of the PAFs could gainfully utilise their poultry training after withdrawal of NGO support, a large number of people trained on skills to manage poultry could not take it forward successfully because of the following:<br>• Limited space for poultry farm near camps;<br>• Lack of proper understanding of potential diseases and requirement for vaccinations<br>• Availability of resources such as electricity and water supply, which are critical for the proper growth of the chicks; |
| 2. | Tailoring and Handicrafts | The people were trained with basic skills of tailoring and handicrafts, which equipped them enough to manage household needs. However, the reasons it did not result in income generating activities are:<br>• Lack of advanced or specialist skills and the general interest in taking things forward without support;<br>• There was lack of finishing in the goods produced which restricted them being able to adequately sell in the market.<br>• Lack of market linkage provided as part of the training; |
| 3. | Masonry | There is saturation of skills in market. With majority people trained on masonry skills the supply has outgrown demand in the area; |
| 4. | General Issues | • Apparent lack of willingness of individuals to pursue regular employment;<br>• There are certain people who attended training just for the sake of being engaged and to earn money being paid to attend trainings;<br>• A large part of the community people don't want females to go out and work in case of less wages;<br>• People have limited understanding and awareness on scope and possibilities of employment and need elongated period of hand holding;<br>• In some PAFs, the people are engaged in foreign employment, which fetches comfortable money which is required for sustenance. |

*Key Learnings from NBGOs Working with Groups*

The initial assessments undertaken by the NGOs on each target group helped them in identification of behavioural patterns and expectations of each group (enlisted in Table 3.6.3-5.).

**Table 3.6.3-5: Characteristics and Expectation of Target Groups**

| Target Groups | Characteristics |
|---|---|
| Women's Groups | • The members of which engage in different activities like handicraft, hotels, business enterprise, poultry, etc.; hence there is not much competition;<br>• Expects clear communication and transparency in terms of support provided, timelines of various activities;<br>• Want clarity in the group selection criteria;<br>• Good field agent is critical for successful intervention with this group. |
| Men's Group (25-40 years) | • They are the main breadwinners of the family and hence tend to turn self-centred when opportunity comes, especially in the given scenario, where the source of income are less;<br>• A considerable proportion of this group is illiterate and hence less aware;<br>• The educated and financially comfortable individuals take responsibility for the group at large and emerge as opinion leaders and decision makers for the group;<br>• This group has an inclination towards working as construction labourers /masons as it is considered as a masculine activity;<br>• The illiterate members of this group are apprehensive of working/ attending trainings in groups, especially with literate folks. |
| Youth Group (17-25 years) | • Energetic and quick learners;<br>• Clear decision making and thought process;<br>• Involvement in the development and welfare of the community;<br>• Open to working in groups<br>• Interested in conducting adult literacy classes for the community |

Note: NWEDC will use this information for preparation of the EST to meet the requirements under PDA.

### *3.6.3.3. Planning for Employment and Skill Training*

**Expected Labour Force Requirements over the Project Live Cycle**

The following table presents a mapping of the labour/workforce requirement for the project. This shall include Nepali and Non- Nepali workforce requirements for NWEDC as well as its Major Contractors.

## Table 3.6.3-6: Labour Requirements

| Sr. No. | Category of Manpower | Minimum Educational Qualifications | Technical Skills / Competence Certificate Desired (if any, please specify) | No. of Years of Experience Desired (if any, please specify) | Nos. Required in 2017 | | | | Nos. Required in 2018 | | | | Nos. Required in 2019 | | | | Nos. Required in 2020 | | | | Nos. Required in 2021 | | | | Nos. Required in 2022 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q |
| **Skilled** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. | Driller | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. | Blaster | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. | Welder | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. | Heavy Eq. Operator | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. | Plant Operator | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. | Foreman | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. | Fitter | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. | Plumber | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. | Carpenter | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. | Electrician | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. | Technician | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12. | Supervisor | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13. | Mason | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14. | Security Head | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15. | Others (Please Specify in separate rows) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Semi-Skilled** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. | Account Helper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17. | Stores Helper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18. | HR & Admin Helper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19. | Cook | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20. | Asst. Welder | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21. | Asst. Foreman | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22. | Wiremen | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23. | Others (Please Specify in separate rows) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Unskilled** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24. | Office Attendant | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25. | Survey Helper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26. | Quality Helper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27. | HSE Helper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28. | E&M Helper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29. | Geologist Helper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30. | Cook Helper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31. | Service Boy | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Sr. No. | Category of Manpower | Minimum Educational Qualifications | Technical Skills / Competence Certificate Desired (if any, please specify) | No. of Years of Experience Desired (if any, please specify) | Nos. Required in 2017 | | | | Nos. Required in 2018 | | | | Nos. Required in 2019 | | | | Nos. Required in 2020 | | | | Nos. Required in 2021 | | | | Nos. Required in 2022 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q |
| 32. | Cleaning Boy | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33. | Pantry Helper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34. | Helper/Labour | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35. | Security Guard | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36. | Others (Please Specify in separate rows) | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Note:

- Such a mapping exercise shall be undertaken based on discussions with its project team, contractors and sub-contractors to obtain an overview of the required laborers in terms of skill level.
- This will be done for each phase of the Project, and opportunities to include local labor will be identified.

## Expected Opportunities for Employment and Skill Development

On the basis of the workforce requirement, NWEDC will identify the expected opportunities for employment and skill development at local levels.

*Existing Expectations*

One of the main expectations of the local community is that they receive opportunities for livelihoods and income generation from the project;

- This may be in the form of direct or contractual employment.
- Most of the community reported to looking for employment as security guards and housekeeping staff in the project.
- One of the key expectations is do with the driving training which is locally considered to be a better opportunity for employment in the long run; this can be supported with mechanic training as one of the other options.
- In terms of skill development the community's expectations primarily pertain to enhancement of the existing skill level, and allowing a larger proportion of the community to develop skills that are useful for income generation.

NWEDC shall further strengthen the understanding of local community's expectations during the skill mapping exercise.

*Existing Skill Mapping*

Thus as can be seen from the above discussion, there is an existing skill set in the local community which may be of use for the project. In summary, the following aspects should be kept in mind of the existing skill set in the community:

**Table 3.6.3-7: Skill set Overview Pre & Post Earthquake (April 2015)**

| Timeline | Skillset |
|---|---|
| Skill set in pre-earthquake scenario: | • In the pre-earthquake scenario, the local community was primarily dependent upon agriculture and livestock farming for livelihood purposes;<br>• The education and literacy levels in the local community were generally low due to a lack of access to infrastructure;<br>• There were a few of the youth in the local community who were engaged in foreign employment, but these were limited to only a few households;<br>• Business, small enterprise, wage labour was limited to a selected segment in the affected villages. |

| Timeline | Skillset |
|---|---|
| Skill set in post-earthquake scenario | • A number of NGOs/INGOs entered in the area in the post-earthquake for providing relief support to the local community<br>• As a result of the trainings provided, the overall skill level in the community improved<br>• However, most of the skill level in the community is still basic and preliminary. This is primarily because the trainings provided by NGOs were basic for a short duration and primarily aimed at allowing the community to stabilize their living conditions post-earthquake and cater to the needs in the local area<br>• The overall literacy level is also understood to be improving as the community has increased access to schools and improved infrastructure<br>• The number of young members of the community seeking foreign employment has also increased |

Consultations indicate that in general, the young population usually don't continue education after SSC level; no one reported university level in the recent survey for LALRP. The priority for the people is to get such skillet which will allow them to find jobs in Nepal and other countries. Certain skills are more in demand in these countries; for Women- housekeeping, packing etc. while for men it is driving, mechanic, electrical etc.

Note: While doing so NWEDC will look at the existing expectations as well as the existing skill levels in the community. This information can be used to assess the workforce requirements that can be met from the local community and district:

- Without any additional training;
- With some additional training.

This will also take into consideration additional employment generation or business opportunity that will be required to support the Project.

Once the skill training requirement for employing the locals is identified, NWEDC will need to identify the agencies (NGOs/ Government agencies/ Technical agencies/ Universities/ Training institutes etc.) which can help in providing training to the locals.

This will be done based on the following (but should not be limited to):

- Review of the information available with the government, in terms of the following:
  - Number of registered agencies, per resource requirement
  - Details of training and certification programmes available with the government
  - Details of training programs by NGOs/INGOs/Universities and other agencies (if available)
- Consultations with stakeholders, including:
  - Government departments
  - NGOs/Agencies working in the field of entrepreneurship development
  - Representative of contractors/ suppliers and vendors, large; medium and small scale

As part of this process, a mapping will also be done of the existing initiatives for skill enhancement by other stakeholders, such as government agencies and other projects in the district. The Company will then be in a position to assess the skills background of the locals and finalise the trainings required, number of labours to be employed and budget needed.

*Other Expected Opportunities in the Area for Employment and Skill Development*

The Rasuwa district is expected to have a lot of opportunities for employment and entrepreneurship ventures in the coming years. This is primarily attributed to the development of other hydropower projects being developed in the district as well as the One Border One Road initiative.

Note: As part of this Section, NWEDC will undertake a broad level mapping of the potential employment and skill development opportunities outside the project in the area.

- This may be done through consultations with the government departments and other projects being set up.
- This mapping will in turn allow for the project to identify other opportunities for employment of local community.
- This will also allow for specific skill sets to be identified which may be in demand in the near future for training purposes.

NGOs with previous experience of working with communities on livelihood restoration in the district and elsewhere in Nepal will serve a good resource to identify opportunities outside Project area.

**NWEDC and Major Contractors: Measures to Recruit and Train Workers**

In keeping with the requirement of manpower thus identified, a detailed plan shall be formulated for each year/phase of the project, to allow maximum locals to be engaged.

The company will develop a plan to be followed for recruitment of the locals during the development of the project. The plan will be at two levels, the macro level (for the entire project lifecycle) and the micro level (an annual plan). The various recruitment methods which will be considered include:

- Direct recruitment of locals;
- Recruitment through local agencies;
- Recruitment with NGOs and other welfare groups.

The process will include the following steps:

- Development of a selection criteria;
- Short-listing of agency/NGO for recruitment;
- Method of approaching the local community;
- Contract terms and conditions, if any;

As far as practicable, the Company shall attempt to transfer the skills of skilled and semi-skilled foreign personnel to Nepalese counterparts during the course of Project implementation. However, the transfer of skill set would depend on the existing skill levels.

**Development of Employable Skills and Human Resources**

*Vocational and Livelihood Training to Locals*

The Company will also look into the feasibility of providing livelihood training to the locals to improve the economic conditions of the area. These may include the following types of training or support:

- Vocational training to the locals;
- Assistance to farmers;
- Forest conservation activities;
- Training to women in the area;
- Provision of apprenticeship programs; and
- Improvement of education facilities in the area.

Each of these trainings will be accompanied with a market linkage training, to allow for maximum benefit to be accrued from the training.

The provision of such livelihood trainings will focus on possible training opportunity in:

- The area- specific farm (agriculture, animal husbandry);
- Small orchards and other farm based allied activities) and non-farm linked training;
- Productivity improvement (knowledge transfer); and
- self-employment program

Women consultations suggest that women are interested in such activities and have experience. Consultations with local NGOs like Manekar suggest that in past similar experiments have not succeeded such as agarbatti (incense sticks) making as cost of production was too high and not competitive. Some areas are quite remote and market access is a problem. In another case of improved potato farming intervention, over production and lack of access to market and storage facilities resulted in farmers not making enough profit which further dampened the spirit of the farmers. The Project access road may change this- and provide market connectivity. Too much training for stuff like Shama weaving may overcrowd the market for women who have already been trained. Therefore, new trainings need to be identified based on these learnings.

Any such interventions will need to identify proper market linkage, and will require specific NGOs/ Institutions with past experience. Self-development activities could be piggery, poultry etc. however learning from the intervention made by NGOs post-earthquake will be important to understand the reason for success/ failure of such interventions. Risk appetite of the people especially after the earthquake should be an important consideration.

The One Border One Road initiative market linkage is likely to expose them to other market opportunities which may exist.

Note: Some of the key aspects which will be kept in mind while preparing the plan are as follows:

- For business and entrepreneurship training, preferably individuals or households with a high risk appetite will be identified;
- While formulating a plan for each training, care will be taken to not saturate the market with a particular skill such as Shama making. For this purpose, multiple trainings should be identified, with the total number of individuals trained in each limited to a number which is agreed with the GoN.
- Some training which will be considered include those pertaining to the tourism sector, such as housekeeping and running restaurants, running inns and home stays, Tamang trails etc.
- While identifying any training, focus/ priority will be given to those trainings which will allow for jobs to be found within the country and then in foreign countries.

*Training in Course of Employment*

Depending on the project phase and activities, the Company will provide the following types of trainings to the local labourers:

- Induction training;
- General H&S training;
- Vocational training to workers and locals;
- Specific on-the-job training;
- Firefighting and mock drill training; and
- Operation and maintenance training.

The company will appoint staff responsible for the implementation of the trainings to the identified locals. Additionally, training materials, schedule and budget will also be developed for each of the training sessions.

The company and GoN will jointly decide the frequency of the trainings and any other additional requirements.

*Training Schedule*

Training schedule will be developed by NWEDC which will include details regarding the type of training, batch per training, frequency, and staff to be trained.

#### *3.6.3.4. Implementation*

This section will provide an understanding of the overall implementation mechanism for the ESTP thus formulated, in keeping with the specific plans put in place.

Note: NWEDC shall formulate this implementation mechanism based on the specific requirements of the plan, the resources available and the requirements of the GoN.

**Organisational Structure**

The NWEDC and GON, as per section 11.3.2 (of the project development agreement) jointly prepare the ESTP to be implemented within 12 months from the Agreement Date in accordance with Schedule 12 of the PDA.

The implementation of the ESTP thus formulated shall be undertaken by the ESMC of the project.

NWEDC will put in place a team with clear cut roles and responsibilities for the implementation of the detailed plan. This section (and sub sections) will provide an understanding the team and the manner in which they will be involved in the implementation. Some key things to be kept in mind and questions which will be answered as part of this section are as follows:

- NWEDC's role and
- Role of HR personnel
- Role of CSR personnel
- Possible implementation partner
- GoN's role
- The role of third parties (if any)
- Roles and responsibilities for each stakeholder

**Implementing Partners**

For the purpose of implementing specific trainings identified, NWEDC shall associate with external third party experts, who have experience in the field and the geographical area. Cottage & Small Industries Training department is one of the key departments which has customised training calendar for different skills. It not only conducts training on its own, but also helps NGOs to conduct training, identify resource person, has dedicated infrastructure for conducting training. There are some specific vocational training institutes in Kathmandu which provide vocational training. NWEDC is already in talks with some of them.

For this purpose, NWEDC will also undertake consultations with the CDO and NRA, for an understanding of the organizations active in the area.

As part of this section, NWEDC will identify NGOs/INGOs and government department/ agencies who shall be involved in the implementation of the plan thus formulated. Some of the key agencies identified include Manekor, Parivartan Nepal, Cottage Industries department, veterinary department, horticulture department etc. Company will build on such networks and allow for opportunities to be created for knowledge transfer.

**Interlinkage with other Plans**

The ESTP thus formulated are part of a larger social impact management framework for the project and shall be implemented in coordination with the other management plans such as the following (but not limited to):

- LBSP
- Stakeholder Engagement Plan
- Livelihood Restoration Plan
- Grievance Redressal Mechanism
- Labour influx management plan

Note: This section will provide a brief description about the effectiveness of the institution/implementation agency for planning, management, monitoring and delivery of the plan.

This will also include suggestions for workable linkages with other programs/projects (government-run; multi/bi-lateral agency sponsored).

**Schedule for Implementation**

This section provides an understanding of the schedule of implementation of the plan thus formulated.

NWEDC will put in place a schedule for implementation of the ESTP, in discussion with GoN. This schedule will provide an itemized timeline for each step of the implementation process

#### *3.6.3.5. Engagement Strategy*

An essential component of the implementation of the ESTP is the engagement with the local community and other external stakeholders.

This section will provide the Engagement strategy for the ESTP. The strategy will be specifically to explain the key needs and sensitivities viz communities, government stakeholders and the EST plan.

Although this will be in line with the overall stakeholder engagement activities of LALRP /ESIA and other plans formulated, it will describe how to position EST actions and address a larger audience (3 VDCs and beyond). The engagement strategy will include the following:

- Aim, objectives of ESTP;
- Coverage, potential beneficiaries and thematic areas;

- Phased approach, timelines and outcomes;
- Grievance management (as per EIA/ESIA/LALRP); &
- Feedback, documentation, communication, multi-media.

#### *3.6.3.6. Monitoring and Review Mechanism*

The Employment and Skills Training Plan will serve as a macro plan that will be constantly reviewed and updated on annual basis, throughout the project lifecycle. Micro plans will be developed, that will comply with the major principles identified, and are ready for implementation during the project activities.

- Schedule with milestones and tracking of delays;
- Responsibilities of NWEDC, GoN, implementation partners and any third party involvement for monitoring purposes;
- Provision for internal and external monitoring;
- Frequency of monitoring and review;
- The KPIs for internal and external monitoring;
- Process of reviewing and updating the ESTP based on the findings of the monitoring reports;
- Overlaps and integration with project and other reporting timelines (LALRP etc.); &
- Systems and institutional linkages for feedback and mid-course correction.

#### *3.6.3.7. Budget*

NWEDC will ensure that adequate budget is allotted for the implementation of the ESTP.

This section will provide an itemized budget for each step in the implementation of the ESTP.

#### *3.6.3.8. Reporting and Documentation*

As per the agreement, NWEDC shall submit annual reports, GON describing in detail the activities undertaken under the Plan, the amounts spent on such activities and impact evaluation of such activities.

Other documents which will be maintained during the plan implemented will include, but not be limited to, the following:

- Meeting minutes during the supply and demand mapping consultations;
- Training records;
- Records of human resources involved in the project and the number of locals employed;
- The number of locals supported with other employment opportunities and trainings; and
- Any complaints or grievances obtained.

Person in charge for maintaining documents will be appointed by the Project team.

As part of the detailed plan, a reporting mechanism will be put in place, in consultation with the GoN, which will provide an understanding of the following:

- Requirement for internal and external reporting;
- Frequency of reporting;
- Format- report, presentation, verbal discussion etc.

Person in charge for maintaining documents will be appointed by the Project team.

### 3.6.4. Industrial Benefit Sharing Plan

This section will present the Industrial Benefit Sharing Plan (IBSP) developed for the project. This plan will be focused only on the procurement of materials and goods from the locals and shall not specify requirements for any skills and employment training to be imparted. Requirements of the same are detailed in the Skills and Employment Development Plan.

As per PDA, (Section 11.9)- Use of Nepali resources; training and development:

The Company shall, and shall procure that its Contractors and Representative shall, in connection with the conduct of the Project:

| | |
|---|---|
| 11.9.1 | *maximise the use of Nepali resources and give first consideration and full and fair opportunity to technically and commercially qualified Nepalese citizens and firms provided that in each case, the use of such Nepali resources meet the quality, quantity and availability requirements of the Company and provided further that use of such resources does not have a material and adverse impact on the costs and the timelines for the Project;* |
| 11.9.2 | *ensure that its Nepal Industrial Benefits Plan provides for an outreach programme under which the Company engages with Nepali suppliers for Project-related opportunities;* |
| 11.9.3 | *comply with the Laws of Nepal including the Labour Act, 2048 and Labour Regulation, 2050;* |
| 11.9.5 | *conduct employee training programmes from time to time, including training in each of the skills used in the Project, including management training;* |
| 11.9.6 | *comply with the Nepal Employment and Skills Training Plan, Nepal Industrial Benefits Plan and Local Benefit Sharing Plan and ensure that appropriate programmes are designed to assist suitable Nepali citizens, entities, and firms to meet the Project's requirements for goods and services;* |
| 11.9. 7 | *shall (to the extent applicable) submit reports every six (6) months to GON for the first three (3) years of the Construction Period and every twelve (12) months thereafter, describing in detail (A) its employee training programmes, (B) the implementation of such training programmes, (C) the progress made towards meeting the objectives set forth in· this Section 11.9 (Use of Nepali resources; training and development) the Nepal Employment and Skills Training Plan, Nepal Industrial Benefits Plan and Local Benefit Sharing Plan.* |

#### *3.6.4.1. Objective of the IBSP*

The IBSP has been formulated in keeping with the requirements of the PDA signed on 29th December 2016. The plan has been developed by NWEDC and GoN & GoN nominated agencies. The plan, to be implemented jointly by GoN and the Company has the following objectives:

- Ensure full and fair opportunity of access for Nepal-based suppliers of goods and services to participate in the development of the Project;
- Help in promoting a vibrant, growing, competitive supplier base within Nepal that over the time shall meet higher value-added requirements for goods and services for the Project;
- Encourage initiatives for joint venture and quality improvement measures that shall enhance the ability of Nepal-based suppliers to compete domestically and internationally; and
- Promote safe and healthy working conditions among suppliers of goods and services to the Company and the Project.

The objectives of the Plan will be discussed with GoN and any changes in the objectives will be made accordingly.

#### *3.6.4.2. Resource Requirements for the Project*

Since there are immediate service requirements and early construction, preliminary Nepal Industrial Benefits Plans shall consider the availability of engineering, legal, planning, consulting and construction services, while the detailed design phase shall enable more precision on the specific requirements for goods and services and their timing that would enable Nepal-based suppliers to be accommodated.

NWEDC will undertake a mapping of the requirement of resource through the project lifecycle, in terms of the specific resource required and any quality and size specifications (Itemisation and quantification of goods and services required over the Hydro Property life cycle).

The following table provides an example of the output which will be presented. This will be done for each phase of the Project, and opportunities to include local population will be identified.

This information should be broadly shared with potential suppliers well in advance to enable them to compete on a full and fair basis. This information could be just shared capturing the basic/ broad requirement. Detailed information will be shared at later stages when specifics are available.

**Table 3.6.4-1: Resource Requirements**

| Sr. No. | Category of Resource | Quality Specifications | Nos. Required in 2017 | | | | Nos. Required in 2018 | | | | Nos. Required in 2019 | | | | Nos. Required in 2020 | | | | Nos. Required in 2021 | | | | Nos. Required in 2022 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q | 1st Q | 2nd Q | 3rd Q | 4th Q |
| 1. | Water | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. | Fossil Fuel | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. | Cement | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. | Gravel | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. | Office Stationery | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. | Housekeeping supplies | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. | Furniture | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. | Computers | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. | Printers | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. | Four Wheelers | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. | Bulbs | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12. | Tube lights | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13. | Construction equipment | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14. | Labour and Manpower | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15. | Others…. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. | Others…. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17. | Others…. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18. | Others…. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19. | Others…. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20. | Others…. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21. | Others…. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22. | Others…. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23. | Others…. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24. | Others…. | | | | | | | | | | | | | | | | | | | | | | | | | |

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Note: The above table provides certain examples of the resources which will be considered and mapped. NWEDC will undertake a detailed mapping exercise, based on discussions with various departments involved in the construction and post-construction activities. This mapping will be undertaken for various stages of the project including:

- Pre-construction and design;
- Early construction;
- Construction;
- Commissioning, (if any specific resource is required);
- Operations; and
- Decommissioning.

#### *3.6.4.3. Vendor Strategy and Procurement Principles*

This section will put in place the key principles and policy points which shall guide the process of industrial benefit sharing for the entire life cycle of the project.

Some of the key principles include the following (but shall not be limited to):

- The procurement process shall ensure full and fair opportunity of access for Nepal-based suppliers of goods and services to participate in the development of the Project;
- The procurement process shall be undertaken in a manner so as to encourage initiatives for joint venture and quality improvement measures that shall enhance the ability of Nepal-based suppliers to compete domestically and internationally; and
- While procuring locally, promote safe and healthy working conditions among suppliers of goods and services to the Company and the Project.

Note: NWEDC shall identify all the principles which shall govern the IBP.

#### *3.6.4.4. Procurement Plan*

Based on the principles identified, NWEDC will put in place a procurement plan for the project. The procurement plan will be aimed at allowing for the utilization of the existing resources while also enabling the development of new skills and capacities. The key steps in the procurement plan are discussed below.

**Mapping of Nepal-Based Suppliers**

While there should be some existing information on the suppliers through some government directory or exchange. This mapping shall include the movable and immovable goods resource requirements. The workforce required for the project shall be covered in the ESTP formulated for the project.

This mapping shall provide an understanding of the following:

- The present organizations which have the existing capacity of serving as contractors and suppliers for the project, in terms of manpower, quality control, availability of raw material, resources to meet the timelines, legal compliances etc.;
- The present organizations which may not have the existing capacity, but can be given trainings and hand holding support to allow them to serve as contractors and suppliers for the project;
- The smaller organizations who can serve as subcontractors to the main contractors for the project.

**Registration Process**

As part of the procurement plan, NWEDC will formulate a registration process for the project. This registration process may be in the form of hard copy forms to be filled out or an online registration process.

The basic information which would be required for registration purposes, such as (but not limited to):

- Registered Name
- Know Your Customers (KYC) Documents
- Resource/ Material(s) to be supplied
- Certifications and registrations required for the material identified;
- Past experiences;
- Contact Information
- Present capacity;

A vendor or supplier may register for multiple products as well.

Note: In case an online registration process is identified, handholding support may be considered for those who are not adequately trained in computers. Alternatively, the project may consider simultaneously providing an offline registration option for such vendors. The information should be provided through mass mediums like local TV channels, local popular newspapers etc.

**Timely Disclosure of Information**

Early interaction with Nepal-based suppliers, both existing and potential, is strongly encouraged by GON. All Project phases shall be addressed in procurement plans to afford opportunities for Nepal-based suppliers for goods and services.

NWEDC understands that timely information sharing, enough time to respond and ease of access to communication will be some of the key measures that NWEDC to help enhance local supplier prospects of business success.

NWEDC may consider having an online portal system for early notification for vendor opportunities (it should be matched with newspaper notifications too).

- A critical component of the procurement plan will be the timely disclosure of information pertaining to available opportunities.
- As part of this disclosure, the project will provide information pertaining to the timing, quantity and quality of resource requirements for the project. This would then allow for the vendors to bid for the project.
- The disclosure process to be followed is to be in keeping with the principles identified in the Stakeholder Engagement Plan for the project.

Note: This could be supplemented by NWEDC interaction (in the form of workshop) with key domestic suppliers to help them understand the timing, quantity and quality requirements for goods and services.

**Vendor Selection Process**

Once the registration process is complete, a short list of qualified vendors will be formulated and maintained in a project database. These vendors and suppliers will then be provided with opportunities for providing services for the project.

Note: As part of this section, NWEDC will identify certain basic parameters for the selection of vendors.

Opportunity will also be provided after giving the disqualified vendors an opportunity to improve with clear feedback on opportunity for improvement.

**Vendor Proposal Selection**

Based on the information disclosure, the short listed vendors will be identified to submit proposals for each resource requirement. These proposals will then be accessed in terms of the project's quality, cost and EHS requirements.

NWEDC will also take extra efforts for proper structuring of procurement packages at a scale to encourage domestic supplier participation, where possible; this is to ensure that local vendors do not lose out on the opportunity because of the sheer scale of the contract package.

For this purpose, the project may consider develop a marking system with each criterion carrying certain weightage.

- If such a system is developed, the local firms will be given an additional bonus score, to promote local industrial skill development.
- The vendor with the highest score overall will be invited for final negotiations or for providing services.
- The procurement packages formulated will also allow for the local vendors to participate.
- The disqualified vendors at this stage will also be given clear feedback on the gaps or the reason for non-selection to ensure better performance during next bidding process. This

mechanism will be aimed at providing constructive feedback to the vendors and assist in improving their performance.

**Capacity Building and Support Activities**

It is understood, that initially it is possible that few local vendors and suppliers may qualify, due to lack of present capacity. Efforts will be made to support GON initiatives for domestic supplier development activities to enhance upgrading of capabilities and product and services quality and competitiveness.

- In keeping with this, NWEDC will undertake capacity building activities with local vendors. The primary purpose of this capacity building will be to allow for the improvement of local supplier's prospects of business success.
- Efforts will be made at every stage to ensure that local vendors and supplier's capacity are built up.
- NWEDC will also put in efforts at encouraging joint ventures between local and foreign suppliers to enhance knowhow transfer;

The target group for these capacity building activities shall be:

- Small and medium size vendors, who wish to increase their productivity;
- Vendors who at the outset do not qualify, but wish to improve their performance and capacity;

Some of the key areas of focus for capacity building have been identified below. NWEDC will, in consultation with GoN, finalize and put in place a plan for the same.

- Workshop/ Induction Training;
- Job-specific On-site training;
- Cluster Development;
- HSE Training;
- Joint Ventures;
- Bank Linkages;

### *3.6.4.5. Implementation*

**Organisation Structure**

The NWEDC and GON, as per section 11.3.2 (of the project development agreement) jointly prepare the IBP to be implemented within 12 months from the Agreement Date in accordance with this Schedule

NWEDC will put in place a team with clear cut roles and responsibilities for the implementation of the detailed plan. This section (and sub sections) will provide an understanding the team and

the manner in which they will be involved in the implementation. Some key things to be kept in mind and questions which will be answered as part of this section are as follows:

1. NWEDC's role
2. GoN's role
3. Industrial Benefits Officer
4. Local communication officer

The roles and responsibilities for each stakeholder will be clearly specified.

*Industrial Benefits Officer*

As a part of the PDA requirements, NWEDC will appoint an Industrial benefits officer, who shall work with domestic suppliers on opportunities to meet mutual needs.

**Interlinkage with other Plans**

The benefit sharing plans thus formulated are part of a larger social impact management framework for the project and shall be implemented in coordination with the other management plans such as the following (but not limited to):

- LBSP
- ESTP
- Stakeholder Engagement Plan
- Livelihood Restoration Plan
- Grievance Redressal Mechanism
- Labour influx management plan

Note: This section will provide a brief description about the effectiveness of the institution/implementation agency for planning, management, monitoring and delivery of the plan.

This will also include suggestions for workable linkages with other programs/projects (government-run; multi/bi-lateral agency sponsored).

**Schedule for Implementation**

This section provides an understanding of the schedule of implementation of the plan thus formulated.

NWEDC will put in place a schedule for implementation of the IBP, in discussion with GoN. This schedule will provide an itemized timeline for each step of the implementation process.

### *3.6.4.6. Engagement Strategy*

An essential component of the implementation of the benefit sharing plan is the engagement with the local community and other external stakeholders.

This section will provide the Engagement strategy for the IBP. The strategy will be specifically to explain the key needs and sensitivities viz local vendors government stakeholders and the IBP.

Although this will be in line with the overall stakeholder engagement activities of LALRP /ESIA and other plans formulated, it will describe how to position IBP actions and address a larger audience (district and beyond). The engagement strategy will include the following:

- Aim, objectives of IBP;
- Coverage, potential beneficiaries and thematic areas;
- Phased approach, timelines and outcomes;
- Grievance management (as per EIA/ESIA/LALRP); &
- Feedback, documentation, communication, multi-media.

#### *3.6.4.7. Monitoring and Review Mechanism*

The IBP will serve as a macro plan that will be constantly reviewed and updated on annual basis, throughout the project lifecycle. Micro plans will be developed, that will comply with the major principles identified, and are ready for implementation during the project activities

NWEDC will identify a monitoring mechanism in terms of the following:

- Schedule with milestones and tracking of delays;
- Provision for internal and external monitoring;
- Frequency of monitoring and review;
- The KPIs for internal and external monitoring;
- Process of reviewing and updating the IBSP based on the findings of the monitoring reports;
- Responsibilities of NWEDC, GoN, and any third party involvement for monitoring purposes
- Systems and institutional linkages for feedback and mid-course correction

#### *3.6.4.8. Budget*

NWEDC will ensure that adequate budget is allotted for the implementation of the IBP.

This section will provide an itemized budget for each step in the implementation of the IBP.

#### *3.6.4.9. Reporting and Documentation*

As per the PDA, NWEDC shall submit annual reports to GON describing in detail the activities undertaken under the Plan, the amounts spent on such activities and impact evaluation of such activities. Some of the key aspects which may be included in the reports shall include (but not be limited to):

- The measures put in place to promote local enterprises;
- The number of local vendors registered with the project;

- The resources procured locally;
- The training and capacity building activities undertaken; and ·
- The way forward

As part of the detailed plan, a reporting mechanism will be put in place, in consultation with the GoN, which will provide an understanding of the following:

1. Requirement for internal and external reporting
2. the frequency of reporting
3. chain of reporting
4. the format- report, presentation, verbal discussion etc.

Other documents which will be maintained during the plan implemented will include, (but not be limited to), the following:

- Meeting minutes during the supply and demand mapping consultations;
- Training records;
- Records of human resources involved in the project and the number of locals vendors engaged in the project;
- Purchase register used;
- The number of locals supported with other capacity building and trainings; and
- Any complaints or grievances obtained.

Person in charge for maintaining documents will be appointed by the Project team.

## 3.7. CUMULATIVE IMPACTS MANAGEMENT PLAN

### 3.7.1. Purpose

This Cumulative Impacts Management Plan (CIMP) summarises and updates the mitigation and monitoring measures identified in a Cumulative Impact Assessment (CIA) prepared as part of a Supplemental ESIA for the Project in 2014 (Supplemental ESIA 2014). The purpose of a CIMP is to describe the specific requirements, roles, and responsibilities to appropriately implement the mitigation measures to address and manage identified cumulative impacts. According to the CIA, commonly identified cumulative impacts include the following:

- Changes in land use;
- Reduction of water flow along certain river stretches, including tributaries that serve as refuges for the fish during the winter and during monsoon high flows, and where breeding and growth of young fish take place;
- Increase in sediment loads to the watershed and alteration of the sediment dynamics;
- Loss of agricultural land;

- Impacts on livelihoods dependent on altered ecosystem services;
- Aquatic impacts, in particular fish and specially in conjunction with the downstream UT-3 project;
- Interference with migratory routes and/or terrestrial wildlife movement; and
- Loss of aesthetic and/or recreational values.

### 3.7.2. Institutional Framework

According to Nepalese Environmental Protection Rules, environmental and social management of the Project is the responsibility of the Proponent. This responsibility will fall under the Proponent's PMO both during the construction and operation phase (see Appendix A, ESMS, for a more detailed description).

Roles and responsibilities to implement the Management Plans are defined as follows. A separate ESMC will be established, reporting to the PMO, to address social, environmental, and safety issues. The ESMC will consist of community liaison officers, Environmental Health and Safety Officer, Social Manager, and one Environmental Manager. The Environmental Manager at corporate leads the ESMC. The Project appointed an Environmental Manager to lead the ESMC and to ensure that mitigation and monitoring actions are duly implemented, monitored, assessed, evaluated and disseminated to Project stakeholders for feedback and improvements.

The ESMC (Figure 3.7-1) is responsible for implementing and monitoring environmental and social provisions not included in the Contractor's contract documents and to liaison with the other governmental and nongovernmental organizations. The ESMC will have full-time social, environmental, and Environmental, Health and Safety professionals on staff to directly lead the supervision and management efforts for the social, environmental, and safety aspects of Project preparation and construction. ESMC staff will be based in Kathmandu and at the Project site. It is recommended that two Community Liaison Officers be located in the field in close proximity to affected communities and the Project site. Environmental Officers will also be required to be located near the Project site to be able to monitor ongoing construction activities.

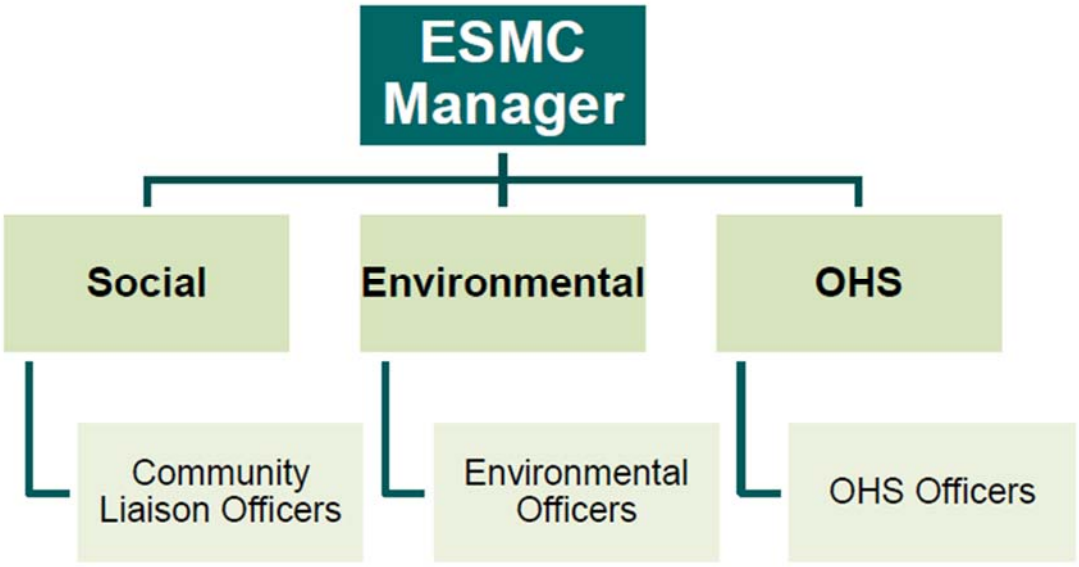


**Figure 3.7-1: ESMC Organisational Chart**

## 3.7.3. Scope

### *3.7.3.1. Project-Level*

Effective application of the mitigation hierarchy (avoid, minimise, mitigate, and compensate/offset) to manage individual contributions of cumulative impacts is recommended as best practice. The actions and measures described below should be addressed by hydropower project developers, including NWEDC, to properly manage their contributions to cumulative impacts at a project level:

- Encourage at least all main-stem Trishuli River hydropower projects (including UT-1) to operate in a run-of-river mode to maintain natural hydrology and water quality;
- Include provisions to pass sediments and flush flows seasonally to mimic the natural pattern of sediment transport and deposition;
- Provide downstream ecological flows to maintain downstream ecological functions (e.g. support fish juvenile life stages), ecosystem services, and water uses;
- Manage riparian landscapes surrounding reservoirs and upstream of reservoirs to minimise hypoxia in reservoirs;
- Provide effective upstream and downstream fish passage at dams where migrations naturally occur and provide attraction flows when and where necessary to ensure fish successfully move through the free-flowing reaches;
- Implement long-term monitoring of fish passages to ensure continued functionality for successful fish passage;

- Construct screening and diversion devices where necessary to prevent downstream passage via turbine or spillways;
- Discourage and monitor extent of in-migration, and target local benefit sharing/community investment funds to increase infrastructure and services capacity;
- Coordinate with boating outfitters to maintain flows suitable for recreation use, if any, and potentially provide suitable flows on specific days during the peak recreation period; and
- Provide sufficient flows to maintain water levels for irrigation intakes during the dry season.

#### *3.7.3.2. Regional Level*

While the individual actions recommended above minimise an individual development's contribution to cumulative impacts, the overall management of cumulative impacts must be the responsibility of multiple project developers and government and requires a collective approach. If individual actions are not enough to mitigate cumulative impacts, collaborative efforts, usually at regional level, are required (IFC 2013). The strategy of collaborative efforts depends on the complexity of the cumulative effects and can range from information exchange between proponents to multidisciplinary working groups and regional initiatives.

Ideally the CIA should be led or developed by government entities that have direct influence on proponents and other government entities to identify the contributions of each actor and establish the mechanism to manage cumulative impacts. International good practice requires that individual proponents must mitigate the impacts generated by their project and, at least, support and strategies to manage cumulative impacts (IFC 2013).

As there are multiple hydropower projects being developed or planned to be developed by different developers with multiple stakeholders in the Trishuli River Basin, managing the identified cumulative impacts and varied stakeholder expectations is considered complex and would be best carried out through a collaborative regional initiative.

The regional cumulative impacts management initiative could be defined and enacted through a regional working group, which would operate under a Memorandum of Understanding. Stakeholders involved in the discussion and creation of the working group should include government agencies, international organizations, affected communities, project developers and financers of hydropower projects and other sector projects of the Trishuli River Basin.

Through their institutional objectives and contacts, the Depart of Energy Development could have a crucial role in the creation and implementation of the regional working group. The regional working group could use the CIA for the Project as a basis to identify objectives, key issues, responsible parties, and management strategies and actions. Roles and responsibilities of each stakeholder should be clearly defined at the beginning of the planning process to establish and maintain a constructive relationship among involved stakeholders. The regional initiative should be engaging and communicate roles, strategies and actions to other stakeholders and interested parties.

A preliminary list of issues that could be covered by the working group includes:

- Coordinate benefit sharing plans in partnership with the regional government, which would allow for the coordinated planning and implementation of strategic community investments (e.g. water access, road improvements, new hospital, and education improvements);
- Coordinate the location, construction schedules, and mitigation of impacts for associated facilities such as access roads, transmission lines, and substations;
- Standardise practices and synergies of mitigation and monitoring measures such as a collective streamflow monitoring network in lieu of individual field monitoring efforts;
- Implement land use zoning in the region, including means to document existing land use patterns;
- Coordinate between finance institutions in project monitoring and collaborative Environmental and Social Management Systems (ESMS);
- Exchange environmental and social data between stakeholders;
- Report and disclosure information to Affected Communities to better manage local expectations and foster a transparent process; and
- Follow up and update the CIA as other projects are added and commissioned. It is important to note that CIAs are not static analysis.

### 3.7.4. Monitoring

Table 3.7-1 presents the proposed management and monitoring measures to mitigate cumulative impacts identified in the CIA performed as part of the Supplemental ESIA. The proposed actions are structured around two levels of responsibility:

- Measures that fall within NWEDC control and could be directly implemented by the proponent; and
- Actions that require collaboration and coordination of multiple stakeholders (e.g. Government of Nepal, other hydropower sponsors in the Trishuli basin, etc.)

NWEDC will be required to implement and follow up on the mitigation measures and coordinate as needed with other regional stakeholders (hydropower operators, nongovernmental organizations, government, Community Forest Groups, etc.) to engage in and support regional initiatives.

**Table 3.7-1: Management and Monitoring Actions for Cumulative Impacts Mitigation**

| Selected VECs | Cumulative Impacts (Indicator) | Proposed mitigation and management actions | |
|---|---|---|---|
| | | NWEDC | Collaborative/Regional Efforts |
| *Environmental* | | | |
| Water Resources: Quantity, Quality and Use | Reduction in water availability (creation of flow-reduced segments) | • Create an Environmental Flow Stakeholders Committee<br>• Monitor environmental flows within the diversion reach (as | • Participate in the Trishuli River Co-Management Platform to collaboratively |

| Selected VECs | Cumulative Impacts (Indicator) | Proposed mitigation and management actions | |
|---|---|---|---|
| | | NWEDC | Collaborative/Regional Efforts |
| | | described in the Environmental Flow Management Plan [EFMP]) | monitor and manage cumulative impacts within the river basin<br>• Engage and support watershed management initiatives in the Trishuli basin |
| | Competition with other users (presence of settlements within the concession areas) | • Engage with water user groups and monitor impacts on water supply<br>• Continue water quality monitoring during operations as described in the EFMP<br>• Develop Water Source Protection Programs | • Engage and support watershed management initiatives in the Trishuli basin<br>• Support collaboration and exchange of data with relevant stakeholders (e.g. Langtang Park Authorities, Water District Offices, etc.) |
| Fish and Aquatic Habitats | Aquatic habitat loss/degradation (creation of flow reduced segments) | • Implement all of the monitoring requirements in the EFMP, including an eDNA analysis of fish in the Trishuli River Basin and enhanced hydraulic analysis of its diversion reach, especially with regards to the *S. richardsonii*<br>• Fish expert to be hired to develop and implement aquatic monitoring program during constructino and operation | Engage in coordinated monitoring efforts and explore joint mitigation options with other hydropower sponsors. |
| | Aquatic habitat fragmentation (construction of dams and other physical barriers) | • Integrate fish passages as part of the BMP and EFMP<br>• Explore and develop mitigation options suggested for the barrier effect (implement Adaptive Management based on monitoring results) | • Engage and support initiatives aiming to mitigate/restore aquatic connectivity (e.g. coordinated capture and release, multi-stakeholder fish rearing program, etc.)<br>• Ensure downstream projects provide fish passage, especially the downstream UT-3 Project. |
| Erosion and Sedimentation Processes | Landslides and other risks (presence of high slide potential areas in the concession areas) | • Stabilize and protect slopes<br>• Monitor landslides and other natural risks (i.e. GLOFs) in the Project area | Engage and support soil conservation and erosion reduction initiatives in the Trishuli basin |
| | Increased surface erosion (density of roads within the concession areas) | • Protect natural vegetation to minimise erosion (e.g. river bank restoration)<br>• Manage sediments and monitor sedimentation<br>• Stabilize and protect slopes | Engage and support soil conservation and erosion reduction initiatives in the Trishuli basin |

| Selected VECs | Cumulative Impacts (Indicator) | Proposed mitigation and management actions | |
|---|---|---|---|
| | | **NWEDC** | **Collaborative/Regional Efforts** |
| | | • Provide adequate drainage<br>• Retention facilities during construction | |
| Terrestrial Habitats | Encroachment on protected areas (proximity of concession areas to protected areas) | • Minimise and mitigate impacts on fauna and vegetation as described in the Biodiverisity Management Plan by limiting disturbance and educating construction workers on steps to prevent damage to the park and/or its wildlife<br>• Extend wildlife and biodiversity monitoring in selected locations into the operational phase (as described in the Biodiversity Management Plan)<br>• Enhance riparian vegetation by developing a Riparian Vegetation Restoration Program which describes existing conditions, restoration design, and monitoring and maintenance activities<br>• Protect the Langtang National Park from further losses of land due to shifting river course and from easy access to the park though dewatered zones during operation<br>• Regular ecological monitoring on the fauna, flora and specific habitats within the impact areas. | • Engage and support stakeholders (e.g. Langtang National Park, WWF Nepal) working on biodiversity protection initiatives in the Trishuli watershed.<br>• Explore opportunities for coordinated re-vegetation reforestation actions with other hydropower sponsors (i.e. maximize terrestrial habitats connectivity). |
| | Pressure on forest habitats (presence of forest habitats within concession areas) | | |

| Selected VECs | Cumulative Impacts (Indicator) | Proposed mitigation and management actions | |
|---|---|---|---|
| | | NWEDC | Collaborative/Regional Efforts |
| *Socioeconomic* | | | |
| Use of Natural Resources | Pressure on forest uses (presence of forest land within concession areas) | • Develop a Community Forestry Support Program that provides guidance on how to undertake construction activities in a community forestry area and how to involve the CFUGs in the process<br>• Monitor impacts on Community Forests (e.g. impacts on productivity and livelihoods) (included in the Land Acquisition and Livelihood Restoration Plan) | Coordinate reforestation and revegetation actions with existing/future initiatives in the watershed. |
| | Pressure on agricultural land (presence of agricultural land within concession areas) | • Develop Agricultural Enhancement Program<br>• Monitor impacts on livelihoods due to the loss of agricultural land (included in the Land Acquisition and Livelihood Restoration Plan) | Support farmers in the Project area to participate in agriculture enhancement opportunities at the district or watershed level. |
| Cultural and Religious Sites | Reduction in water availability for rituals (cremation sites within the concession areas) | • Few existing cremation sites are located within the concession area of an existing hydropower project. Further disruption is not expected. | Collaborate with the Government and other stakeholders in cultural related issues. |
| | Interference with access and use of cultural sites | Coordinate with local communities to minimise disruption of cultural/religious activities, especially significant dates (included in the Construction ESMP) | |

## 3.7.5. Auditing, Reporting, and Record Keeping

### *3.7.5.1. Audit and Inspection*

An audit program detailing the aspects to be audited, the area (relevant department or section), and the frequency of audits will be established. The audits will be based on appropriate protocols prepared by the environmental, social and health functions.

Regular environmental, social, and health audits and random spot checks will be undertaken by selected audit team members throughout all phases of the Project. The audit and inspection frequencies will be defined, and may be increased or decreased according to the findings and degree of confidence in the audit program. Audits will also assess compliance with agreed objectives and targets as well as the effectiveness of the management plans and their implementation.

Audit findings will be reviewed by the applicable management functions and where corrective actions are deemed necessary; the relevant management plans will be updated.

#### *3.7.5.2. Record and Record Keeping*

The proposed Project will develop a system of internal reporting that allows for appropriate reporting on the effectiveness of the ESMS. Public reports will also be prepared on a range of issues of interest or concern to local communities.

During the construction phase, contractors are required to take all appropriate measures in the ESMS and related plans and procedures to identify and document incidents of environmental, social and health non-conformance. These records should be produced at no less than weekly frequency, identifying the category of non-conformance, its potential severity, and its frequency to be demonstrated. The resultant records will be addressed in the appropriate management meetings to initiate corrective actions required.

These records are intended to facilitate the purposeful reduction of incidents of non-conformance, leading to a consequential reduction of the root causes of such incidents. All management plans include a monitoring plan detailing parameters that will be monitored. The results from this data will be reviewed and published annually. The report will review performance over the previous year and will set targets for subsequent years.

### 3.7.6. Adaptive Management System

Project design changes may occur that need to be accommodated by NWEDC and their contractors. Similarly, the institutional framework and roles and responsibilities provided in Section 3.7.2, Institutional Framework, may also change as the Project progresses.

The ESIA management plans require a mechanism to manage change. At times these changes may be material, potentially influencing the original findings of the ESIA, and hence, the basis for its approval. Such a mechanism to manage change, or a change management system, must ensure that changes to the scope of the proposed Project are subjected to a robust assessment process. Any changes to Project scope will be evaluated for their degree of significance, and will be incorporated into the appropriate documentation as follows:

- Minor changes will be reflected in updates to the applicable Management Plans; and
- Substantive changes that might potentially alter the ESIA findings (i.e. those that result in changes to the predicted significance of environmental, socioeconomic and health impacts) will be subject to re-assessment, further stakeholder consultation, supplementary reporting and revision of the Project's Environmental, Social and Health Management Plans. Typically, such substantive changes will be submitted as an addendum to this ESIA.

### 3.7.7. River Basin Coordination

Although most of the potential cumulative impacts of the UT-1 Project appear manageable, there is the potential for over 40 hydropower projects in the Trishuli River Basin, which collectively pose significant environmental and social risks. Since cumulative impacts typically result from the actions of multiple stakeholders, the responsibility for their management is collective. At times, cumulative impacts can transcend a regional/administrative boundary and, therefore, collaboration in regional strategies may be necessary to prevent, or effectively manage, such

impacts. Where cumulative impacts already exist, management actions by other projects may be needed to prevent unacceptable cumulative impacts. There is a need for a platform or organization that can facilitate multi-stakeholder cooperation and commitment to collaborate in the monitoring and co-management of cumulative impacts in the Trishuli River Basin.

The UT-1 Project is actively participating in the Trishuli Basin CIA, funded by the IFC, and has committed to participating in the Trishuli River Co-Management Platform to collaboratively monitor and manage cumulative impacts within the river basin. The Project is also undertaking additional activities, including an eDNA analysis of fish in the Trishuli River Basin and enhanced hydraulic analysis of its diversion reach to better evaluate common snow trout's upstream migration flow requirements, which it will share with the government and other hydropower developers within the Trishuli Basin.

### 3.7.8. Funding

Provision for the financing of the implementation of the CIMP (through the financing of the ESMC) has been included in the budget of the NWEDC. This may include periodic meetings between Depart of Energy Development, other project proponents, local stakeholders, and those necessitated by the Adaptive Management System.

### 3.7.9. References

IFC (International Finance Corporation). 2013. Good Practice Handbook, Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets.

ESSA (ESSA Technologies Ltd.). 2014. Supplemental ESIA Upper Trishuli-1 Hydropower Project, Nepal. Prepared by ESSA Technologies Ltd. for the Nepal Water and Energy Development Company and the International Finance Corporation. December 2014.

## 3.8. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING REPORTING PLAN

The following table describes the monitoring and reporting requirements for the Project as discussed through the ESIA and the ESMMP.

| Resource/Area | Monitoring Requirement/ Indicator | Frequency | Reporting Requirement | Entity Responsible |
|---|---|---|---|---|
| Construction Phase | | | | |
| Air | Dust accumulation: Inspect for and record dust accumulation on roof and vegetation in the surrounding area | Monthly | Monitor, record, and report exceedances | EPC Contractor |
| Air | Air quality inside the tunnel: $PM_{10}$, CO, $SO_x$, and $NO_x$ | Monthly | Report concentrations in excess of parameters in ESIA | EPC Contractor |

| Resource/Area | Monitoring Requirement/ Indicator | Frequency | Reporting Requirement | Entity Responsible |
|---|---|---|---|---|
| Air | Install an online real-time gas monitoring system, including analysis equipment, to detect elevated concentrations of hazardous gases (coal gas) | Continuous | Monitor, record, and report the situation of hazardous gas to make sure that the emission has not exceeded the established standards | EPC Contractor |
| Air | Monitor air quality (TSP/$PM_{10}$) at Hakubesi-Fulbari, Gogane, and Mailun Villages. | 3 times a year | Record and compare with ambient standards in the ESIA. | EPC Contractor |
| Noise | Noise Level Meter installed at Hakubesi-Fulbari, Gogane, and Mailun Villages. | 3 times a year | Record and monitor noise levels. | EPC Contractor |
| Noise | Maintain noise levels associated with all machinery and equipment at or below 90 decibels. | 3 times a year | Record and monitor noise levels. | EPC Contractor |
| Noise | Construction site noise shall be monitored with portable detecting devices | Continuous | Monitor the noise level at the sensitive receptors | EPC Contractor |
| Water | Sample three locations for DO, pH, BOD, turbidity, total suspended solids, and hardness: upstream of weir, between weir and power house, and downstream of power house | 3 times a year | Record and compare with Standards for Effluents Discharged in the ESIA. | EPC Contractor |
| Water | DO, pH, BOD, turbidity, total suspended solids, and hardness. Sample immediate points after treatment units of tunnel discharge, discharge from aggregate, crushing plant and batching plant, settling ponds, and sanitary discharge. | Monthly | Report concentrations in excess of parameters listed in the ESIA: Standards for Effluents Discharged into Inland Water from Construction Sites and Camps | EPC Contractor |
| Water | Water quality from runoff from any fresh bitumen surfaces | As needed | monitored and remedial actions taken where required | EPC Contractor |

| Resource/Area | Monitoring Requirement/ Indicator | Frequency | Reporting Requirement | Entity Responsible |
|---|---|---|---|---|
| Water | Water quantity in Community Springs/Water Sources | Before, during and after construction | Monitor water yield to detect impacts and provide alternate water supplies to villages/communities if water supply is affected | EPC Contractor |
| Water/Soil | Pollution Prevention: open defecation and garbage/solid waste disposal | Daily | Visual monitoring of nearby villages and headwork and powerhouse areas. | EPC Contractor |
| Water/Soil | Hazardous materials/Waste use as well as the storage, handling, and disposal procedures | Continuously | Records must be kept on site. | EPC Contractor |
| Water/Soil | Tunnel excavation material disposal (source and final disposal location) shall be monitored and documented | Continously | Records must be kept on site. | EPC Contractor |
| Soil | Landslide and slope stability – access roads and tunnel | 6 times a year | Record and monitor number of incidence of landslides, slope failure and debris flow. | EPC Contractor |
| Soil | Erosion of soils and deposition in downslopes of the access roads, tunnels, spoil disposal areas, and quarries | 6 times a year | Monitor via frequent mapping and site observations | EPC Contractor |
| Flora | Forest cover – visually monitor number of trees felled within 1 km of dam, access road and switchyard as well as baseline plots | Bi-annually | Record visual observations | Environmental and Social Management Cell |
| Fauna | Monitor and record information on raiding season (flora raiding by wild herbibores), frequency and sites | Bi-annually | Conduct community consultations and maintain records | Environmental and Social Management Cell |
| Fauna | Aquatic Ecology - monitored as part of a Biodiversity Evaluation and Monitoring Program | Bi-annually | Conduct Fish sampling and interview local | Environmental and Social Management Cell |

| Resource/Area | Monitoring Requirement/ Indicator | Frequency | Reporting Requirement | Entity Responsible |
|---|---|---|---|---|
| | (BEMP) to be developed by a fish expert with metrics to demonstrate No Net Loss of aquatic biodiversity as required by IFC's PS6. | | fishermen, maintain records. | |
| Health and Safety | Sample water supply reservoir and end tap of the Camps. | Monthly | Report concentrations in excess of parameters listed in the ESIA: Drinking Water Quality Standards for Construction Camps and Construction Sites | EPC Contractor |
| Health and Safety | Monitor structural stability of tunnels | During the construction phase | Record visual observations | EPC Contractor |
| Health and Safety | Maintain records and reports concerning health, safety and welfare of persons, and damage to property, as the Environmental Supervision Team may reasonably require | Monthly | Records must be kept on site. | EPC Contractor |
| Health and Safety | Training program numbers | During the construction phase | Keep records of attention and issues covered and provide such records when required by the Environmental and Social Management Cell or the Safety and Environmental Officer | EPC Contractor |
| Health and Safety | Visually monitor number of houses, construction material, development of cracks and house owner information in Hakubesi-Fulbari | In response to complaints | Document structured through write ups, maps, and photographs. | Environmental and Social Management Cell |
| Health and Safety | Visually inspect workers camps for adequate water, wastewater, and solid waste facilities | Weekly | Record visual observations | EPC Contractor |

| Resource/Area | Monitoring Requirement/ Indicator | Frequency | Reporting Requirement | Entity Responsible |
|---|---|---|---|---|
| Health and Safety | Compliance to code of conduct and Review of Records required to be maintained by law | Monthly | Maintain records | Environmental and Social Management Cell Representatives |
| Social | Review records of Grievance Redressal Mechanism and community engagement activities, Compliance to code of conduct, and records of weekly and monthly monitoring | Annually | Document any deviations from requirements in the Labor Influx Management Plan, submit annual reports to the GON | External Monitoring by Third Party |
| Social | Perception of environmental enhancement programs in Hakubesi-Fulbari, Gogane, and Mailun and VDC Offices in Dhunche and Ramche | Bi-annually | Interviews, observation and structured questionnaire survey of selected groups. | Environmental and Social Management Cell |
| Social | Monitoring compliance with the Employment and Skills Training Plan, the Industrial Benefit Sharing Plan | Annually | Submit annual reports to the GON | NWEDC |
| Socio-economics | Economic and social status of affected communities (Hakubesi-Fulbari, Gogane, and Mailun) | Once a year | Interviews, observation and structured questionnaire survey of selected groups. | |
| Socio-economics | Inflation of prices - commodities in Hakubesi-Fulbari, Gogane, and Mailun (cereals, cash crops, kerosene, meat, sugar, salt, spices, soap. Milk, ghee, etc.) | Monthly | Record keeping of prices. | Environmental and Social Management Cell |
| Socio-economics | Trade and business development – number of hotels, tea stalls, and restaurants. | Three times a year | Direct enumeration and record keeping. | Environmental and Social Management Cell |
| Operation Phase | | | | |
| Soil | Landslide and slope stability – access roads and tunnel | Bi-annually for the first 5 years or operation | Record and monitor number of incidence of landslides, slope failure and debris flow. | NWEDC |

| Resource/Area | Monitoring Requirement/ Indicator | Frequency | Reporting Requirement | Entity Responsible |
|---|---|---|---|---|
| Soil | Erosion of soils and deposition in downslopes of the access roads, tunnels, spoil disposal areas, and quarries | Bi-annually for the first 5 years or operation | Monitor via frequent mapping and site observations | NWEDC |
| Water | Sample three locations for DO, pH, BOD, turbidity, total suspended solids, and hardness: upstream of weir, between weir and power house, and downstream of power house | Yearly for 30 years | Record and compare with Standards for Effluents Discharged in the ESIA. | NWEDC |
| Water | Aquatic habitat loss/degradation (creation of flow reduced segments) | Monitor monthly for 5 years | Engage in coordinated monitoring efforts and explore joint mitigation options with other hydropower sponsors | NWEDC |
| Water | EFlows releases and river condition: gauging station located at Eflows Site 1 and another at Eflows Site 2 | Continuous | Communicate the results of the independent monitoring of EFlows releases and river condition to stakeholders | NWEDC will be responsible for the release of EFlows and record keeping |
| Drinking Water | Sample water supply reservoir and end tap of the Camps. | Yearly | Report concentrations in excess of parameters listed in the ESIA: Drinking Water Quality Standards | |
| Noise | Noise level in the powerhouse area | Once after operation | Measure noise level using noise level meter | NWEDC |
| Flora | Forest cover – visually monitor number of trees felled within 1 km of dam, access road and switchyard as well as baseline plots. Survival of planted tree species and maintenance of floral diversity within offset site | Bi-annually for the first 5 years of operation | Record visual observations | NWEDC |

| Resource/Area | Monitoring Requirement/ Indicator | Frequency | Reporting Requirement | Entity Responsible |
|---|---|---|---|---|
| Fauna | Monitor and record information on raiding season (flora raiding by wild herbibores), frequency and sites | Bi-annually for the first 5 years of operation | Conduct community consultations and maintain records | NWEDC |
| Fauna | Aquatic Ecology - monitored as part of a Biodiversity Evaluation and Monitoring Program (BEMP) to be developed by a fish expert with metrics to demonstrate No Net Loss of aquatic biodiversity as required by IFC's PS6. | in January, March, June, and September at the three EFlow monitoring sites | Conduct Fish sampling and interview fishermen, maintain records. | NWEDC |
| Fauna | Terrestrical biodiveristy will be monitored at the project site and in LNP as part of a Biodiversity Evauation and Monitoring Program (BEMP) to be developed to demonstrate NNL per IFC's PS6. | Bi-annually for the first 5 years of operation | | To be implemented by LNP or NGOs with supervision by NWEDC. |
| Fauna | Monitor bird carcasses electrocuted and record any threatened or migratory species observed as described in the BEMP | Monthly | Record and monitor number | NWEDC |
| Socio-economics | Economic and social status of affected communities (Hakubesi-Fulbari, Gogane, and Mailun) | Once after 2 years of operation | Interviews, observation and structured questionnaire survey of selected groups. | NWEDC |
| Socio-economics | Inflation of prices - commodities in Hakubesi-Fulbari, Gogane, and Mailun (cereals, cash crops, kerosene, meat, sugar, salt, spices, soap. Milk, ghee, etc.) | Three times a year for the first 2 years of operation | Record keeping of prices. | NWEDC |
| Socio-economics | Trade and business development – number of hotels, tea stalls, and restaurants. | Three times a year | Direct enumeration and record keeping. | NWEDC |

| Resource/Area | Monitoring Requirement/ Indicator | Frequency | Reporting Requirement | Entity Responsible |
|---|---|---|---|---|
| Social | Perception of environmental enhancement programs in Hakubesi-Fulbari, Gogane, and Mailun and VDC Offices in Dhunche and Ramche | Bi-annually | Interviews, observation and structured questionnaire survey of selected groups. | NWEDC |

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## ATTACHMENT 1

# LAND ACQUISITION AND LIVELIHOOD RESTORATION PLAN

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# Land Acquisition and Livelihood Restoration Plan

*Upper Trishuli-1 Hydropower Project, Nepal*

NEPAL WATER AND ENERGY DEVELOPMENT CO. PVT. LTD.

**Public Consultation Version Draft Report**

March 2018

www.erm.com

ERM

*The business of sustainability*

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*ABBREVIATIONS*

| | |
|---|---|
| ADB | Asian Development Bank |
| AEPC | Alternative Energy Promotion Centre |
| BCTS | Brahmins, Chhetri, Thakuri and Sanyasi |
| BRI | Border Road Initiative |
| CDO | Chief District Officer |
| CFC | Compensation Fixation Committee |
| CFUG | Community Forest User Group |
| Cu.mt. | Cubic meter |
| DAO | District Administrative Office |
| DDC | District Development Committee |
| DFO | District Forest Officer/Office |
| DoED | Department of Electricity Development |
| DUDBC | Department of Urban Development & Building Construction |
| EA | Executing Agency |
| EIA | Environmental Impact Assessment |
| ERM | Environmental Resources Management India |
| ESIA | Environmental and Social Impact Assessment |
| FECOFUN | Federation of Community Forestry Users of Nepal |
| FPIC | Free Prior Informed Consent |
| GoN | Government of Nepal |
| HA | Hectare |
| HH | Households |
| ICP | Informed Consultation and Participation |
| IDP | Internally Displaced People |
| IFC | International Finance Corporation |
| ILO | International Labour Organization |
| INGO | International Non-Government Organization |
| IP | Indigenous People |
| IPDP | Indigenous Peoples Development Plan |
| JSS | Jan Sarokar Samiti |
| Kg | Kilogram |
| KV | Kilo Volt |
| KWh | Kilo Watt per hour |
| LAA | Land Acquisition Act |
| LNP | Langtang National Park |
| LRP | Livelihood Restoration Plan |
| MW | Mega Watt |
| NEA | Nepal Electricity Authority |
| NGO | Non- Government Organization |
| NR | Nepali Rupee |
| NRA | National Reconstruction Authority |
| NTFP | Non Timber Forest Produce |
| NWEDC | Nepal Water & Energy Development Company |
| OBOR | One Belt One Road |
| OM | Operations Manual |
| PAFs | Project Affected Families |

| | |
|---|---|
| PAPs | Project Affected People |
| PDA | Project Development Agreement |
| PIO | Project Implementation Officer |
| PIO | Public Information Officer |
| PPA | Power Purchase Agreement |
| R&R | Resettlement and Rehabilitation |
| RoR | Run Of River |
| SIMF | Social Impact Management Framework |
| Sqft | Square feet |
| UT-1 | Upper Trishuli-1 |
| VAT | Value Added Tax |
| VDC | Village Development Committee |

## *GLOSSARY*

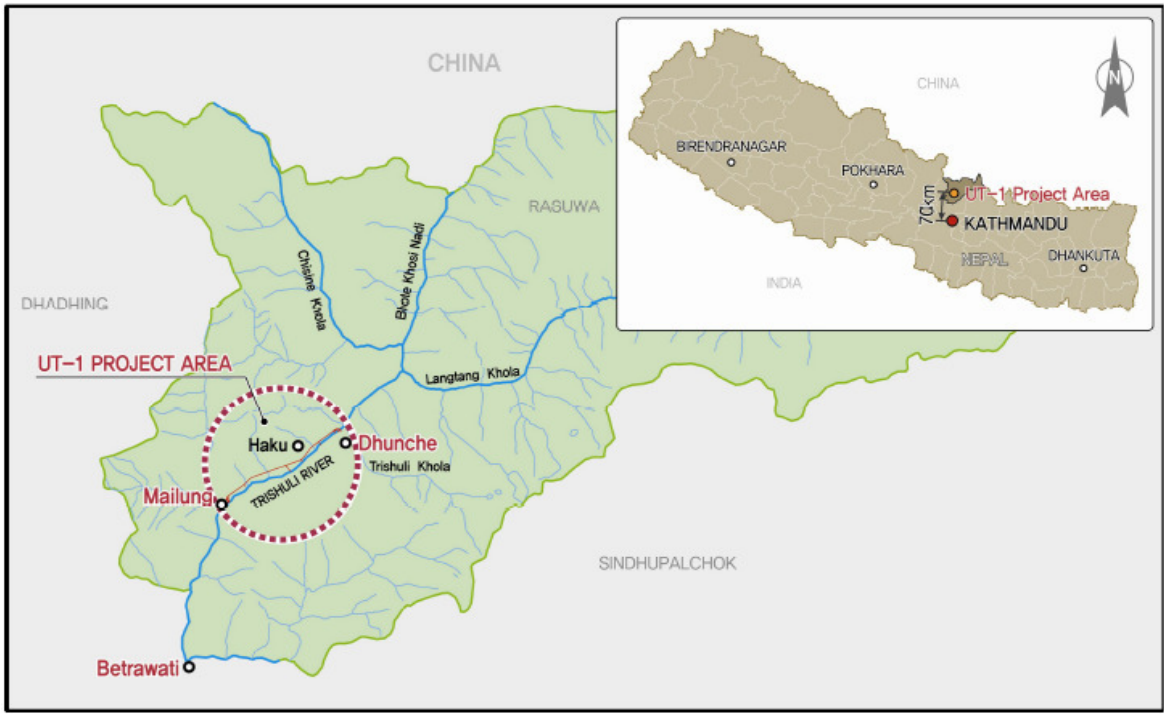
| Term | Description |
|---|---|
| Ailani Land | Barren unregistered land |
| Anna | Is a customary unit of measurement; 1 Anna: 31.8 sq. m and 1 Ropani is comprised of 16 Anna |
| Contextual Vulnerability | Contextual vulnerability is understood as the 'present' susceptibility to an impact, which is influenced by multiple factors and processes. |
| Diyalo | wooden strips of pine trees and firewood |
| Economic Displacement | According to World Bang Group PS 5: Land Acquisition and Involuntary Resettlement "Economic Displacement refers to the loss of assets or access to assets that leads to loss of income sources or means of livelihood" |
| Free Prior Informed Consent | FPIC builds on and expands the process of ICP as discussed below, and is established through good faith negotiations between the client (the Project) and the affected communities of Indigenous Peoples. As part of this process, the client will document (i) the mutually accepted process between the client and Affected Communities of Indigenous Peoples, and (ii) evidence of agreement between the parties as the outcome of the negotiations. FPIC does not necessarily require unanimity and may be achieved even when individuals or groups within the community explicitly disagree. |
| Gaunpalika or gaupalika | Translated in English as Rural municipality, is the newly formed lower administrative division in Nepal. The Ministry of Federal Affairs and Local Development (Nepal) dissolved the existing village development committees and announced the establishment of this new local body. There are currently 481 rural municipalities in Nepal out of 744 local units. |
| Guthi Land | "Swayambhuguthi land or the Trust land is the land that belongs to a Monastery at Swayambhu in Kathmandu. Guthi Tainathi land (Guthi owned land)" means a land which is not registered in the name of any person and in which the Guthi Corporation has exclusive right. "Guthi" means and includes a Guthi (trust) endowed by any philanthropist through relinquishment of his or her title to a movable or immovable property or any other income-yielding property or fund for the operation of any shrine (matha) or festival, worship or feast of any God, Goddess or for the construction, operation or maintenance of any temple, shrine (devasthal), rest house (dharmashala), shelter (pati), inn (pauwa), well, tank, road, bridge, pasture, garden, forest, library, school, reading hall, dispensary, treatment facility, house, building or institution for any religious or philanthropic purpose." Source: The Guthi Corporation Act, 2033 (1976). |
| Household Size | Household size is the number of persons who reside in a structure and for whom the economically active individuals of the household are financially responsible for |
| IDP Camp | Internally Displaced Camps Temporary settlements, established on private or government land, for those households who were displaced due to the earthquake. These camps, are set up through aid and assistance of the government and INGOs/NGOs and are comprised of temporary shelters. |
| Indigenous People | The World Bank Group PS 7: Indigenous People, defines Indigenous People as a distinct social and cultural group possessing the following characteristics in varying degrees:<br>• Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;<br>• Collective attachment to geographically distinct habitats or ancestral territories in the Project area and to the natural resources in these habitats and territories;<br>• Customary cultural, economic, social, or political institutions that are separate from those of the mainstream society or culture; or<br>• A distinct language or dialect, often different from the official language or languages of the country or region in which they reside. |
| Informed Consultation and Participation | Informed consultation and participation refers to the process of consultation which will result in the Affected Communities' informed participation. ICP involves a more in-depth exchange of views and information, and an organized and iterative consultation, leading to the client's (the Project's) incorporating into their decision- making process the views of the Affected Communities, on matters, that affect them directly, such as proposed mitigation measures, the sharing of development benefits and opportunities and implementation issues. |
| Jan Sarokar Samiti | "Project Concerned Persons" Committee. |
| Joint Family | A family unit including two or more generations in a common residence |
| Khola | Streams |
| Kodo | Wild cereal grown in mountainous regions |

| Term | Description |
|---|---|
| Lal Purza | Land ownership document |
| Literacy Rate | The number of persons who is 7 or above, who has the ability to read, write and understand in any language. |
| Livelihood Restoration | Livelihood restoration refers to the re-establishing of income sources and livelihoods of people. |
| Mohiyani Hak | Local cultivating or Tenants Rights for land |
| Negotiated Settlement | PS 5 defines negotiated settlement as a situation where buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail. |
| Nuclear Family | A couple and their dependent children living in a common residence |
| Out Migration/ Migration | The process of people moving out of an area in their country to move to another area in their country permanently or temporarily |
| Pangi | Pangi is a traditional woollen apron worn by Tamang women. This apron is also a symbol of the women's marital status |
| Population Density | the number of people living per unit of an area (e.g. per sq. km.); the number of people relative to the space occupied by them |
| Poverty Line | A level of personal or family income below which one is classified as poor according to governmental standards. Or<br><br>The amount of money needed for a person to meet his basic needs. It is defined as the money value of the goods and services needed to provide basic welfare to an individual. |
| Project Affected Family | A household, whose members reported a shared in the land impacted by the Project and were thus subject to direct or indirect adverse or beneficial impacts on its social, physical, economic, cultural or natural environment due to land procurement for the Project. |
| Project Affected Population/ Person | Project Affected Population refers to the individuals who are part of the PAFs, and were thus subject to direct or indirect adverse or beneficial impacts on its social, physical, economic, cultural or natural environment due to land procurement for the Project. |
| Project Area or Area of Influence | Under World BankGroup Performance Standard 1, "Area of Influence" is defined to encompass:<br>The area likely to be affected by:<br>• the Project and the proponent's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the Project;<br>• impacts from unplanned but predictable developments caused by the Project that may occur later or at a different location;<br>• indirect Project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent;<br>• Associated facilities, which are facilities that are not funded as part of the Project and that would not have been constructed or expanded if the Project did not exist and without which the Project would not be viable.<br>Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the Project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted. |
| Project Footprint | The area that may reasonably be expected to be physically touched by Project activities, across all phases. The Project footprint includes land used on a temporary basis such as construction laydown areas or construction haul roads, as well as disturbed areas in transport corridors, both public and private. |
| Rehabilitation | Rehabilitation is understood as the re-establishing of incomes, livelihoods, living and social systems of a community. |
| Resettlement | Resettlement or relocation refers to the re-building of housing, assets and productive resources, cultural sites and infrastructure, in another location for the individuals or communities. |
| Ropani | Unit of land in Nepal (1 ha = 19.66 ropani); |
| Sex Ratio | The ratio of females to males in a population. It is calculated based on the following:<br><br>$\frac{Number\ of\ Females}{Number\ of\ Males}$ X 1000 |
| Vulnerable Population | Individuals or groups who could experience adverse impacts more severely than others based on their vulnerable or disadvantaged status. This vulnerability may be due to ethnicity, gender, language, religion, culture, political views, dependence on natural resources, sickness or disability or other factors. |

## 1.0 Introduction

The Nepal Water and Energy Development Company Limited (NWEDC) is proposing to construct the 216 megawatt (MW) Upper Trishuli 1 Hydropower Project (the "Project" or "UT-1") on the Trishuli River within the Rasuwa District of the Central Development Region of Nepal, approximately 70 kilometres northeast of Kathmandu (Figure ES1-1). The International Finance Corporation (IFC), the Asian Development Bank, the Asian Infrastructure Investment Bank, and other potential lenders are participating in a lender's consortium, along with potential loan guarantees from the World Bank and Multilateral Investment Guarantee Agency (collectively referred to as the "Lenders").

*Figure ES 0-1 Upper Trishuli-1 Project Location*




*Source:* NWEDC

NWEDC prepared an Environmental Impact Assessment (EIA) for the Project, which was approved by the Government of Nepal in February 2013. With the involvement of international lenders, the Project's environmental and social management program was subjected to extensive strengthening and revisions through a number of supplemental studies to bring the Project into conformance with international standards (e.g., World Bank Group Performance Standards [PS] and Environmental, Health and Safety [EHS] Guidelines). These studies led to a Supplemental EIA and a Livelihood Restoration Plan.

In April 2015, Nepal suffered a large earthquake centred within 100 kilometres of the UT-1 site. The Rasuwa District, where the Project is located, was one of the worst affected areas. NWEDC provided extensive relief to earthquake-affected people and assisted with some reconstruction efforts in the area. This earthquake changed the environmental and social

baseline conditions in the Project area. After the earthquake, most of the population from the Project area evacuated and many are still living in Internally Displaced Person (IDP) camps in the region. Over the last year, a few residents have returned (permanently or temporarily) to their local villages. Most of the local residents, however, are reported to be wary of returning due to the risk of landslides. Also, the younger population is reported to have gotten accustomed to living closer to urban centres, which provide more economic opportunities. In addition to these changes to the social context, NWEDC has revised the Project designs to better address seismic and landslide risks, resulting in some additional land acquisition.

Given these changed baseline conditions, the lenders selected the international sustainability consulting firm Environmental Resources Management (ERM) to update the social baseline study and to prepare a Social Impact Management Framework, consisting of the following documents:

- Lender required Land Acquisition and Livelihood Restoration Plan (LALRP), a Stakeholder Engagement Plan, an Indigenous People Development Plan and a Gender Action Plan, all reflecting the post-earthquake context; and
- Government of Nepal required Local Benefit Sharing Plan, Employment and Skill Training Plan, and Industrial Benefit Sharing Plan.

The attached document is the Public Consultation Draft version of the LALRP. The LALRP will be finalized after receipt of Lender comments, comments from stakeholders and completion of a Free, Prior, and Informed Consent (FPIC) process with the affected Indigenous Peoples. The other plans are available as separate documents.

## 2.0 Project Description

The Project consists of a 77-metre-wide diversion dam in a narrow gorge located 275 metres downstream of the confluence of the Langtang Khola with the Bhotekosi River. The diversion dam creates a small 2.1 hectare impoundment and diverts up to 76 cubic metres per second ($m^3/s$) of water through a powerhouse with a 216 MW capacity, returning the water to the Trishuli River approximately 10.7 kilometres downstream of the dam. The Project will connect to the Chilime–Trishuli transmission line via a 689-metre extension from the Project switchyard. The Project will be accessed via existing public roads, but NWEDC will construct an 11.84-kilometre private road upstream on the west side of the river to access the UT-1 dam.

The Project will take approximately 5 years to construct and will employ about 1,100 workers, with about 10 to 15 percent recruited locally and the remainder from elsewhere in Nepal or expatriates. Once in operations, the Project will operate in a true run-of-river mode, employ 72 staff, and produce about 1,440 gigawatt hours (GWH) per year.

## 3.0 Pre- and Post-Earthquake Socioeconomic Profile

The three VDCs, within which the Project is located, is a rural agricultural areas with a total population of 7,181 individuals (2011 census). Most of these residents are Tamang, an indigenous community, although some other minority ethnic groups are also found in the Project area. A significant portion of the population in Project area reported agriculture as the key source of income prior to the earthquake. Other livelihood activities identified included construction-related activities, driving, and bamboo basket making. Livestock rearing is an important supplementary source of income.

Most of the villages in the Haku VDC, including Gogone, Tiru, Haku Besi, Phoolbari and Thanku, were severely impacted by the earthquake with many former residents still living in

IDP camps across Rasuwa and Nuwakot districts. While some members of families have returned to their original villages, household surveys suggest most are only returning for short durations to care for stranded livestock and other agricultural purposes. The livelihoods of these earthquake-affected people has changed dramatically. Many of the residents of the IDP camps report having difficulty finding stable sources of livelihoods, with the primary source of income now coming from general labour, masonry, and related construction support services, rather than agriculture. Many families have either lost their livestock or seen a sharp reduction in their numbers, despite training and support by NGOs in poultry and boar farming as part of the relief efforts. Some households report family members having left the area, and even the country, in search of work, and sending back remittances. Some of the families have had success in setting up small shops in and around Dhunche.

## 4.0 Project Effects

The UT-1 Updated Environmental and Social Impact Assessment (March 2018) provides a detailed evaluation of all Project impacts; this document focuses on impacts relating to land acquisition and livelihoods, taking into special consideration these effects on indigenous and vulnerable peoples. Table ES-1 summarizes these impacts, which are described in more detail below.

### *4.1 Land Acquisition*

The Project requires acquisition of 107.79 hectares (ha) of land (see Table ES-2), all of which came from eight villages (Haku Besi, Sanu Haku, Thullu Haku, Gogone, Tiru, Thanku, Mailung and Phoolbari) within the Haku VDC.

**Table ES-2: Summary of Land Acquisition**

| Government Land | Private Land | Trust Land (*Guthi*) | Mailung HEP Land | Total (ha) | Number of Affected Private Land Owners |
|---|---|---|---|---|---|
| 84.06 | 5.05 | 15.53 | 3.15 | 107.79 | 38 |

ha = hectares

Most of this land (approximately 78 percent) was government-owned, including a small portion of Langtang National Park buffer land, with much of the remaining land used as community forests by five Community Forest User Groups (CFUG) representing 422 members (families).

About 19 percent of the land was owned by 38 private land owners or trust tenants, including 20 private land owners, and 18 tenants farming the Trust (*Guthi*) land, which is owned by the monastery at Swayambhu in Kathmandu. These tenants were treated the same as landowners in the land acquisition process. In addition to this, there are 11 individuals being impacted by temporary land lease and 5 individuals who are impacted by loss of structures. These individuals represent 154 PAFs. Of these 154 PAFs, 149 PAFs have an impact on livelihood and are thus considered in this LRP. The 5 PAFs, who are only impacted by loss of structure, will be considered as part of the ESIA and benefit sharing provisions for the project

Most of the government land, and all of the private and Guthi land was acquired before the 2015 earthquake. The remaining 3.15 ha of land was recently acquired (March 2018) from the Mailung Hydroelectric Project (HEP) in order to relocate the powerhouse worker camp to a safer location, from a seismic and landslide perspective. Although owned by the Mailung HEP, this property still retained 7, partially damaged, residential structures, two of which

were still occasionally occupied. The additional number of families as a result of this recent land take (impacted by loss of land as well as structure) is 12, taking the total PAF number to 154.

Of the 107.79 ha of land required for the Project, NWEDC will only temporarily lease approximately 71 percent during construction, most of which is government and Mailung HEP owned land. All of the *Guthi* land and most of the private land, however, is needed for Project facilities and would be permanently acquired.

### *4.2 Physical Displacement*

As part of the land acquisition described above, the Project also required the acquisition of 36 structures, including 27 residential structures, eight cowsheds, and one water mill. The residential structures included 14 primary residences, 5 secondary residences (only used seasonally), and 8 partially constructed houses (where the owners may have initiated construction to take advantage of compensation being offered by NWEDC).

Although 14 primary structures were acquired (seven prior to the earthquake, and seven at the Mailung HEP site after the earthquake), only 12 PAFs were affected, as 2 families were already PAFs as they had their primary residence taken in 2015. They relocated to the Mailung HEP land, where their primary residence was subsequently taken a second time. It should be noted that, although NWEDC did recently acquire the 7 primary residences on the Mailung HEP site, the earthquake had damaged all of these structures and all of the families had already been displaced at the time of acquisition and were living in IDP camps.

### *4.3 Loss of Trees and Crops*

In addition to the acquisition of land and structures, 21 of the 38 landowners also loss trees and crops. Most of the crops and vegetables produced on the land were for sustenance to meet the needs of the owners/tenants. The trees on private land impacted by the Project included fruit trees (e.g., Mango) and trees used for timber and firewood. Approximately 2,554 trees/saplings were reported to be impacted by the Project land take.

### *4.4 Loss of Natural Resources*

The Project will result in the loss for forest used for non-timber forest products and will reduce flow in the 11.84 km long diversion segment between the dam and the powerhouse. Water from this river segment was used during the dry season for drinking water, household uses such as clothes washing, and watering cattle. Proposed environmental flows would still be sufficient to support these uses. This segment of the Trishuli River was also used for the following purposes:

- Fishing – about 13 of the PAFs reported sustenance or recreational fishing in the river, but do not rely on fish for protein or income. The proposed environmental flows will still support fish use of and migration through the diversion segment.
- Irrigation – one water intake has been used to irrigate a small area supporting four families. Monsoon flows will continue to be spilled at the dam site and flow down the diversion segment.
- Cremation – during stakeholder consultation, one cremation site previously used by the Dalits was identified on the west bank of the Trishuli River along the diversion reach, but it has reportedly not been used in many years and other sites further downstream are now preferred.

Since the earthquake, however, most families have left the area and their use or dependence on natural resources along the diversion segment has been at least temporarily reduced to almost negligible.

### *4.5 Indigenous and Vulnerable Peoples*

Nearly 90 percent of PAFs directly impacted by the Project belong to the Tamang ethnic group, which is identified as an indigenous nationality, or *Adivasi Janajati*, in Nepal. The Tamang have their own language, traditional customary practices, distinct cultural identity, social structure, and oral or written history, as recognized by the National Foundation for Development of Indigenous Nationalities Act (NFDIN 2002).

The presence of this group triggers specific requirements under Lenders' social safeguard policies. WBG PS 7 (Indigenous Peoples) requires a client to develop an Indigenous People's Development Plan (IPDP) and seek the Free, Prior, Informed Consent (FPIC) of affected Indigenous Peoples (IP) communities under specific circumstances, including 'where a project impacts on land and natural resources subject to traditional ownership or under customary use.' Based on the Project's impacts on forestland communally used by Community Forest User Groups (CFUGs), which are primarily composed of Tamang, it has been determined that FPIC is applicable to this project. NWEDC is initiating an FPIC process in the first half of 2018, focusing on those IPs currently or formerly resident in the eight main villages in or near the Project footprint and their traditional representatives (if any) located elsewhere.

As described above, a large majority of the population in the Project area are indigenous, and nearly all residents of the Project area were severely affected by the earthquake, so for purposes of this document, all PAF's are considered to be vulnerable.

## 5.0 Land Acquisition Status, Process, and Additional Mitigation Measures

NWEDC has completed the land take process for approximately 93 percent of the land required for the Project. Negotiations for about 4.85 ha of government-owned land and an additional 3.15 ha Mailung HEP-owned land are still ongoing. Similarly, NWEDC has completed the land take process for 81 percent of the structures required for the Project. Negotiations for the seven structures required for the new powerhouse worker camp near Mailung are still ongoing.

### *5.1 Land Acquisition and Compensation Process*

NWEDC initiated the land acquisition process in 2010 before the involvement of international lenders and the process did not initially meet international standards. ERM conducted a gap analysis of the process relative to PS 5 (Land Acquisition and Involuntary Resettlement) in 2015, and NWEDC has been working to fill the identified gaps. We summarize this process below and describe additional actions that NWEDC will take to fill these gaps and bring the overall Project land acquisition process into conformance with PS 5.

#### *5.1.1 Initial Private Land Acquisition*

The process for the private land take by NWEDC involved the following key steps:

- Surveys for land identification;
- Assessment of existing land value of the plots of land identified;
- Negotiations with the land owners for the rate of the land parcels;
- Payment of compensation amount; and
- Transfer of ownership to NWEDC.

NWEDC compensated land owners for the acquired land at negotiated rates, which were higher than the market rate in the area. The compensation rates were generally consistent across the properties, although higher rates were paid, for the land located close to the main Betrawoti-Mailung-Syabrubesi Road.

### *5.1.2 Guthi Land*

NWEDC undertook this land acquisition process on the principle that the Guthi land would be treated as equivalent to private land. The land take process for the Guthi land required the transfer of tenancy rights based on negotiated settlements with the tenancy right holders (locally known as those with *Mohiyani Hak*). To facilitate the land transaction, NWEDC also:

- Paid the Guthi tenants 10 percent of the total compensation amount in advance to help resolve any tax and tenancy rights related issues associated with the land; and
- Paid the agreed to compensation before taking possession of the land to facilitate purchase of alternative land and construction of houses by the tenants.

The access road construction, which is the activity requiring the acquisition of the Guthi land, had not reached the Guthi land at the time of the 2015 earthquake. The 18 Guthi tenants (representing 60 PAF) were all displaced by the earthquake. NWEDC has paid compensation to the owners of seven structures (4 primary residences and 3 cowsheds) and 17 of the tenants for their land. One Guthi tenant (involving 8 PAFs), however, has not been able to provide tenancy documents and has not yet received compensation.

### *5.1.3 Mailung HEP Land Acquisition*

NWEDC recently acquired (February 2018) a long term lease on 3.15 ha of land on the east side of the Trishuli River from Mailung HEP for the new location for the powerhouse worker camp (in order to reduce seismic and landslide hazards associated with the prior location). This was a relatively straightforward negotiated land transaction with a commercial entity.

### *5.1.4 Land Acquisition Summary*

All land acquisition was based on negotiated settlements and cash payments. NWEDC did not consider *land for land* compensation a viable option because of the lack of suitable available land in the Project area. More importantly, the community preferred receiving cash compensation as it provided diversified options to the families for income generation and improvement in standards of living, which is evident from the choices already made by the PAFs for use of the compensation money.

Although NWEDC indicates that it has been able to acquire all land to date through negotiated settlements between the company and the land owners/tenants, NWEDC had the option to fall back on the Government to use the legal land acquisition process in case there was unwillingness to sell the land. Therefore, ERM considers the involuntary resettlement provisions of PS 5 to be triggered.

In order to bring the private land acquisition process into conformance with the requirements of PS 5, NWEDC will:

- Provide assurance to the 1 tenant (8 PAFs) lacking tenancy rights that compensation will be paid as and when such rights are established and the necessary documentations are made available to NWEDC. If the tenant is not able to provide certificates for their tenancy, provide transition allowance for a period of time and other livelihood support to mitigate livelihood loss from that land;
- Grant preference to the PAFs for direct/indirect Project employment opportunities and livelihood restoration options;
- Where the family is categorised as vulnerable, provide additional social and livelihood support,.

### *5.2 Structure Acquisition and Compensation Process*

NWECD reached negotiated settlements with 20 of the 29 owners of Project-affected structures, relying on structure valuations conducted by the Nuwakot Division office of the Nepal Department of Urban Development & Building Construction (DUDBC). The 7 PAFs that lost their primary residence have already constructed replacement houses in their villages or on alternative land in Thade and Dhunche with the compensation money. Unfortunately, the 2015 earthquake damaged or destroyed most of these replacement houses (at least 5 out of the 7) and most of these families are currently living in IDP camps.

There were some discrepancies in the structure acquisition process, including.

- NWEDC has not yet compensated nine structure owners, including owners of two cowsheds and seven families who initiated new house construction to take advantage of compensation being offered by NWEDC. NWEDC never formally established a cut-off date after which it would not provide compensation for new construction.
- NWEDC was inconsistent in compensating structure owners relative to the inclusion of scrap value and Value Added Tax.

NWEDC's recent acquisition of the Mailung HEP land is complicated in terms of evaluating conformance with the requirements of PS 5. Mailung HEP acquired the land in question nearly 15 years ago, but allowed the families to remain on the land, essentially as tenants. During the 2015 earthquake, all seven houses on the property were damaged and the families left the area for safe accommodations (e.g., IDP camps). NWEDC entered into a long term lease agreement with Mailung HEP for this land in February 2018. At the time of the agreement, only a couple of families were sporadically using the Mailung HEP site, mostly to care for remaining livestock. Although Mailung HEP is the legal owner of the land and these structures have been damaged by the earthquake and are currently not occupied, these seven houses are understood to be the primary residence for seven PAFs. NWEDC has had DUBDC assess these structures, which will be used as the basis for providing compensation. NWEDC also intends to provide transition payments to the seven families to help them find secure safe housing.

In order to ensure conformance with the requirements of PS 5, NWEDC will:

- Compensate the nine remaining uncompensated structures at replacement value, without deduction of depreciation cost and scrap value and inclusive of VAT; and
- Compensate the Mailung HEP structure owners at replacement value, without deduction of depreciation cost and scrap value and inclusive of VAT, in consultation with the DAO office and *Jan Sarokar Samiti*.

NWEDC has committed to completing the compensation process by June 2018.

### *5.3 Community Forest Acquisition and Compensation Process*

The process of leasing of Government-owned Community Forest was a government-led process, which was headed by the District Forest Office (DFO). The CFUGs were initially opposed to the loss of forest, although once they were informed that NWEDC would compensate for the tree cutting and that disturbed lands not used for the access road would be reforested, the CFUGs agreed to the lease. NWEDC compensated the members of the CFUGs for the loss of trees required for Project construction. The DFO led the tree valuation process, with CFUG representatives participating in the tree marking and identification process.

However, during initial road construction activities, a number of trees in the Community Forest outside the lease area were damaged by blast debris and disposal of excavated materials, for which the CFUGs had not been compensated. Further, the construction worker camps in the area were sourcing firewood from the surrounding Community Forest without permission.

In addition, subsequent consultations have identified on PAF who was growing trees on government-owned land outside the Community Forests, who did not receive any compensation for the loss of his livelihood.

In order to mitigate these unforeseen impacts, NWEDC has agreed to:

- Provide compensation for any trees damaged by construction activities outside the lease area;
- Prohibit firewood collection by the construction workers and ensure there is provision of alternate fuels for cooking and heating;
- Adopt, provide training in, and implement a Worker Code of Conduct that clearly informs construction workers to avoid damaging the Community Forests;
- Conduct training and capacity building of the CFUGs for rejuvenation and management of community forest area;
- Provide financial support to the CFUG in managing and protecting the Community Forests;
- Establish a Grievance Mechanism to ensure any CFUG concerns are quickly identified and addressed through grievance process of the Project; and
- Provide compensation and help restore the livelihood for the one PAF who lost their trees cultivation areas.

## 6.0 Livelihood Restoration Plan

Livelihood restoration measures are required to mitigate adverse project impacts on affected communities (i.e., to mitigate economic displacement caused by Project-related acquisition of arable land and associated loss of access to natural resources). The selection of appropriate livelihood restoration strategies has, however, been greatly complicated by the effects of the 2015 earthquake, which devastated PAFs' homes, lands, and access to resources, forcing many of them into temporary IDP camps, and completely interrupting their livelihoods. Nearly all of the PAFs are in flux and uncertain about their future plans, with many still living in IDP camps three years after the earthquake. In this context, it is difficult to separate

livelihood restoration needs associated with Project impacts (for which the project is responsible) with similar larger scale relief needs associated with earthquake impacts (for which the Government is responsible).

Project discussions with PAFs on the topic of livelihood restoration have spanned the pre-earthquake and post-earthquake scenarios: the most recent surveys and discussions occurred in 2017, while the bulk of PAFs were still resident in multiple IDP camps and prospects for re-establishing housing and agriculture in the project area were very uncertain. Some of the families want to return to their home villages, others seem to prefer being closer to some of the larger towns and the more diverse economic opportunities they offer, and still others are afraid to return to their villages for fear of more earthquakes, but also do not have the skills to be marketable in the larger towns.

In this context, a "one size fits all approach" is not appropriate. This *Consultation Draft* Livelihood Restoration Plan takes a more flexible approach, focusing on helping the PAFs address their basic need of constructing safe housing, while presenting a range of stable livelihood options. As Government reconstruction grants have started to flow, some of PAFs have begun to return to the Project area to rebuild their houses and cultivate their land. This suggests that Project-related livelihood restoration options should focus on gaining access to arable land (either in their original villages or elsewhere), in order to achieve long term rehabilitation.

Recognizing that the situation on the ground is still evolving, the Project plans to continue engaging with PAFs through the forthcoming FPIC process to determine optimal livelihood restoration strategies - and associated PAF priorities - in the post-earthquake context. NWEDC will update the LALRP to reflect these preferred strategies and options.

### *6.1 Consultation Draft Livelihood Restoration Plan*

This Livelihood Restoration Plan for the UT-1 Project has been designed with the current context in mind, and is based on the following principles:

- Restore, if not improve, the living standards of the PAFs to pre-Project levels;
- Provide livelihood support to all the PAFs, such that at least one member of the PAFs, depending on their skills and age, age-appropriateness will be provided with either:
  - Direct employment with the Project;
  - Contract business opportunities with the Project;
  - Training on occupational skills with market linkage support;
  - Seed capital for business in line with existing skills and additional technical support; or
  - Special allowances in case of the elderly and physically and mentally differently abled who cannot be engaged in livelihood generation activities.
- Ensure the PAFs are able to sustain their livelihoods once support from the Project ends;
- Integrate gender equality into all components of the entitlements to ensure practical and tailored benefits for women and vulnerable households;
- Finalize the LALRP after obtaining input from the PAFs during the FPIC process;
- Implement the LALRP in a participatory and consultative manner;
- Establish Key Performance Indicators and monitor the effectiveness of the LALRP throughout its implementation, making adjustments as needed to ensure success.

NWEDC has overall responsibility for the successful implementation of the LALRP, with implementation being led the Social Manager within the Environmental and Social Management Cell (ESMC). The Social Manager will report to the Environment and Social Manager at NWEDC and will be supported by Community Liaison officers (CLOs) who will be primarily responsible for undertaking regular interaction and mobilisation activities with the community. It is critical that the CLOs are drawn from within the Project area and include female and Tamang representatives.

NWEDC will recruit an Implementation Partner having expertise with the on ground implementation of livelihood restoration and enhancement projects to manage the day-to-day implementation of the LALRP, in keeping with the entitlement framework and principles identified above.

NWEDC and its Implementation Partner will also consider involving external parties to help support implementation of the LALRP. These external parties may include relevant government departments, NGOs, civil society organizations, the *Jan Sarokar Samiti,* and possibly other community organizations identified during the course of LALRP implementation.

The LALRP also defines a monitoring and reporting process with the intent to:

- Document and track the implementation process;
- Assess implementation compliance with the LALRP principles identified above;
- Assess performance against the LALRP's established Key Performance Indicators; and

Identify any challenges during the implementation of the LALRP and put in place corrective measures.

# 1 INTRODUCTION

## 1.1 PREAMBLE

Environmental Resources Management (ERM) has been commissioned by Nepal Water and Energy Development Company (hereinafter referred to as '*NWEDC*') to update the Social Impact Management Framework (SIMF) for the Upper Trishuli 1 Hydropower Project in Nepal. This document presents the updated Land Acquisition and Livelihood Restoration Plan (LALRP) prepared as part of this SIMF. A Livelihood Restoration Plan (LRP) was previously prepared was this Project in 2015, however, before this plan could be implemented, the Gorkha earthquake hit Nepal on 25th April 2015, with its epicentre in the Project area. The earthquake resulted in significant impacts and internal displacement of a large number of people from local villages. The intent of this LALRP is to update the 2015 LRP in keeping with the present post-earthquake context.

## 1.2 PROJECT OVERVIEW AND BACKGROUND

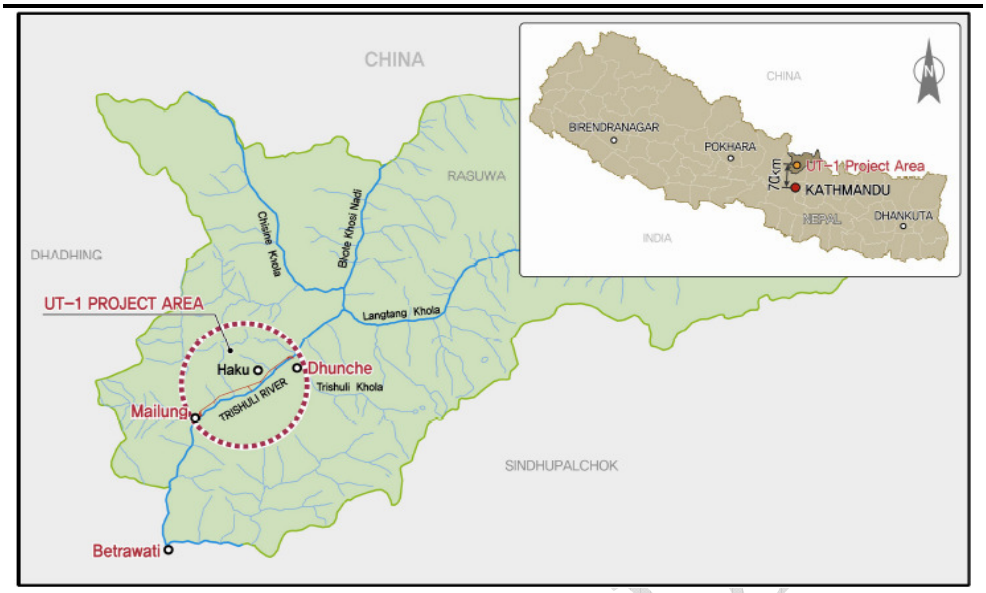
NWEDC is proposing to construct the 216 megawatt (MW) Upper Trishuli 1 Hydropower Project (the "Project" or "UT-1") on the Trishuli River within the Rasuwa District of the Central Development Region of Nepal, approximately 70 kilometres northeast of Kathmandu (Figure 1-1). This is a rural area in the upper portion of the Trishuli River Basin, with the Langtang National Park forming the eastern boundary of most of the Project area.

The International Finance Corporation (IFC), the Asian Development Bank (ADB), the Asian Infrastructure Investment Bank, and other potential lenders are participating in a lender's consortium, along with potential guarantees from the World Bank and Multilateral Investment Guarantee Agency (collectively referred to as the "Lenders").

The Project consists of a 77-metre-wide diversion dam in a narrow gorge located 275 metres downstream of the confluence of the Langtang Khola with the Bhotekosi River. The diversion dam creates a small 2.1 hectare impoundment and diverts up to 76 cubic metres per second ($m^3/s$) of water through a powerhouse with a 216 MW capacity, returning the water to the Trishuli River approximately 10.7 kilometres downstream of the dam. The Project will connect to the Chilime–Trishuli transmission line via a 689-metre extension from the Project switchyard. The Project will be accessed via existing public roads, but NWEDC will construct an 11.84-kilometre private road upstream on the west side of the river to access the UT-1 dam.

The Project will take approximately 5 years to construct and will employ about 1,090 workers, with about 10 to 15 percent recruited locally and the remainder from elsewhere in Nepal or expatriates. Once in operations, the Project will operate in a true run-of-river mode, employ 72 staff, and produce about 1,440 gigawatt hours (GWH) per year.

*Figure 1.1 Upper Trishuli 1 Project Location*




*Source:* NWEDC

### 1.2.1 *Project Footprint and Area of Influence*

The Project footprint is spread across three former VDCs, Haku, Dhunche and Ramche. The land take for the Project is from eight villages (Haku Besi, Sanu Haku, Thullu Haku, Gogone, Tiru, Thanku, Mailung, and Phoolbari) from the Haku VDC. A total of 107.79 ha of land are required for the Project. This land take has resulted in the loss of land for 38 land owners and Guthi tenants. In addition to this, there are 11 individuals being impacted by temporary land lease and 5 individuals who are impacted by loss of structures. These individuals represent 154 PAFs. Of these 154 PAFs, 149 PAFs have an impact on livelihood and are thus considered in this LRP[1].

The introduction to the new Constitution in 2015 has been accompanied by a change in the administrative structure of the country (Refer to ***Figure 3.1*** and ***Figure 3.2***) in keeping with this, the following wards and *Gaunpalika/ Gaupalika* are now included as part of the Project footprint.

*Table 1.1 Change in Administrative Structure for Project AoI*

| Impacted Village | Old Administrative Structure | New Administrative Structure |
|---|---|---|
| Haku Besi, Sanu Haku and Thullu Haku | Haku Ward number 3 | Parvati Kunda Ward number 1 & 2 |
| Gogone and Tiru | Haku Ward Number 8&9 | Uttar Gaya Ward number 1 |
| Mailung | Dadagaon Ward number 9 | Uttar Gaya Ward number 1 |
| Thanku | Haku Ward number 5 | Parvati Kunda Ward number 1 & 2 |

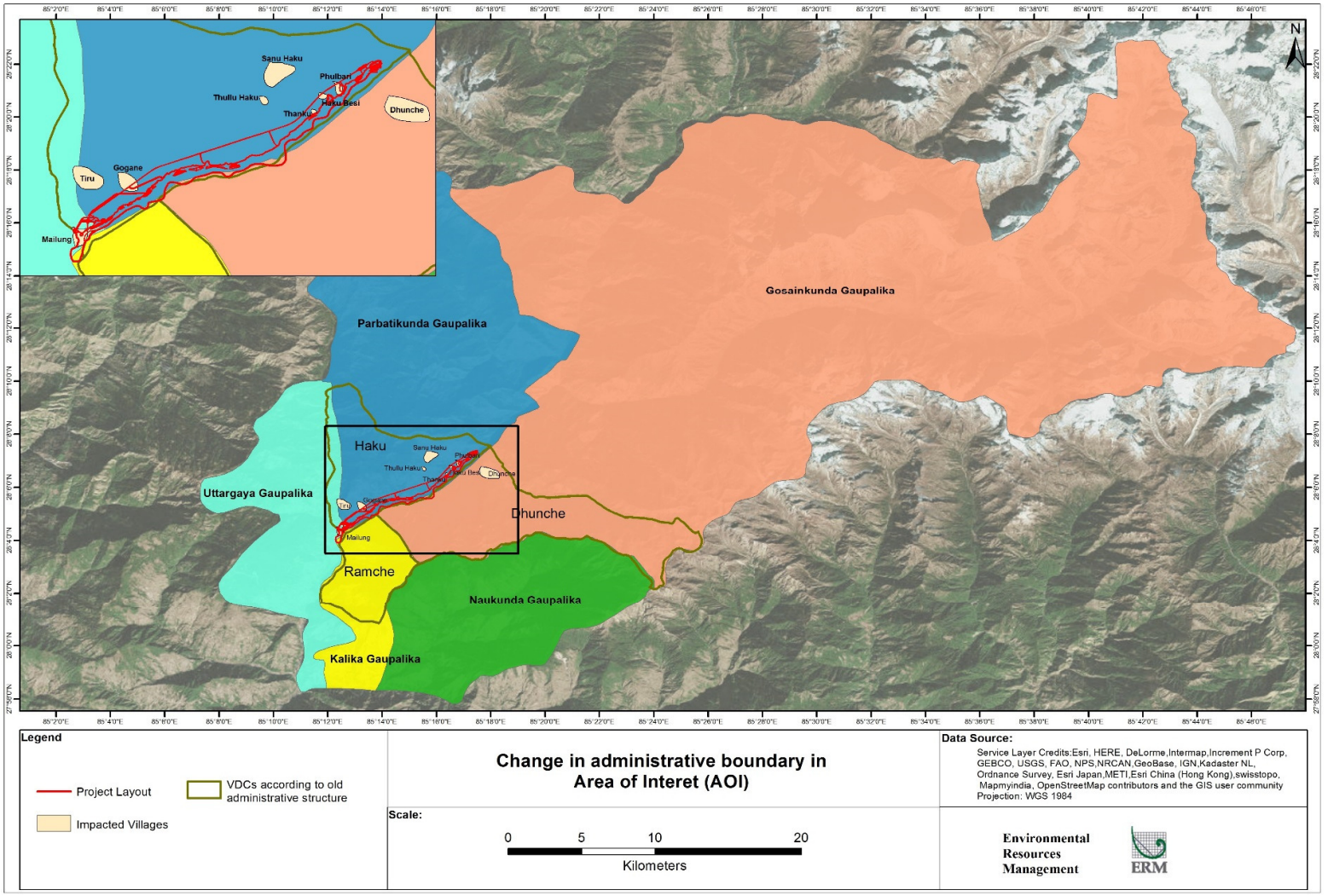
[1] The 5 PAFs, who are only impacted by loss of structure, will be considered as part of the ESIA and benefit sharing provisions for the project

| Impacted Village | Old Administrative Structure | New Administrative Structure |
|---|---|---|
| Phoolbari | Haku Ward number 3 | Parvati Kunda Ward number 1 & 2 |
| No directly affected villages | Ramche | Kalika Ward Number 1 |
| No directly affected villages | Dhunche | Gosaikunda Ward number 6 |

*Source:* NWEDC

The following figure provides an understanding of the Project layout in keeping with the former administrative structure and the new administrative structure.

*Figure 1.2* *Project Layout against the Revised Administrative Structure*



In the old administrative structure, the Rasuwa District was comprised of 18 Village Development Committees (VDCs), each with 9 wards. However, as per the new administrative structure, there are 5 *Gaunpalikas* in the Rasuwa District. Thus while the Project was previously affecting three of the 18 VDCs, it is now affecting 4 of the 5 Gaunpalikas.

Furthermore, the reorganisation of the wards of the 18 VDCs have been done in such a manner that the wards falling under same VDC may not fall under a single *Gaunpalika*. This will result in an increase in the population within the Gaunpalikas within the Project footprint.

The Area of Influence for this LALRP covers the directly affected villages and VDCs, indirect Project impacts on ecosystem services upon which there is livelihood dependence, and associated facilities that have a land impact. Hence the Area of Influence covers the three former VDCs of Haku, Dhunche and Ramche. It is acknowledged that there are certain Project benefits which are to be made available at the district and Gaupalika level (such as the Benefit Sharing Plans), however, they are outside the scope of this LALRP.

### *1.3 SCOPE OF THE LALRP*

This LALRP is being developed as part of the larger Social Impact Management Framework (SIMF). The specific scope of this LALRP is to verify and re-assess the following:

- Socio-economic profile/status and any vulnerabilities arising from the earthquake;
- Utilization of land/asset compensation and the current status (impact) on the assets created using the compensation amount;
- Change if any, in the livelihood profiles;
- Change, if any in the options of resettlement and rehabilitations;
- Reaffirm the livelihood restoration preferences/options suggested prior to the earthquake and update choices/preferences;
- Map (verify) skills/capacities to undertake/perform the suggested livelihood options/preferences;
- Reassess/confirm the delivery models for the livelihood maintenance/restoration/improvement programs; and
- Update/reassess time and resource requirements for implementing the LALRP.

The LARP is focussed on 149 families who have been impacted by livelihood loss of some kind.

### *1.4 SUMMARY OF APPROACH AND METHODOLOGY*

This LALRP has been built on the information previously collected as part of the complimentary socio-economic baseline for the ESIA in 2014 (ESSA and NESS), the Gap Assessment and the previous LRP formulated in 2015 (ERM),

and an updated socio-economic survey of the identified Project Affected Families (PAFs) and detailed stakeholder consultations (e.g., PAFs, local community, NGOs/ INGOs, Government agencies) in 2017 (ERM).

As part of the updated socio-economic survey, a team of eight ERM and NESS personnel conducted household surveys of the PAFs, focus group discussions, and key informant interviews with certain key stakeholder groups in April and May 2017 (see Table 1.4).

*Table 1.2 Stakeholder Engagement as part of the LALRP Process*

| S. No | Stakeholder Group | Group Representatives | Date | Summary of Consultations Undertaken |
|---|---|---|---|---|
| 1. | NGOs active in the Project area | Manekor | 12th April 2017 | a discussion was undertaken on the activities of the organizations in the post-earthquake scenario, and the key learnings/ take aways from the same |
| 2. | | LaCCos | 12th April 2017 | |
| 3. | | Lumanti | 11th May 2017 | |
| 4. | Government Departments | National Reconstruction Authority (NRA) | 13th April 2017 | A discussion on the role and purpose of the NRA, its key objectives, way forward and challenges being faced |
| 5. | | Ministry of Federal Affairs and Local Development (MoFALD) | 5th May 2017 | A discussion on the process of grant disbursal for house reconstruction and the role of MoFALD in the same |
| 6. | | Department of Urban Development & Building Construction (DUDBC) | 5th May 2017 | A discussion on the overall reconstruction process and the designs approved by the government |
| 7. | | Land and Revenue Department | 5th May 2017 | A discussion on the role and key objectives of the agencies and the possibility of associating with them for the LALRP process |
| 8. | | Veterinary Department | 5th May 2017 | |
| 9. | | Chief District Officer (CDO) | 12th April 2017 | |
| 10. | | Cottage Industry Department | 5th May 2017 | |
| 11. | Local Community/ PAFs | Women group from Haku VDC | 5th May 2017 | A discussion with the various stakeholder groups on the following aspects:<br><br>The impacts from the earthquake<br>Present livelihood profile<br>Role of the Project in earthquake relief<br>Present perception towards the Project<br>Present expectations from the Project in terms of LALRP activities |
| 12. | | Women Group from Haku VDC | 5th May 2017 | |
| 13. | | Tamang Women Group from Satbise | 1st May 2017 | |
| 14. | | Mixed group in Nuabise | 8th May 2017 | |
| 15. | | Mixed group in Bogetitar | 7th May 2017 | |
| 16. | | Mixed Youth Group | 29th April 2017 | |
| 17. | | Mixed Group from Farm Camp | 12th April 2017 | |
| 18. | | Women Shop Owner in Nuabise | 8th May 2017 | |

| S. No | Stakeholder Group | Group Representatives | Date | Summary of Consultations Undertaken |
|---|---|---|---|---|
| 19. | | Women Shop Owner in Nuabise | 8th May 2017 | |
| 20. | | Mixed Group in Khalde | 13th April 2017 | |
| 21. | | Key Informant Interview, local Politician in Nuabise | 13th April 2017 | |
| 22. | | Key Informant Interview, women returned after Foreign Employment | 2nd May 2017 | |
| 23. | | Men Group in Mailung | 14th April 2017 | |
| 24. | | Men Group from Haku VDC | 6th May 2017 | |

The PAFs associated with the land lease process were not covered as part of the socio-economic survey for the LRP, as the negotiations for the land lease were not completed. This survey will be completed at a later date, once the negotiation process is completed.

Of the 142 PAFs (associated with the 38 land owners and tenants), the socio-economic household survey included 129 (91 percent survey rate). Thirteen PAFs were not surveyed because the families were reported to have migrated out of the Project area (11) or no household representative was available at the time of the survey (2). The following table provides an understanding of the date of survey conclusion in each of the settlements covered.

*Table 1.3 Date of Survey Completion in Each Major Settlement*

| Settlement | Date of Completion |
|---|---|
| Shanti Bazaar | 30th April 2017 |
| Satbise | 1st May 2017 |
| Mailung | 2nd May 2017 |
| Khalte | 3rd May 2017 |
| Nuabesi | 3rd May 2017 |
| Battar | 3rd May 2017 |
| Dhunche | 6th May 2017 |

The detailed methodology is provided in ***Annex D***.

### *1.4.1 Study Challenges and Limitations*

ERM recognizes the following challenges and/or limitations in conducting this updated socioeconomic baseline:

- The LALRP presently is based on the socio-economic survey of 142 PAFs, from the 38 land owners and tenants. The survey of the 11 individuals (and their associated PAFs) will be undertaken once the negotiation process is completed and the LALRP will be updated accordingly;

- The PAFs identified, is based on the present information available. the number of PAFs may change, once the survey for those impacted by the land lease process is completed
- The PAF surveys were undertaken primarily in Dhunche or the IDP camps, as this was where most of the PAF were living and for safety reasons.
- The consultations with the PAFs had certain challenges and limitations. This was primarily because of the vulnerable situation they are in currently with disrupted lives, insecure shelter and livelihood and no immediate relief in the medium and long term. Thus the priorities of the PAFs (to secure shelter and livelihood) were not presently aligned with the focus of the LALRP (impacts of Project activities). As a result of this, the discussion often got diverted to the critical issues for the community in terms of support for resettlement and permanent shelter and ERM was not able to get focussed attention of the PAFs on aspect such as livelihood restoration options.
- The consultations and survey activities needed to take into account the daily schedule of the PAFs and local community. Most of the local community; men and women; are engaged in wage labour during the day and leave the camps early and come back late. It was therefore not easy to get dedicated time for consultations..
- Furthermore, the local government elections were due at the time for the detailed site visit. Certain members of the local community and PAFs were also active political leaders. This also affected the consultations.
- The latest Census of Nepal data is only available for 2011, and does not reflect the changes in the population as a result of the earthquake or the changes in the administrative structure.

## *1.5 LAYOUT OF THE REPORT*

The remaining report has been organized according to the following sections

| | |
|---|---|
| *Section 2* | Land Requirement for the Project |
| *Section 3* | Applicable Reference Framework |
| *Section4* | Socio-Economic Profile of the Project AoI |
| *Section 5* | Stakeholder Identification and Analysis |
| *Section 6* | Project Impacts and Mitigation Measures |
| *Section 7* | Livelihood Restoration Entitlements Identified |
| *Section 8* | Implementation Mechanism |
| *Section 9* | Reporting and Monitoring |

# 2 LAND REQUIREMENT FOR THE PROJECT

This section provides an understanding of the Project's land requirement and associated Project Affected land owners and families.

## 2.1 LAND AND STRUCTURE ACQUISITION FOR THE PROJECT

The Project requires the permanent acquisition or temporary (construction phase) lease of a total of 107.79 hectares (ha) of land (Table 2.1), including:

- Government-owned land – 84.06 ha, including
  - 5.41 ha from the Langtang National Park. The Project has reached an agreement with the Park authorities to acquire and donate an equal (or larger) area of similar land use/classification within the Park buffer zone with compensatory afforestation.
  - 78.61 ha falls under Community Forest being used by five Community Forest User Groups (CFUGs) with 422 families who have user rights over the forest for various purposes. All CFUG members belong to the Tamang Community.
- Privately-owned land – 20.58 ha with 142 PAF, including
  - 5.05 ha of private land within the villages of Tiru, Haku Besi, Thanku, Phoolbari, Gogone and Mailung. All the private land taken was agricultural land with a few having structures on them.
  - 15.53 ha of Swambhuguthi (Guthi) Trust land, which belongs to the Monastery at Swayambhu in Kathmandu and comprised of 29 agricultural plots held by 18 tenants. The Guthi land falls in Haku Besi and Phoolbari villages as well as small settlements like Thanku and Budget Farm (very small cluster of households located in and around Haku Besi).
- Commercially-owned land - 3.15 ha owned by the Mailung Hydroelectric Project (HEP).

Most of this land (99.79 ha) was acquired and compensation paid in 2013 – 2014, prior to the earthquake, NWEDC is still negotiating for 4.85 ha of land in the Mailung area to support the relocation of the powerhouse area worker camp to a safer (from a seismic and landslide hazard perspective) location. About 70 percent of the land will be leased as it is only required during construction; most of this is government-owned Community Forest land.

As part of the land acquisition described above, the Project also required the acquisition of 36 structures, including 19 houses, 8 partially constructed houses (whose owners had initiated construction to take advantage of the compensation being offered by NWEDC), 8 cow sheds, and one water mill. Of these, 29 structures were acquired in 2015, while 7 additional structures have been acquired in 2017-2018.

*Table 2.1 Land Requirement for the Project*

| Project Component | Government Land (Community Forest) | | | Langtang National Park Land | | | Private Land | | | Swyambhuguthi | | | Mailung HEP | | | Government Land (River & Floodplain) | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Temp | Perm | Total | Temp | Perm | Total | Temp | Perm | Total | Temp | Perm | Total | Temp | Perm | Total | Temp | Perm | Total | Temp | Perm | Grand total |
| Access Road | 33.05 | 0 | 33.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.55 | 8.55 | 0 | 0 | 0 | 0 | 0 | 0 | 33.05 | 8.55 | 41.6 |
| Batching Plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.34 | 2.34 | 0 | 0 | 0 | 0.98 | 0 | 0.98 | 0 | 0 | 0 | 0.98 | 2.34 | 3.32 |
| Construction Camp (including base camp and labour camp) | 0 | 0 | 0 | 2.8 | 0 | 2.8 | 1.36 | 0 | 1.36 | 0 | 5.54 | 5.54 | 1.968 | 0 | 1.968 | 0 | 0 | 0 | 6.128 | 5.54 | 11.668 |
| Intake | 0 | 3.91 | 3.91 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.91 | 3.91 |
| Switchyard and Power house Camp | 0 | 5.53 | 5.53 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.53 | 5.53 |
| Spoil Area | 14.82 | 0 | 14.82 | 0 | 0 | 0 | 0 | 1.34 | 1.34 | 0 | 1.44 | 1.44 | | 0 | | 0 | 0 | 0 | 14.82 | 2.78 | 17.6 |
| Construction Road | 10.3 | 0 | 10.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10.3 | 0 | 10.3 |
| Headwork (LNP*) | 0 | 0 | 0 | 0 | 2.61 | 2.61 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.61 | 2.61 |
| Transmission line | 1.932 | 0.02 | 1.952 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.096 | 0.01 | 0.106 | 0.036 | 0 | 0.036 | 2.064 | 0.03 | 2.094 |
| Baily Bridge Abutment | 0 | 0 | 0 | 0 | 0 | 0 | 0.0112 | 0 | 0.011 | 0 | 0 | 0 | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 0.1112 | 0 | 0.1112 |
| Access Road for Surge Shaft | 9.05 | 0 | 9.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.05 | 0 | 9.05 |
| Quarry area | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Submergence area | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grand Total | 69.152 | 9.46 | 78.612 | 2.8 | 2.61 | 5.41 | 1.3712 | 3.68 | 5.051 | 0 | 15.53 | 15.53 | 3.144 | 0.01 | 3.154 | 0.036 | 0 | 0.036 | 76.5032 | 31.29 | 107.7932 |

| | |
|---|---|
| | the land take for this component is under review by NWEDC |
| | Of the total 1.968 ha, 0.948 ha land take is under review by NWEDC |

## 2.2 *PROJECT AFFECTED FAMILIES*

Land acquisition for the Project has resulted in the loss of land for 38 land owners and tenants, In addition to this, there are 11 individuals being impacted by temporary land lease and 5 individuals who are impacted by loss of structures. These individuals represent 154 PAFs. Of these 154 PAFs, 149 PAFs have an impact on livelihood and are thus considered in this LRP[1]. As stated in the Section 1.4, the LRP presently deals with 142 of the 149 PAFs as indicated in Table 1.2. Of these 142 PAFs, 89% are Tamang, which is considered as an Indigenous People's group.

This substantially higher number of PAFs, in comparison to land owners, was primarily for the following reasons:

- In most of the cases, the land reflected the ownership details as was captured in the Cadastral survey undertaken in Nepal almost 37 years back and land division and therefore mutation in the name of separated family members has not happen after the cadastral survey in most of the cases.
- As a result of the trend of early marriages (in the age-group of 14-20 years) there were numerous instances of younger members of the family living separately but being dependent upon the same parcel of land. The *Lal Purza* however in most cases did not reflect this mutation in the family;
- Though families were living together, but received payment amount separately when the payment received by affected land owners/ tenants (in case of *Guthi* land) was divided internally.
- Families who were earlier residing together have separated post-earthquake to benefit from relief efforts as most of the entitlement for relief efforts factored in separate HHs;
- Some families have separated due to economic or family issues. For example some of the parents (belonging to the age group of 40-60 years) have gone back to the original village and the young members of the family (18-35 years) have stayed in the IDP camps because of better education facilities for children, better access to market, better employment opportunities, liking for the relatively urban environment, etc. and
- Members of the household have migrated out for work and established a separate household;

[1] The 5 PAFs, who are only impacted by loss of structure, will be considered as part of the ESIA and benefit sharing provisions for the project

*Table 2.2 Details of land Loser for UT-1 Project*

| S.No. | Location | Land Loser ID | Number of PAFs associated with land loser | Number of PAPs associated with Land loser |
|---|---|---|---|---|
| **Private Land** | | | | |
| 1 | Mailung | MAI-25 | 4 | 21 |
| 2 | Mailung | MAI-02 | 1 | 3 |
| 3 | Mailung | MAI-06 | 4 | 15 |
| 4 | Mailung | MAI-21 | 1 | 6 |
| 5 | Mailung | MAI-38 | 1 | 4 |
| 6 | Gogone | GOG-34 | 5 | 10 |
| 7 | Mailung | MAI-29 | 3 | 7 |
| 8 | Mailung | MAI-37 | 1 | 13 |
| 9 | Mailung | MAI-01 | 4 | 11 |
| 10 | Gogone | GOG_07 | 7 | 27 |
| 11 | Mailung | MA-32 | | 1 |
| 12 | Gogone | GOG-39 | 8 | 34 |
| 13 | Mailung | MAI-11 | 10 | 34 |
| 14 | Gogone | GOG-01 | 6 | 21 |
| 15 | Gogone | GOG-13 | 4 | 10 |
| 16 | Mailung | MAI-22 | 3 | 7 |
| 17 | Haku Besi | HAK-07 | 3 | 13 |
| 18 | Mailung | MAI-32 | 5 | 23 |
| 19 | Mailung | MAI-10 | 1 | 7 |
| 20 | Gogone | GOG-17 | 17 | 60 |
| **Guthi Tenants** | | | | |
| 21 | Phoolbari | PHO-01 | 1 | 7 |
| 22 | Haku Besi | HAK-01 | 5 | 22 |
| 23 | Haku Besi | HAK-06 | 1 | 7 |
| 24 | Haku Besi | HAK-07 | 3 | 13 |
| 25 | Haku Besi | HA-10 | 3 | 16 |
| 26 | Haku Besi | HAK-13 | 4 | 22 |
| 27 | Phoolbari | PHO-02 | 2 | 17 |
| 28 | Haku Besi | HAK-17 | 1 | 2 |
| 29 | Haku Besi | HAK-18 | 1 | 7 |
| 30 | Phoolbari | PHO-04 | 8 | 32 |
| 31 | Phoolbari | PHO-12 | 7 | 30 |
| 32 | Haku Besi | HAK-10 | 3 | 16 |
| 33 | Haku Besi | HAK-19 | 5 | 23 |
| 34 | Phoolbari | PHO-19 | 3 | 22 |
| 35 | Thanku | THA-01 | 7 | 34 |
| 36 | Haku Besi | HAK-26 | 2 | 8 |
| 37 | Haku Besi | HAK-24 | 2 | 6 |
| 38 | Phoolbari | PHO-22 | 2 | 8 |
| | Total | | 142 | ~619 |

*Source:* NEWDC, 2014 and Data collected by ERM, 2015

Prior to the earthquake, these PAFs resided in the Haku VDC. However, post-earthquake, many of these PAFs are still living in Internally Displaced Persons (IDP) camps or have moved to different Gaunpalikas (or former VDCs) in the Rasuwa and Nuwakot districts. The following table provides an understanding of the distribution of the PAFs in pre-earthquake and post-earthquake scenario.

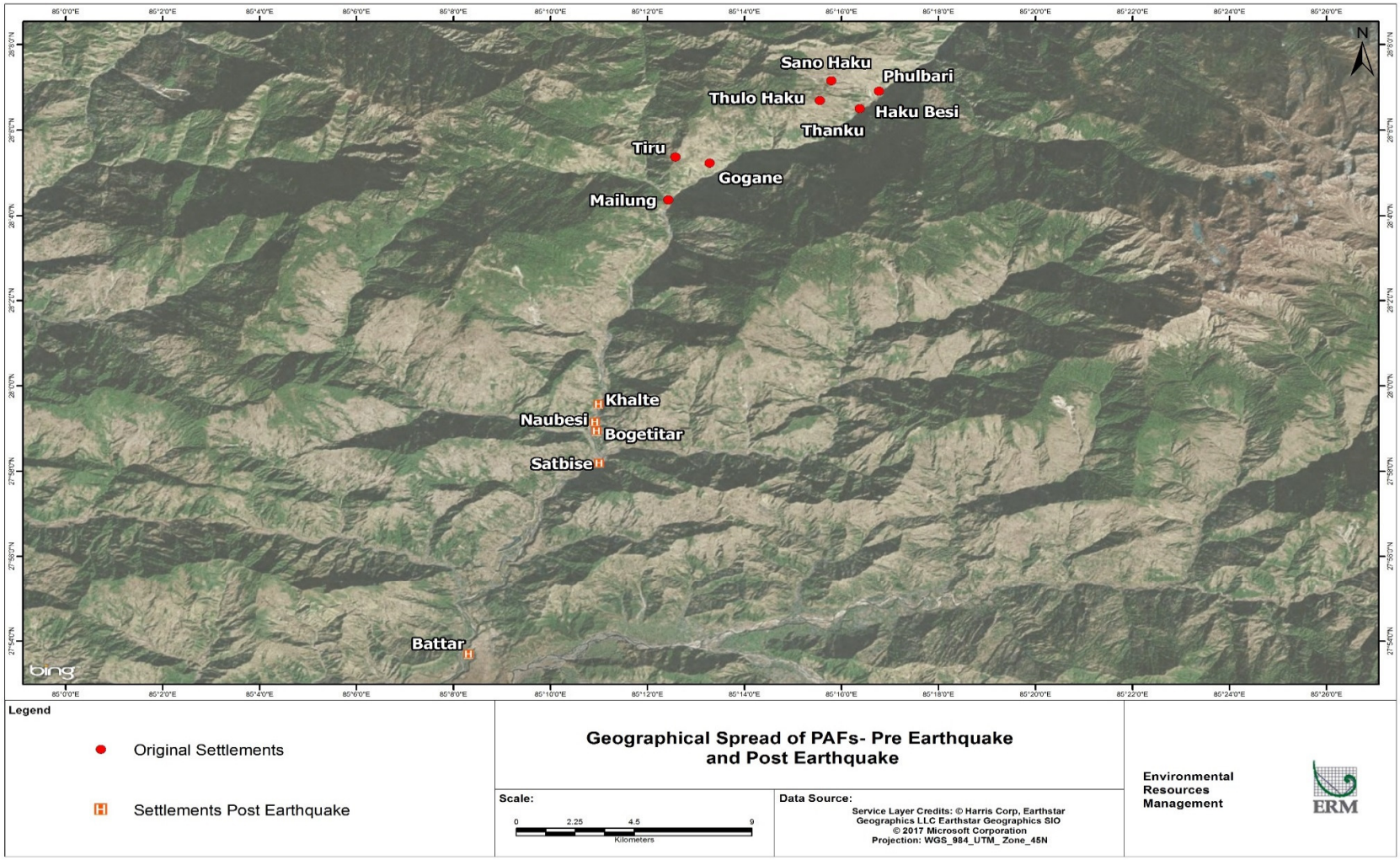
*Table 2.3 Distribution of PAFs*

| Original Residence | Current Residence (Mostly IDP Camps) | Number of PAFs |
|---|---|---|
| Gogone (and Tiru) | Batar | 7 |
| | Bogetitar | 18 |
| | Kathmandu | 1 |
| | Khalde | 3 |
| | Naubise | 9 |
| | Satbise | 2 |
| | Tiru | 1 |
| Haku Besi | Dhunche | 15 |
| | Haku Besi | 5 |
| | Kathmandu | 2 |
| | Kebutol (IDP camp in Dhunche) | 3 |
| | Pradhikaran | 1 |
| Mailung | Bogetitar | 8 |
| | Kathmandu | 1 |
| | Khalde | 5 |
| | Mailung | 2 |
| | Naubise | 12 |
| | Satbise | 4 |
| | Shanti Bazaar | 2 |
| Phoolbari | Dhunche | 10 |
| | Kebutol (IDP camp in Dhunche) | 7 |
| | Phoolbari | 2 |
| | Thade | 1 |
| | Trishuli | 1 |
| Thanku | Dhunche | 1 |
| | Thade | 6 |
| | Information not available | 13 |
| Total PAFs | | 142 |

*Source:* LALRP HH Survey, 2017 based on the responses given

The following figure provides an understanding of the geographical spread of the PAFs.

*Figure 2.1* *Geographical Spread of the PAFs- Pre Earthquake and Post Earthquake*




*Source:* ERM. Based on HH Survey, 2017, Responses Provided.
*Note:* It should be noted that the above positions are approximate locations of the key residential areas on Google Earth Imagery and represent approx. boundaries of the settlements identified

In addition to these PAF, this land take has also resulted in the loss of government-owned community forests for five Community Forest User Groups (CFUGs) representing 422 members (i.e., families) who are residents of the eight Project footprint villages.

There is still a lot of uncertainty in terms of whether people will be returning to their native villages (once they receive housing grants), moving to Government resettlement sites (once they are constructed); or continuing to live in the IDP camps for the foreseeable future. The situation on ground is expected to be dynamic at least for the next few years. This LALRP has been developed within this context.

## 2.3 *CUT OFF DATE FOR THE PROJECT*

The WBG's PS 5 requires a census to be carried out to collect appropriate socio-economic baseline data to identify the persons who will be displaced by the Project, determine who will be eligible for compensation and assistance, and discourage ineligible persons, such as opportunistic settlers, from claiming benefits. In the absence of host government procedures, the client needs to establish a cut-off date for eligibility. Information regarding the cut-off date should be well documented and disseminated throughout the Project area.

There was no official cut-off date declared for the Project as NWEDC undertook negotiations with individual families. It is proposed that the date of the disclosure of this LALRP be considered as the cut-off date for the LALRP Benefits. This may also have implications for the determination of benefits/entitlements, which are discussed in ***Section 11***.

***Box 2.1 Opportunistic Encroachment in the Project Area***

*NWEDC, after payment of compensation (or payment of the agreed price to the land owners), was faced with a situation in which some of the former land owners started construction on the land already sold to NWEDC. NWEDC in this context sent letter to Rasuwas District Administrative Office (DAO) requesting their intervention to stop this opportunistic construction ( March 4, 2013). The site management reported that there were individual negotiations with such land owners in which the offer to compensate for the raw material was made; however there was no formal notice to bar people from making improvement or creating assets to their land. The DAO came up with a public notice on 20th March 2013, asking for removal of the illegal structures within 7 days of publication of such notice. Visit to the site with the site management team found that the structures are still there.*

*Five such cases have been reported since the compensation for the land has been provided. This reiterates the need for a formal cut- off date to be established and communicated in the area. The NWEDC land team suggests that the information was shared with the DAO when opportunistic developments started cropping up in the area. The cut-off date, however, was not officially communicated to the land owners and the community at large.*

*Source:* ERM site Visit, 2014

The Jan Sarokar Samiti, which was a community based committee especially formed for the Project and registered with the Chief District Office (CDO), with representation from the three affected VDCs, indicated that:

- Declaration of any such cut-off date by NWEDC or any company does not constitute a formal and binding cut-off date unless mandated by law.
- In absence of this, the company depended upon its presence in the field and good will with the community to establish the principle of a cut-off date, but this was not successful. Therefore, NWEDC should provide compensation for structures that were built before receipt of compensation in terms of replacement value, excluding depreciation and the scrap value.
- If however the government issues a notice now prohibiting further construction on land that has been purchased by the Company, then that date should be considered as the cut-off date, irrespective of whether payment has been made or not.

In keeping with the impacts of the earthquake, the present socio-economic profile of the PAFs and the fact that majority of the PAFs are categorised as Indigenous Peoples, it seems prudent and practical to consider the date of the disclosure of this LALRP, as the cut-off date for the Project. This also covers the issue of structures being constructed by some of the land losers in the later stages, before the payment was made.

The Project, would however, need to communicate the cut-off date to all the affected wards falling under the Project area, as well as other forums such as Jan Sarokar Samiti meetings. Any grievances that may emerge from the declaration of a cut-off date will need to be taken through the grievance redressal process described in ***SEP & GRM*** for the project.

Some of the land losers, as reported, continue to cultivate or use the land, especially in Guthi land area; though the payment for rights over the land has already been paid by NWEDC. The Project has sent communication to the families about not using the land during site visits and regular engagement at platforms like Jan Sarokar Samiti meetings.

The understanding of the context of the Project and the process associated with land procurement requires an understanding of the local administrative structure and local laws and regulations. While some of the laws and regulations have direct relevance in the context of the Project, others need to be reviewed as they define the complete administrative process surrounding the management of land including private, Guthi and Community Forest land.

This section provides a brief understanding of the requirements influencing the Project, in terms of the national rules and regulations as well as the applicable requirements of the World Bank Group's Performance Standards (2012) and Asian Development Bank's Safeguard Policy Statement (2009) requirements.

Details of the relevant laws and general administrative structure in Nepal are captured in ***Annex B***. An abridged version is provided here.

## 3.1 NATIONAL REGULATIONS

### 3.1.1 *The Constitution of Nepal, 2072 BS (2015 AD)*

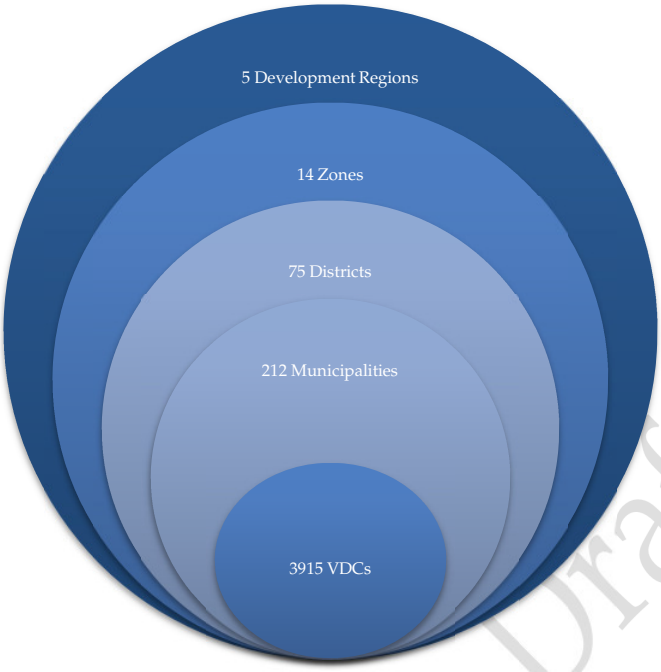
The present Constitution of Nepal came into effect on 20th September 2015. This Constitution replaced the interim Constitution of 2007. Article 25(1) establishes the right to property for every citizen of Nepal, whereby every citizen is entitled to earn, use, sell and exercise their right to property under existing laws. Article 25(2) states that except for public interest, the state will not requisition, acquire or otherwise create any encumbrances on property of a person. Article 25(3) states that when the state acquires or establishes its right over private property, the state will compensate for loss of property and the basis and procedure for such compensation will be specified under relevant laws.

*The Changed Administrative Structure*

A new local level administrative structure is being formed in Nepal, which has been approved by the cabinet, in line with the 2015 Constitution. This new structure was adopted on 10th March, 2017[1], and elections were underway in the month of May for the *Gaunpalikas.* The old and new administrative structures are depicted in ***Figure 3.1*** and ***Figure 3.2*** respectively.

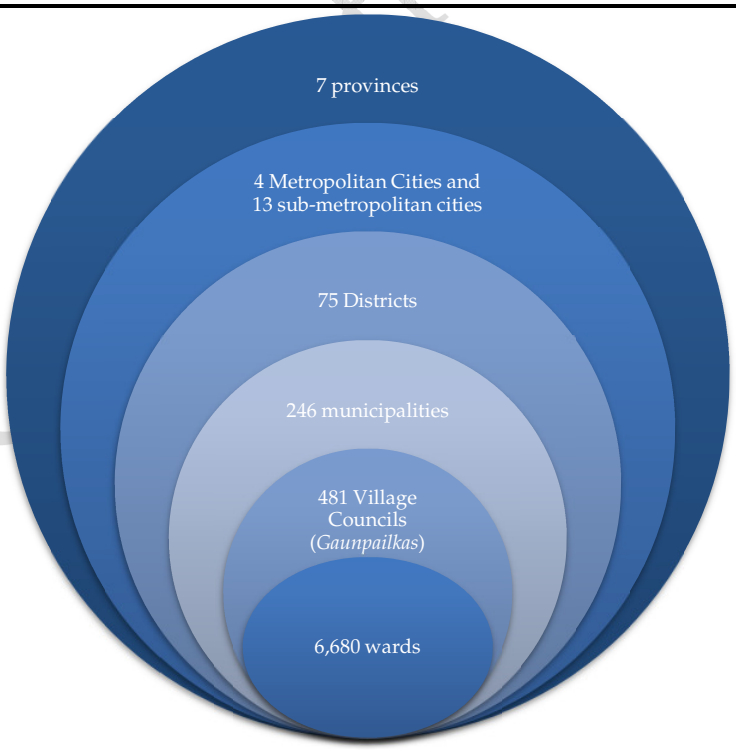
(1) https://thehimalayantimes.com/nepal/new-local-level-structure-comes-effect-today/

*Figure 3.1* ***Old Administrative Structure of Nepal***




*Source:* Ministry of Federal Affairs and Local Development

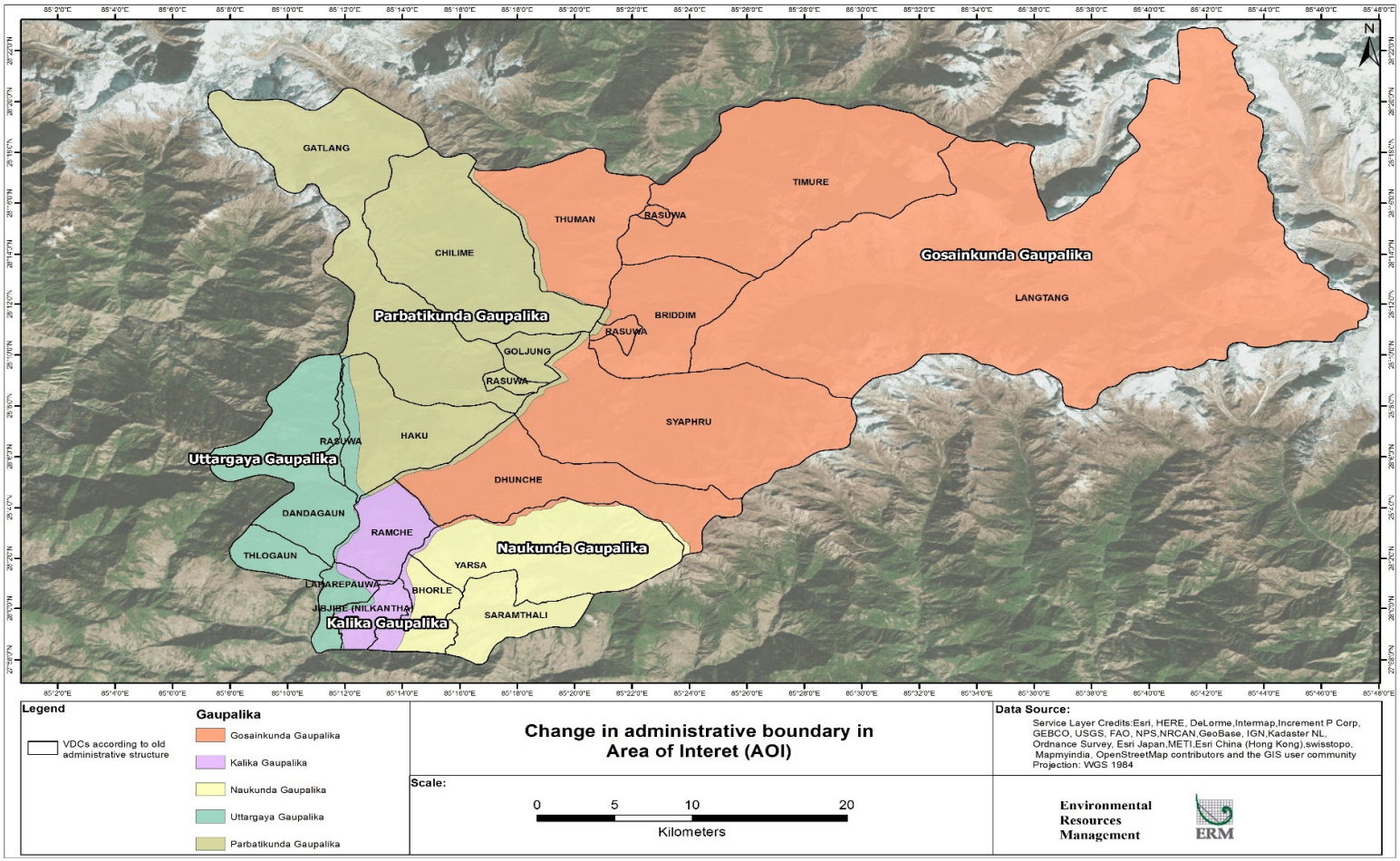
*Figure 3.2* ***New Administrative Structure of Nepal***




*Source:* Ministry of Federal Affairs and Local Development

In keeping with this, the following figure provides an understanding of the manner in which the administrative structure of Rasuwa District has changed.

*Figure 3.3 Changed Administrative Structure in Rasuwa District*



The key changes from the new administrative structure, which are relevant for the livelihood restoration and benefit sharing process, are as follows:

- This new structuring is primarily aimed at moving Nepal toward a federal structure. In keeping with this, rural and urban municipalities have been defined as local governments. These local governments, at the province and local level will exercise legislative powers, as sub-national governments;
- For this, many of the existing laws shall have to be repealed or aligned and amended while more than one hundred new laws shall have to be legislated by the federal government to meet the constitutional requirements. These laws will pertain to
  - provision for coordination mechanisms across different tiers of government;
  - changes in size, purpose and composition of public organizations
  - Provision for additional constitutional bodies and their purpose; and
  - Provisions for exclusive and concurrent revenue assignments at all three tiers of government.

Though the exact scope of the changes in the laws and legal provisions is presently not known, it is observed that;

- The profile of the Gaunpalikas resembles the former Village Development Committees (VDCs), but they have more rights on collection of royalty and taxes. This will in turn have implications for benefit sharing and community based initiatives of the Project;
- The Gaunpalikas will also have a larger annual budget in comparison to the VDCs. This will thus impact the level of projects or interventions undertaken by the government at the Gaunpalika level and their interface with the provisions identified as part of the SIMF for the Project;
- Though the constitution does not recognize "District" as a different tier of sub-national government, its existence is allowed to continue. It remains to be decided and seen whether the existing organizational arrangements at District level would be completely eliminated or remain in new forms as extension of provincial government or a kind of federation or integrator or supervisory agency of local government units at District level;
- There is also an apprehension of competing interests in sharing many of the powers and resources from the federal government to sub-national governments simultaneously. This may also result in a lack of clarity in terms of the agencies and levels of government to be involved in the implementation of the SIMF for the Project.

### *3.1.2 Applicable National Regulations*

The key applicable national regulations are as summarized in the table below.

*Table 3.1 Key National Regulations and Conventions Applicable for the Project*

| Regulation | Summary |
|---|---|
| Land Acquisition Act, 2034 BS[1] (1977 AD) | Land Acquisition Act, 2034 BS (1977 AD) is the core legal provision to guide the land acquisition and resettlement activities in Nepal. The Act empowers the Government to acquire land for development purposes, by paying compensation to the landowner.<br><br>Though the land was mostly bought through private purchase, some of the provisions of the act were partially used by the DAO in the interest of the Project. |
| Land Acquisition, Resettlement and Rehabilitation Policy for Infrastructure Development Projects, 2071 BS (2015 AD) | The key objective of this policy is to avoid or at least minimize displacement and where not possible to provide adequate compensation and rehabilitation assistance to affected persons.<br><br>According to the Project classification criteria, the UT-1 Project is categorised as a High Risk Project. This policy shall guide the identification of mitigation measures for the Project and development of management plans for the implementation of the same. |
| The Guthi Corporation Act, 2033 BS (1976 AD) Second Amendment in 1993 AD | Guthi lands refer to the land and property donated by the government or the state and individuals for social and religious benefits. The term Guthi indicates an 'organization based on caste or kinship, or occasionally on geographical proximity, which insures the continued observance of social and religious customs and ceremonies of the community'. Guthi lands were exempt from tax and not to be reclaimed for private use by the donors. Generally, only the income derived from the property should be used; while the property including land remains intact, i.e. cannot be sold.<br><br>The act primarily deals with the management of the Sansthan, powers, duties etc. The applicability of this act for the Project stems from the provision of the rent and tenancy rights associated with the Guthi land. Section 30 of the act mentions that, "Notwithstanding anything contained in Lands Act, 1964 and other prevailing Nepal law, the tenancy right in a land cultivated on tenancy according to this Act may be sold and purchased." Chapter 6 of the act mentions in detail the provisions relating to Tenants. Section 35 of the Act, mentions Registration of tenants on payments of fees.<br><br>There are 15.53 ha of Guthi land affected by the Project for which these provisions have to be considered. |
| The Decentralization Act 2039 BS (1982 AD) Master Plan for the Forestry Sector of 1988 and the Forest Act of 1993 | The Decentralization Act 2039 BS (1982 AD) introduced the concept of Community Forest User Groups (CFUGs). The Master Plan for the Forestry Sector of 1988 and the Forest Act of 1993 formalized the concept and gave a legal basis for the groups to function as autonomous institutions in the management of forest resources.<br><br>The above mentioned Acts are important for the Project as 76.67 ha (51.54 ha on permanent basis and 25.13 ha on temporary basis) of Community Forest and Government land is being diverted for the Project. For this, the land take process is guided by these Acts and provisions. |

[1] The years given outside of the bracket represent the year in keeping with the Hindu calendar followed in Nepal. This calendar is known as the Bikram Sambath Calendar. Throughout this report, the BS year will be given along with the accompanying year in keeping with the English Calendar in bracket.

| Regulation | Summary |
|---|---|
| Hydropower Development Policy, 2058 BS (2001 AD) | The Hydropower Development Policy, 2001 was introduced with a view to make clear, transparent and investment –friendly hydropower development in Nepal. On the basis of this policy, a model Project Development Agreement was formulated by the Ministry of Energy, Government of Nepal in 2010. On the basis of this policy and PDA, a basket of benefits/provisions were identified for the purpose of benefit sharing with the local community in the Project area.<br><br>This policy is applicable for the Project, as it is a Run of the River Project. However, this policy will have to be amended in keeping with the changed administrative structure. Presently clarity is required on the manner in which the existing provisions for benefit sharing at VDC and District level will be interpreted at the Gaunpalika and District level. |
| Convention (No. 169) Concerning Indigenous and Tribal Peoples in Independent Countries | International Labour Organization (ILO) Convention 169 is directed at Government, and its implications for private sector are indirect. However, the convention is referred as a reference point by Indigenous People (IPs) and Civil Society Organizations. This Convention has been ratified by Nepal in 1989. This Convention's provisions need to be kept in mind as more than 63.75% of the Rasuwa District's population and 93.6% of the Project AoI's population is comprised of the Indigenous group of Tamang. Furthermore, of the 89% of the PAFs are Tamang |

## 3.2 *APPLICABLE STANDARDS OF INTERNATIONAL DEVELOPMENT FINANCE INSTITUTIONS*

Apart from the national rules and regulations, the following international standards are applicable on the Project.

*Table 3.2 Applicable International Standards*

| International Standards | Summary |
|---|---|
| WBG PS 5: Land Acquisition and Involuntary Resettlement | This Performance Standard puts in place various processes and systems to avoid/minimise the social and economic impacts related to land acquisition and resettlement. In cases where avoidance of such impacts is not possible, the PS requires the mitigation of the impact through compensation for the losses suffered and improvement of the living conditions of the affected communities in the form of comprehensive compensation packages. |
| WBG PS 7: Indigenous People | PS 7 recognises that Indigenous Peoples, as social groups with identities that are distinct from dominant groups in national societies, are often among the most marginalised and vulnerable segments of the population. The PS underlines the requirement of avoiding / minimizing adverse impacts on indigenous people in a Project area, respecting the local culture and customs, fostering good relationship and ensuring that development benefits are provided to improve their standard of living and livelihoods.<br><br>This PS requires the Project to establish and maintain an ongoing relationship with the IPs affected by the Project through the life of the Project through an informed consultation and participation process, which would include, when required, a Free Prior and Informed Consent (FPIC) of the IPs. |

| International Standards | Summary |
|---|---|
| ADB's Safeguard Policy Statement (SPS), 2009 | The SPS builds upon ADB's previous safeguard policies on the Environment, Involuntary Resettlement, and Indigenous Peoples and has the following objectives:<br><br>• Avoid adverse impacts of projects on the environment and affected people, where possible;<br>• Minimize, mitigate, and/or compensate for adverse Project impacts on the environment and affected people when avoidance is not possible; and<br>• Assist borrowers and clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks. |
| ADB Public Communications Policy 2011 | ADB's Public Communications Policy (2011) sets out disclosure requirements for various ADB activities, including Safeguard Requirement such as Safeguard Requirements 2: Involuntary Resettlement (Appendix 2 of SPS); and Safeguard Requirements 3: Indigenous Peoples (Appendix 3 of SPS). The policy puts in place the requirements of information disclosure to ADB and external stakeholder and the requirement for undertaking consultations and facilitating participation of the affected people and other impacted stakeholders. |
| ADB Social Protection Strategy 2001 | The Social Protection Strategy spells out the scope of social protection and commitment of the ADB to develop priority interventions in five major elements including labour market policies and programs, social insurance programs, social assistance and welfare service programs, micro and area-based schemes and child protection. |
| ADB Operations Manual (OM) C3 Sector and Thematic Policies on Incorporation of Social Dimensions 2011 | As part of this OM, all ADB operations incorporate social dimensions so as to ensure greater inclusiveness, equity and empowerment for the poor, vulnerable, and excluded groups, while providing them with a greater sense of security and ability to manage risks. As part of this OM, ADB encourages consultations with and participation by stakeholders during the key stages of the Project life, the incorporation of gender considerations and social analysis into the relevant aspects of ADB operations. The OM also requires the Project design and implementation arrangements include actions to enhance benefits and monitor and evaluate the distribution of the benefits of the Project |
| ADB Gender Mainstreaming Guidelines 2012 | The projects of the Asian Development Bank (ADB) have four gender mainstreaming categories:<br><br>• Category I: gender equity as a theme (GEN);<br>• Category II: effective gender mainstreaming (EGM);<br>• Category III: some gender elements (SGE); and<br>• Category IV: no gender elements (NGE).<br><br>The Gender Mainstreaming Guidelines 2012 provides a detailed overview on the definition, requirements and application of the above gender mainstreaming categories. |

## 3.3 *PROJECT DEVELOPMENT AGREEMENT WITH MINISTRY OF ENERGY*

On 29th December 2016, the Project Development Agreement (PDA) for the Project was signed between the Ministry of Energy, Government of Nepal and

NWEDC. Some of the key clauses of the agreement, pertaining to environmental and social aspects, are as follows (this is not an exhaustive list):

- The following Plans shall be prepared as part of the Project:
    - The Local Benefit Sharing Plan,
    - Employment and Skill Training Plan and
    - Industrial Benefits Plan
    - Land Acquisition and Livelihood Restoration Plan (LALRP);
- The Company shall ensure that its Nepal Employment and Skills Training Plan provides for appropriate training of suitable citizens of Nepal for Project-related opportunities;
- The Company shall comply with the Nepal Employment and Skills Training Plan, Nepal Industrial Benefits Plan and Local Benefit Sharing Plan and ensure that appropriate programmes are designed to assist suitable Nepali citizens, entities, and firms to meet the Project's requirements for goods and services;
- The Company shall conduct employee training programmes from time to time, including training in each of the skills used in the Project, including management training;
- **Prior to Commercial Operation Date**, the Company shall build the distribution network to supply such Local Free Power to each Eligible Household within the Free Electrification Area;
    - GON shall be responsible for the operation and maintenance of such distribution network at its sole cost.
    - GON and the Company shall jointly prepare a plan (the "Rural Electrification Plan"), based on a pre-feasibility study to be carried out by GON and the Company (at the Company's sole cost) to assess the costs and scope of rural electrification.
    - The Company shall implement the Rural Electrification Plan.
- **From and after commercial operation date**, the company shall supply at its own cost- 20 KWH of free power each month to each household within the free electrification area to up to 200% of the number of original Households;
- The company shall not impair the use of the river for drinking and cultural uses, existing irrigation, industrial and recreational uses. Where impaired, it should be mitigated
- .

The Company shall (to the extent applicable) submit reports every six (6) months to GON for the first three (3) years of the Construction Period and every twelve (12) months thereafter, describing in detail:

- its employee training programmes,
- the implementation of such training programmes,
- The progress made towards meeting the objectives of using Nepali resources, training and development, the Nepal Employment and Skills Training Plan, Nepal Industrial Benefits Plan and Local Benefit Sharing Plan.

# 4 SOCIO ECONOMIC BASELINE

This section provides an overview of the socio-economic baseline of the Rasuwa District and the Project AoI and a detailed socio-economic profile of the PAFs. The baseline is based on primary and secondary quantitative and qualitative data. The baseline for the Rasuwa District and VDCs is based on the secondary data available and the regulatory EIA developed for this Project. The baseline of the PAFs is based on the socio-economic survey undertaken as part of this LALRP formulation. The following table provides the various sources of information used.

*Table 4.1 Sources of Information for Baseline*

| Baseline Area | Source of Information |
|---|---|
| Rasuwa District | • Census Data 2011<br>• UT-1 Supplementary ESIA 2014 |
| Project AoI (VDCs/ villages touched by the Project ) | • Census Data 2011<br>• UT-1 Supplementary ESIA 2014<br>• Focus Group Discussions Undertaken as part of LRP preparation 2015 and LALRP 2017 |
| Project Affected Families | • Household Survey for LRP preparation 2015<br>• Household Survey for LALRP 2017<br>• Focus Group Discussions Undertaken as part of LRP preparation 2015 and LALRP 2017 |

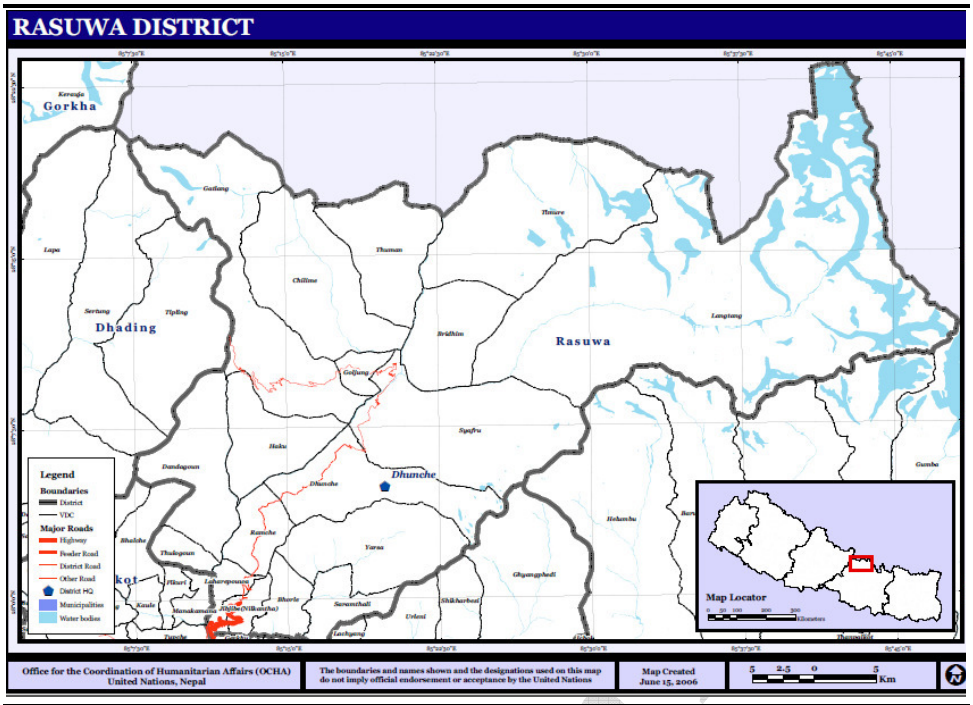
**Note:** The socio-economic information available for the Rasuwa District and VDCs/Project area is restricted to the Census Data 2011 and the information collected during the Complementary ESIA in 2014. This data does not reflect the changed administrative structures and the implications of the same on the socio-economic profile of the Project area. Furthermore, the data presented in this section for the Rasuwa District and Project area does not necessarily reflect the post-earthquake scenario. Where possible, the current status has been included information received during the consultations and PAF survey.

## 4.1 RASUWA DISTRICT SOCIO-ECONOMIC BASELINE

### 4.1.1 Demographic Profile

The Rasuwa District (District) is located in the north central part of Nepal with a population of 43,300 individuals and 9,778 households and is one of the districts with the lowest population in the country.

*Figure 4.1 Rasuwa District Map*




*Source:* United Nations Nepal Information Platform, http://www.un.org.np/attachments/district-map-rasuwa

The District has an average household size of 4.43 individuals, and a sex ratio of 1016 females per thousand males, which is comparable to the national average (1050 females per thousand males). Covering approx. 1,544 sq. km., the District has a population density of 53.6 persons per sq. km as can be seen from the following table.

*Table 4.2 Rasuwa District Demographic Profile*

| Variables | Value |
|---|---|
| Total Population | 43,300 |
| Total Area (sq. km) | 1,544 |
| population density | 53.6 |
| Total Households | 9,778 |
| Sex Ratio | 1016 |
| Average Household Size | 4.43 |

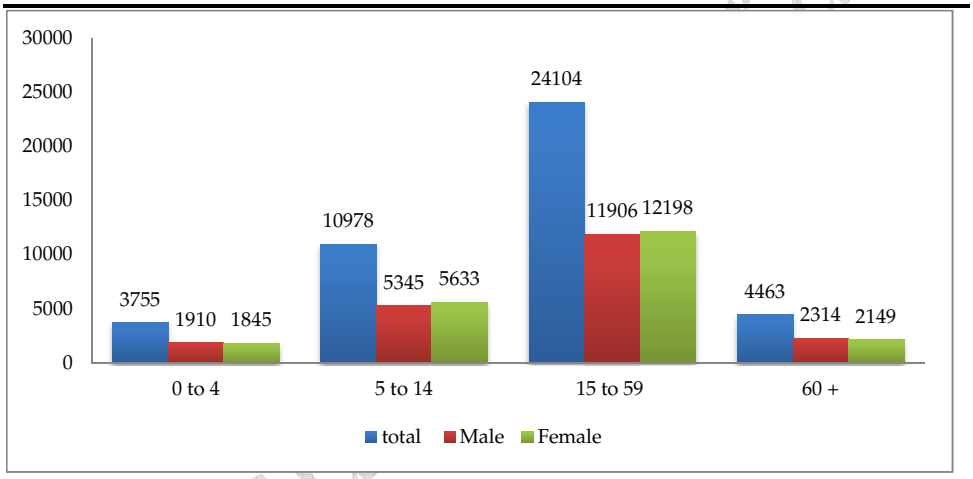
*Source:* Census 2011

Post-earthquake, the District has not undergone a shift in terms of the overall demographic profile. An increase in the population and population density in the urban areas and in settlements in the valley may be expected. Similarly, the number of households may increase. This is primarily the result of households splitting up post the earthquake, due to space issues in temporary housing and also to gain maximum benefit from relief support given by NGOs/INGOs.

The increase in number of households though has been offset by the very fact that some of the old age families who were able to be independent in the

native village conditions have come to depend on their offspring and stay with them, thereby resulting in decreased households and a potential increase in average household size. However, it is likely that while families have decided to live together to deal with the livelihood challenges (and other challenges such as pressure of rent) temporarily; they do intend to settle separately once the situation improves. This is also reflected in the number of household members who have applied for separate resettlement grant /support from the government. Another cause of change in population may be the out-migration of sections of the population; especially youth; for livelihood purposes. However, the effects of this out-migration are likely to be offset by a section of the population returning to the District post-earthquake. This group is comprised of those who had earlier out migrated in search of employment, but have returned to the District and families, to take care of the family members.

*Figure 4.2* ***Distribution of population by Age in the Rasuwa District***



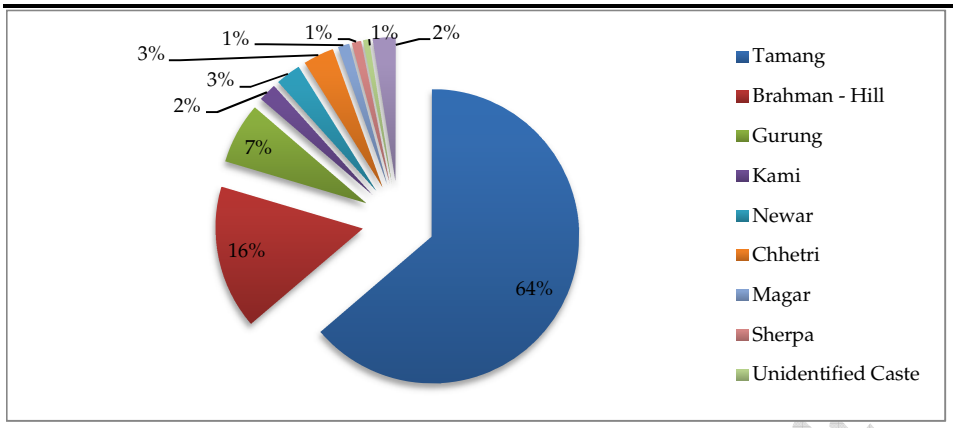

*Source:* Census 2011

According to the information available, 34% of the District is reported to be in age group of 0-14 years, while the age group between 15 to 59 (the productive age group) represent 56% of the population..

### *4.1.2 Social Groups*

The population in the District includes 18 ethnic groups, with the Tamang (an indigenous group) forming a majority of the population (63.75%). The other main ethnic groups in the area are Hill Brahman, Gurung, Kami, Newar, Chhetri, Magar and Sherpas amongst others. The following figure provides an understanding of the ethnic composition of the District.

*Figure 4.3 Ethnic Composition of the Rasuwa District*




*Source:* Census 2011

The main religion in the area is Buddhism (69% of the total population), followed by Hinduism (25.4%) and Christianity (4%). The other religions in the area comprise of Islam, Kirat, Prakriti, and Bon. Over the last years, there is reported to an increase in the number of Christians which could as a result of active presence of NGOs/ INGOs in the District and an increase in the number of children studying in Catholic boarding schools for better education.

The District is characterised by 9 languages, the most prominent of which is Tamang (60%), followed by Nepali (31.67%). The other languages spoken in the area are Newari, Magar, Gurung, Sherpa, Maithali, Tharu and Tibetan.

*Gender*

While women constitute 50.4% of the total population in the District, their access to education, property ownership and participation in social organization and economic activities is lower than in the case of their male counterparts. Compared to the 60.58% male literacy rate, 46.5% of the women are reported to be literate and only 8% of the women have legal ownership of property. However, the life expectancy of women at 54 years is comparable to that of men at 55 years. The following table provides an understanding of the ownership of assets by women.

*Table 4.3 women's Ownership of Assets*

| Asset | HHs No. | Percentage |
|---|---|---|
| Both House and Land | 460 | 5 |
| Land only | 322 | 3 |
| Neither house nor land | 8892 | 91 |
| Not stated | 67 | 1 |
| **Total** | **9741** | **100** |

*Source:* UT-1; Complementary Social Baseline, NESS, July 2014

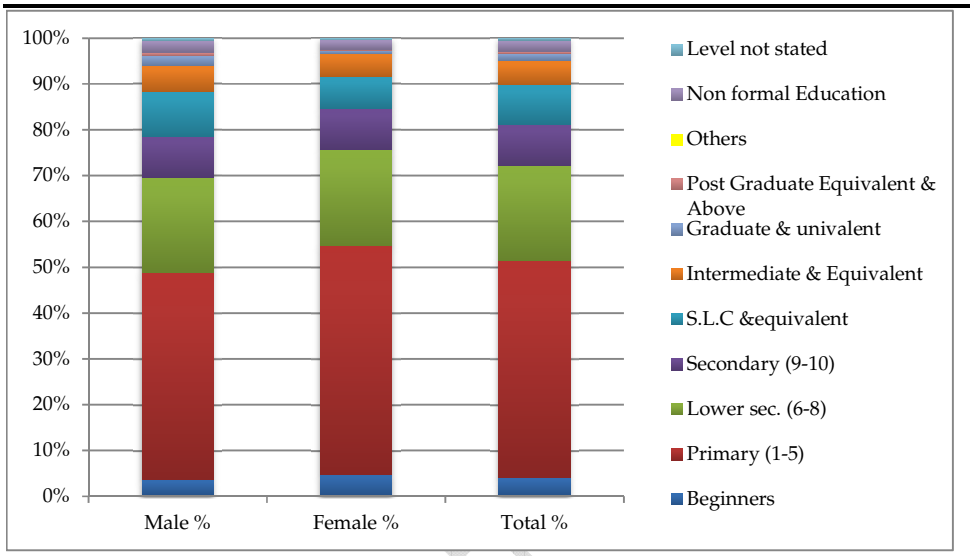
While involved in income generating activities such as agriculture and small businesses, women are reported to be mostly involved in household activities

including child care, animal husbandry, water fetching and looking after the welfare of family members.

### 4.1.3 *Education Profile*

The District is characterised by a literacy rate of 53.6%, with the male literacy rate being 60.58% and the female literacy rate being 46.5%.

*Figure 4.4 Educational Profile for the Rasuwa District*




*Source:* Census 2012

Of the literate population, 50% is reported to have education only till the primary level while only 16% of the population is reported to have received the School Leaving Certificate and 7.18% has education above the intermediate level.

The District is reported to have 129 educational institutions, of which 123 are managed by the community and 6 are institutional. The primary education institutions comprise of 80% of the total educational institutions. Some of these educational institutions too have been impacted by the earthquake.

### 4.1.4 *Livelihood Profile +*

Agriculture with animal husbandry is reported to be the main source of livelihood for 89% of the households. The other occupations include manufacturing, trade and business, transportation, services etc.

However, despite the dependency of the majority of households on agriculture for livelihood, only 40% of these households meet their food input from their own agricultural production, while the remaining resort to seeking loans, wage labour and outmigration (within and outside Nepal) for livelihood. Nearly 24% of the households in the District have at least one of

their family members living outside the village. Approx. 36% of the household are reported to be marginal farmers (0-0.5 ha) and 54% of the population is reported to live below the poverty line.

The dependence on non-farm based activities has increased post-earthquake. This is because a part of the population has lost (some temporarily, others permanently) access to agricultural land and livestock holdings. Furthermore, the increased proximity to urban areas and an increase in construction activities (due to repair and reconstruction) has resulted in a section of the population (especially youth) moving towards labour in construction site, as masons; unskilled construction labour and other low skill based occupations. Another source of income that has grown considerably since the earthquake is stone breaking. Construction labour activities have also been supported and augmented by NGOs/INGOs providing training in skills such as masonry, plumbing and electrician.

### *4.1.5 Health*

The District has 18 health care facilities, including 1 hospital at Dhunche. In addition to this, there are 17 health posts and sub-health posts at the VDC level. Apart from this, there are 42 primary health care outreach clinics, 57 Expanded Program on Immunization (EPI) clinics and 24 female and child health volunteers.

The predominant diseases in the District include disease of the skin respiratory system, diarrhoea, parasitic infections, gastric disorders and eye and ear infections. It is reported that the Gorkha earthquake resulted in a loss of physical infrastructure, including damage to hospitals and health posts, though exact damage information t was not available at the time of the assessment. As a large number of people now live in concentrated IDP camps, health risks related to poor access to water and sanitation is increasing..

### *4.1.6 Water Supply and Sanitation*

In the District, 88% of the households report using tap/piped water, while the remaining are primarily dependent upon nearby springs and rivers. The sources of the water supply in most of the cases are springs. The villages impacted by the landslide induced by the earthquake have reported loss of access to the spring water as some springs have disappeared or appeared elsewhere.

About 57% of the District's population is reported to have access to some type of toilet (predominantly being flush toilets with septic tanks) in their homestead, facilities of storm water drainage and wet sewage drainage do not exist in the District.

### 4.1.7 *Energy Use*

In terms of sources of energy, 98% of the households were reported to rely on firewood for cooking and other household purposes. The firewood was primarily sourced from the Community Forest land through established user rights. The commercial supply of energy is reported to be limited to the District headquarters and those households connected by the main roads. Solar lighting is reported to be a source which is growing in importance within the District. As part of the relief support provided by NGOs/ INGOs, the impacted population was provided with solar lights and panels.

## 4.2 *SOCIO ECONOMIC PROFILE OF THE PROJECT AOI*

### 4.2.1 *Demographic Profile*

*VDCs in AoI*

The three VDCs in the Project area are characterised by a total population of 1,646 households and 7,181 individuals. The average household size in the Project area is 5.71 persons, which is higher than the average size of the Rasuwa District and national average.

***Table 4.4 Demographic Profile of the VDCs in the Project AoI***

| VDC | Households | Total Population | Male Population | Female Population | Sex Ratio |
|---|---|---|---|---|---|
| Dhunche | 714 | 2,744 | 1,465 | 1,269 | 866 |
| Haku | 443 | 2,169 | 1,049 | 1,120 | 1068 |
| Ramche | 489 | 2,268 | 1,092 | 1,178 | 1079 |
| Total | 1,646 | 7,181 | 3,606 | 3,567 | 989 |

*Source:* UT-1 Supplemental ESIA Appendix A, 2014, based on the responses given

As has been discussed previously, most of the villages in Haku VDC, including Gogone, Tiru, Haku Besi, Phoolbari and Thanku were displaced due to the earthquake. Most of the population from the Haku VDC is presently living in IDP camps across Rasuwa and Nuwakot districts. While a portion (certain members of the family) of the population has returned back to the original village, most are only going for short durations for agricultural purposes including taking care of the livestock (whatever was saved from the earthquake); however most of the families are still continuing with some kind of alternate accommodation in the IDP camps.

The overall Project area is characterised by a negative sex ratio of 989 females per thousand males. However, the VDCs of Haku and Ramche are characterised by a positive sex ratio of 1068 and 1079 females per thousand males respectively. A possible reason for this sex ratio could be the men migrating for work; however the same could not be confirmed as part of the assessment.

*Table 4.5 Age Structure of the population in VDCs in AoI (%)*

| Age Group | Male | Female | Total |
|---|---|---|---|
| Below 5 years | 7.5 | 7.8 | 7.5 |
| 5-14 years | 21.7 | 21.5 | 21.6 |
| 15-59 years | 62.9 | 64 | 63.4 |
| 60 years and above | 7.9 | 6.7 | 7.4 |
| Total | 53.4 | 46.6 | 100 |

*Source:* UT-1 Supplemental ESIA Appendix A, 2014 based on the responses given

Almost, 29.1% of the population surveyed in 2014 as part of the complementary baseline, was reported to be below the age of 14 years, while 7.4% of the population was reported to be 60 years and above. The economically active section of the population (15-59 years) comprises of 63.4% of the population, as can be seen in the above table.

*Project Affected Families*

The survey included 129 of the 142 PAF households (91% survey rate), with a total population of 604 individuals and an average household size of 4.68 individuals per households. This average household size is lower than that of the Project area, which may be attributed to the separation of families post-earthquake.

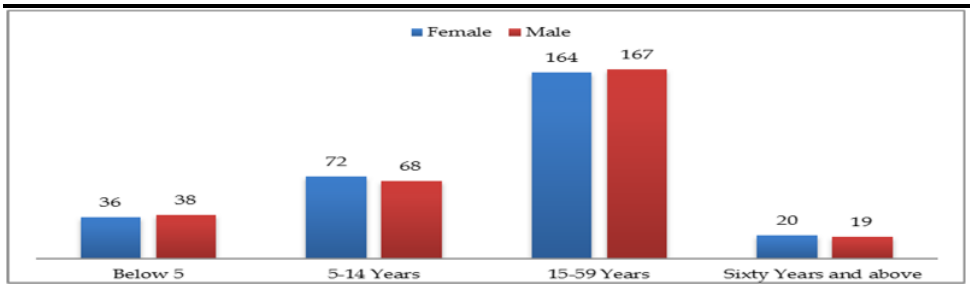
*Table 4.6 Demographic Profile of PAFs*

| Original Residence | Number of PAFs | Total Population | Female | Male | Sex Ratio | Average Household Size |
|---|---|---|---|---|---|---|
| Gogone | 41 | 173 | 80 | 93 | 860 | 4.22 |
| Haku Besi | 26 | 122 | 64 | 58 | 1103 | 4.69 |
| Mailung | 34 | 159 | 74 | 85 | 871 | 4.68 |
| Phoolbari | 21 | 116 | 62 | 54 | 1148 | 5.52 |
| Thanku | 7 | 34 | 16 | 18 | 889 | 4.86 |
| Grand Total | 129 | 604 | 296 | 308 | 961 | 4.68 |

*Source:* LALRP HH Survey, 2017 based on the responses given

The overall Sex Ratio of the households surveyed was 961 females per thousand males, which is lower than the sex ratio in the Project area, especially Haku and Ramche. Within the households surveyed, the PAFs from Haku Besi and Phoolbari were reported to have a positive sex ratio. These villages have historically been characterised by a positive sex ratio.

*Figure 4.5 Age Wise Classification of the PAFs*




*Source:* LALRP HH Survey, 2017 based on the responses given

As can be seen from the above figure, a majority of the PAF population (57%) are reported to fall within the economically active age group of 15-59 years. Furthermore, this age group and those below the age of 5 are reported to have a negative sex ratio of 982 and 947 females per thousand males respectively.

### 4.2.2 *Social Groups*

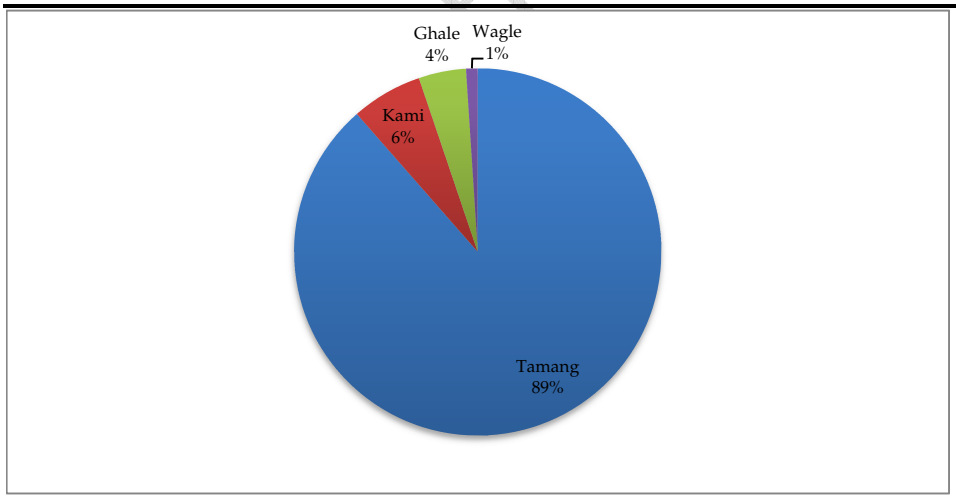
*VDCs in AoI*

The ethnic groups found in the Project AoI are Tamang, Gurung, Magyars and Newars. Of these, the Tamang are in majority, comprising of 93.6% of the population (surveyed during the complementary baseline for the supplemental ESIA), followed by Gurung (1.3%) while the castes of Brahmins, Chhetri, Thakuri and Sanyasi (BCTS) constituted 3.8% of the population. The IPDP provides an understanding of the profile of the key indigenous ethnic groups in the AoI

*Project Affected Families*

The following figure provides an understanding of the distribution of social groups identified amongst the PAFs.

***Figure 4.6 Social Groups amongst the PAFs***




*Source:* LRP HH Survey, 2015 based on the responses given

As can be seen from the above figure, 89% of the PAFs belong to the Tamang community. In addition to this, 6% of the PAFs were reported to belong to the Dalit (Kami) group and 4% and 1% of the PAFs were reported as Ghale and Wagle groups respectively. The IPDP for the Project provides a detailed understanding of the Tamang population in the District and Project area.

### 4.2.3 *Family Structure*

*VDCs in AoI*

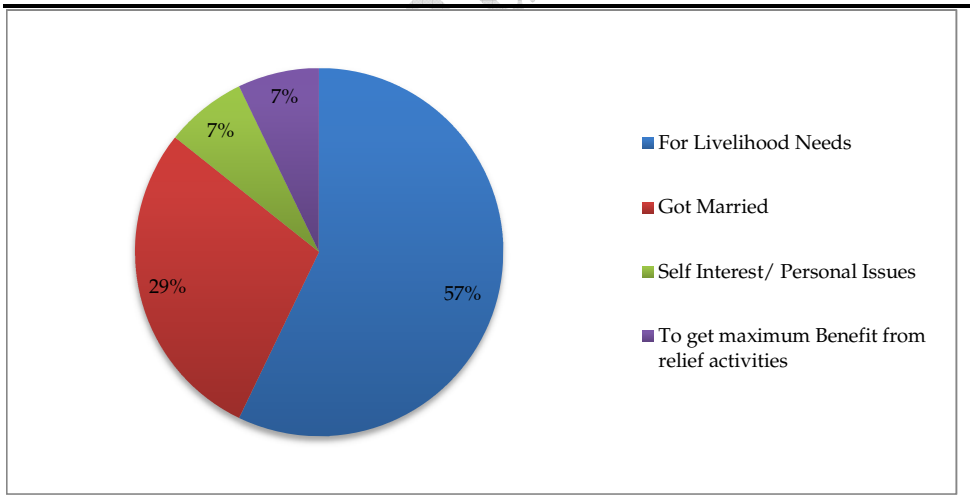
79% of the households in the Project AoI were reported to live in nuclear families, while 21% reported to having adopted a joint or extended family structure.

Post-earthquake, there are two main trends observed in terms of family structure. There have been instances of families coming together, with parents living with their children; who earlier used to reside in separate households. However, the larger trend is expected to have been of the number of nuclear households in the Project area increasing due to the younger population moving to a separate household from their parents. This may be due to the children getting married and establishing separate households or the family splitting up post-earthquake to get maximum benefits from relief work.

*Project Affected Families*

82.75% of the PAFs reported to live in nuclear families, while 17.25% were reported to living in Joint Families. Further post-earthquake, 12% (15 PAFs) reported to having at least a member of the household living separately. The following figure provides the reasons for the separation given by these PAFs.

***Figure 4.7 Reasons for Separation of Household Members Post Earthquake***




*Source:* LALRP HH Survey, 2017 based on the responses given

In terms of family size, the Tamang are reported to have a relatively large family size in comparison to the Dalit household.

### 4.2.4 *Education and Literacy*

*VDCs in AoI*

As can be seen from the table below, 30% of the surveyed population in the VDCs is reported to be illiterate. The male literacy rate is reported to be higher (79.6%) than that of women (60.1%) in the VDCs. Amongst the ethnic groups; the Gurung are reported to have the highest literacy rate at 95%, followed by the BCTS group and Magyars.

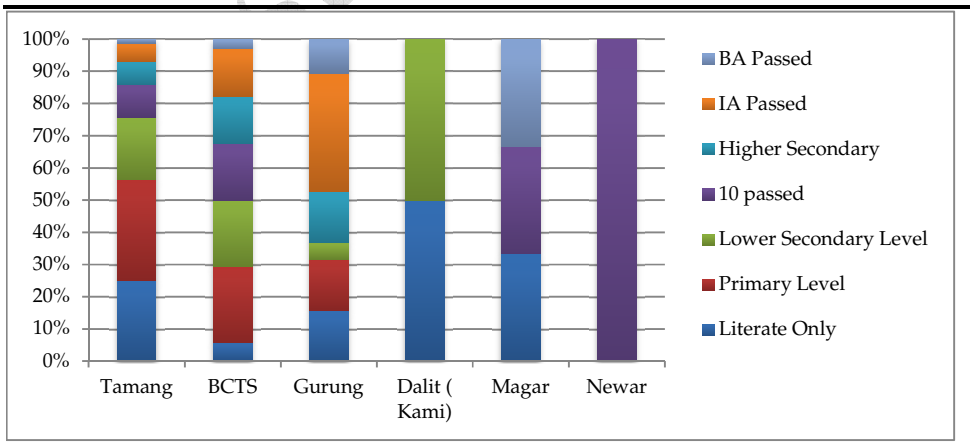
***Table 4.7 Educational Status of the Project AoI (% of total surveyed population in 2014)***

| Categories | Illiterate | | | Literate | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Men | Women | Total | Men | Women | Total | Men | Women | Total |
| Tamang | 21.6 | 40.1 | 30.4 | 78.4 | 59.9 | 69.6 | 52.4 | 47.6 | 100.0 |
| BCTS | 3.6 | 35.7 | 14.3 | 96.4 | 64.3 | 85.7 | 66.7 | 33.3 | 100.0 |
| Gurung | | 14.3 | 5.0 | 100.0 | 85.7 | 95.0 | 65.0 | 35.0 | 100.0 |
| Dalit | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 | 100.0 |
| Magar | | 50.0 | 25.0 | 100.0 | 50.0 | 75.0 | 50.0 | 50.0 | 100.0 |
| Newar | | 100.0 | 50.0 | 100.0 | | 50.0 | 50.0 | 50.0 | 100.0 |
| Total | 20.4 | 39.9 | 29.5 | 79.6 | 60.1 | 70.5 | 53.1 | 46.9 | 100.0 |

*Source:* UT-1 Supplemental ESIA Appendix A, 2014 based on the responses given

Of the literate population in the Project area, 24% is reported to not have any formal education but are able to write or read basic sentences. 30% has only completed education till the primary level. Furthermore, 19% has completed lower secondary education and 10% have completed education till class 10. However, only 1.7% of the population is reported to have completed education till the Bachelors level.

***Figure 4.8 Level of Education of the Project AoI (% of the Educated Population) (2014)***



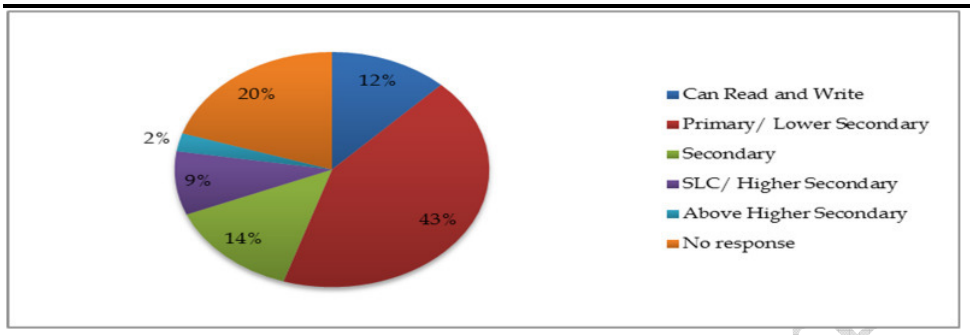

*Source:* UT-1 Supplemental ESIA Appendix A, 2014 based on the responses given

*Project Affected Families*

Similarly, 35% of the PAF population is reported to be illiterate. In terms of the literacy rate across gender, the male literacy rate is reported to be higher (54%)

than that of women (48%). The following figure provides an understanding of the literacy level of those PAFs who were reported to be literate.

*Figure 4.9 Educational Status of PAFs surveyed*




*Source:* LRP HH Survey, 2015 based on the responses given

As can be seen from the figure above, of the literate population amongst the PAFs, 12% reported to be able to read and write but not have any formal education while 42.68% has only completed education till the primary or lower secondary level. However, only 2.5% of the population is reported to have completed education till the Bachelors level or have completed a certificate course.

### 4.2.5 Land Use and Ownership

*VDCs in AoI*

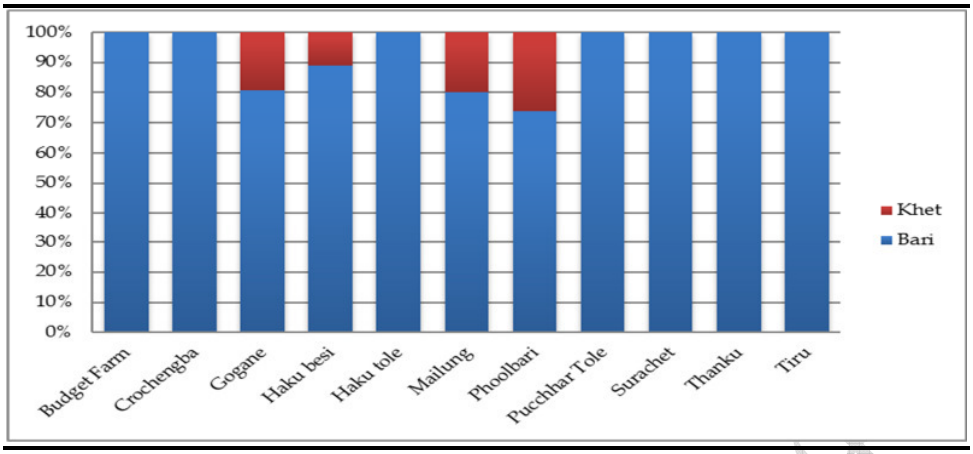
In terms of the private land holdings within the Project AoI, the following three land types have been identified:

- *Bari* or un-irrigated upland
- *Khet* or irrigated low land and
- *Kharbari* or marginal land

*Project Affected Families*

Of the households surveyed 86% of the households were reported to own land categorised as Bari or un-irrigated upland, which is reported to lower in terms of fertility. On the other hand, 14% of the PAFs (in Gogone, Haku Besi and Phoolbari) surveyed reported owning irrigated low lands or *Khet*, which are more fertile and appropriate for rice cultivation.

*Figure 4.10 Land Ownership pattern amongst PAFs*




*Source*: LRP HH survey, 2015 based on the responses given

Furthermore, 42 PAFs from Haku Besi, Phoolbari and Thanku, were reported to have access to Guthi land impacted by the Project as tenants.

*Table 4.8 Land Holdings amongst the PAFs Surveyed*

| Village Names | Average Land holding (ha) | Average Leased Land (ha) | Distribution of Marginalized Land Owners | Distribution of Small land Owners |
|---|---|---|---|---|
| Gogone | 0.19 | 0.08 | 24 | 2 |
| Haku Besi ( including Sanu Haku and Thullu Haku) | 0.57 | | 2 | 7 |
| Mailung | 0.23 | | 5 | |
| Phoolbari | 0.41 | 0.81 | 11 | 8 |
| Thanku | 0.11 | | 5 | |
| Tiru | 0.22 | | 9 | |
| Grand Total | 0.29 | 0.4 | 56 | 17 |

*Source*: LRP HH survey, 2015 based on the responses given

The average size of the land holdings per households is reported to be 0.29 Ha of owned land and 0.44 Ha of leased land. Only the villages Gogone and Phoolbari are reported to have leased land. The highest average land holding size was reported from the villages Haku Besi and Phoolbari while the lowest land holding sizes were reported from Thanku and Gogone.

In terms of the size of the land holdings, 43.41% of the PAFs were reported to marginal land owners (less than 0.5 Ha) while 13.18% of the land owners were reported to be small land owners (0.5-2 Ha). Furthermore, 100% of the small land owners reported their land type as Bari, while 19.35% of the marginal land owners reported to owning *Khet* land (irrigated land).

**Note:** In many cases the total land holding reported by the PAFs includes those plots which have already been transferred to NWEDC for the UT-1 Project. So, the reported land availability may not be correct reflection of

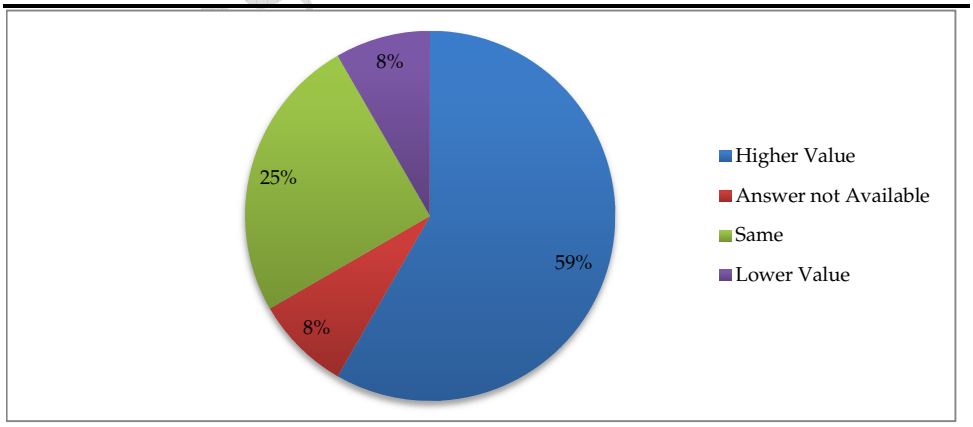
actual land ownership in all the surveyed PAFs. This is especially important in case of Haku Besi, Phoolbari villages, where the land acquired and transferred to NWEDC was still available for cultivation as the access road construction has not started in these places. In case of Gogone the land ownership effectively is not of value now as the land is either not suitable for cultivation due to landslides and debris or is not safe enough to reach there and cultivate. Even the Government's Geological Survey report has confirmed the same. Consultations with the DUBDC at Dhunche indicated that the Government has finally decided that some land will be provided to the landless people, whose land was lost in the earthquake and do not have any land available for the house construction. This work has been awarded to certain department and is being supported by one of the INGOs across all the earthquake affected part of Nepal.

*Use of compensation money for Purchase of Additional Land*

Twenty one PAFs reported having purchased land with the compensation money, of which 16 PAFs purchased new land post- earthquake. These 16 residential plots ranged in size between 1 to 8 anna (0.003-0.03 Ha) and were located in Batar (7), Dhunche (6), Betravati (1), Ramche (1), and Kathmandu (1).

Some of the PAFs indicated that they have purchased land as investment, and are presently not utilizing the same (no construction for accommodation or for business) or have leased it out on rent. As can be seen from the figure below, 59% of the PAFs reported the value of the purchased land to be high. This high value is primarily because land is being purchased in urban areas, such as Dhunche, Betravati, and Kathmandu.

***Figure 4.11 Value of Alternative Land Purchased***




*Source*: LALRP HH survey, 2017 based on the responses given

Furthermore, 8 PAFs from Phoolbari who do not have a tenancy certificate to the Guthi land, have applied for the same and are at various stages of receiving it after due process to be followed by the government.

### 4.2.6 *Livelihood Profile*

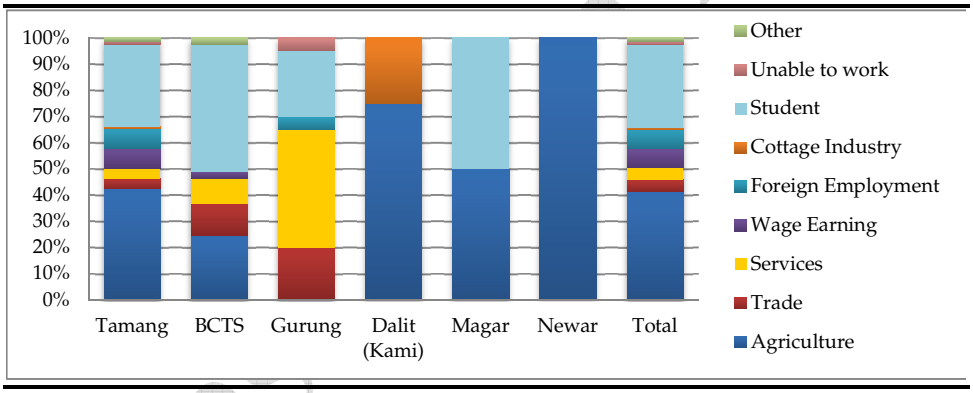
*VDCs in AoI*

A significant portion of the population in the AoI (41.3%) within the economically active age group reported agriculture as the key source of livelihood in the pre-earthquake scenario. Apart from agriculture, the other sources of income identified were as follows:

- Wage labour (7.3%),
- Business (4.9%),
- Foreign employment (7.5%) and
- Service (4.76%).

Wage earnings were primarily related to construction- related activities such as masonry, carpentry, construction work, and driving and bamboo basket making.

***Figure 4.12 Livelihood Profile in the Project AoI***




*Source:* UT-1 Supplemental ESIA Appendix A, 2014

Within the Project AoI, the social groups such as Kami, Magar and Newar report the highest dependence on agriculture. On the other hand, Indigenous groups of Tamang and Gurung report their major income source being wage earnings and foreign employment.

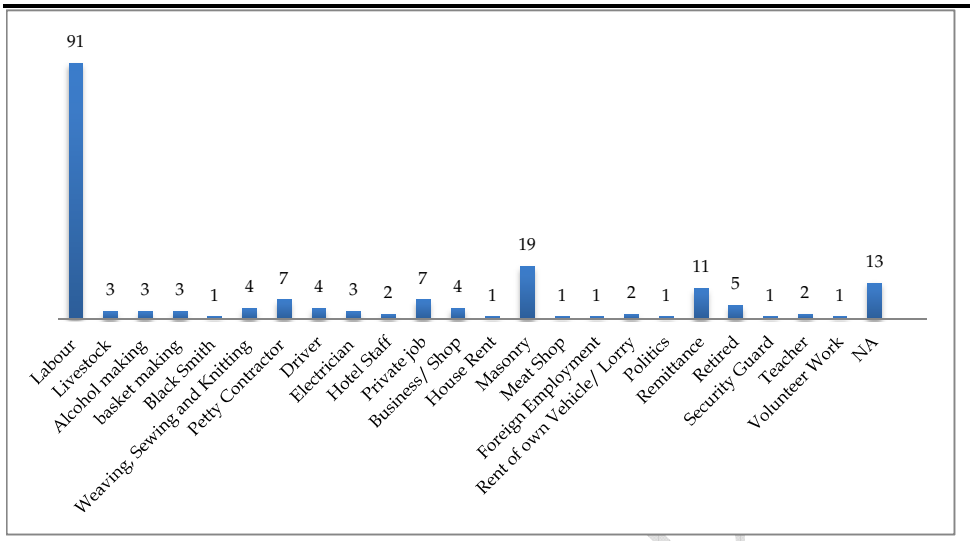
From the discussions with the local community, it is understood that post-earthquake, the dependence on agriculture has reduced as people have lost access to their land, or their land stands damaged. This has been compensated by an increase in dependence upon wage labour in construction sites and stone breaking.

*Project Affected Families*

Amongst the PAFs surveyed, the primary source of livelihood reported is labour (47% of PAFs) and masonry (9.9% of PAFs). This is followed by

agriculture (7% of PAFs) and remittance (5% of PAFs). The remaining sources of income represent less than 5% of the total PAFs.

*Figure 4.13 Livelihood Profile of the PAFs*




Source: LALRP HH Survey 2017 based on the responses given.

This is a significant shift in the livelihood profile, in comparison to the pre-earthquake scenario, where approximately 50% of the population in comparison had reported a dependence upon agriculture as a source of income.

According to the discussions with the PAFs, presently the livelihood profile of the community is characterised by variation and uncertainty in income sources. Nearly 60% of the PAFs reported to having difficulty in finding stable sources of livelihood. Most of the PAFs involved in labour work, reported to be gainfully engaged for approx. 8-15 days in a month, which is very low. This has resulted in the PAFs trying to diversify their livelihood activities, with income from labour being supplemented by livestock/ poultry farming, agriculture, weaving, basket making and sale of homemade alcohol.

Some of the reasons identified by the PAFs for difficulty in finding stable sources of livelihood include the following:

- fluctuations in the market,
- demand for only particular skills,
- lack of proper training to be really employable,
- inadequate resources (access to money and land) and
- technical expertise, lack of access to government support, etc.,

The PAFs have limited education, which is a major hindrance in gaining new skills.

28% of the PAFs surveyed expressed the desire to return to their original settlements. Most of the remaining 72% PAFs reside in IDP camps, on rented private land or government land, which they may have to vacate at some time.

Thus, this livelihood profile and the present trends, is largely dependent upon the current residence of the population and are likely to change once again if the PAFs change location of residence.

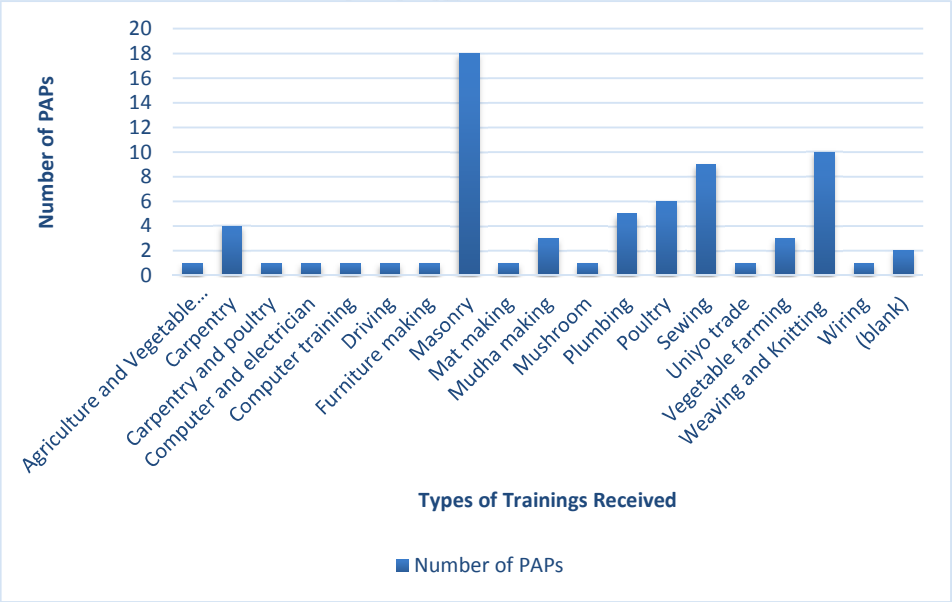
In the pre-earthquake scenario, most women were engaged in agricultural or livestock farming activities. Presently a larger number of women are reported to be engaged in wage earning activities, primarily stone breaking.

Another shift in the post-earthquake scenario has been the increased economic burden on the younger population as the older generations (50 years and above), having lost access to agricultural land and livestock holding and to not having any other skill training or physical fitness to undertake wage labour, now depend on their children to look after them. A common scenario is of the elders of families living as a separate household in the IDP camp or original village, but economically dependent on their sons for maintenance and financial support.

**Trainings Received**

64 individuals from 51 PAFs have received livelihood and skill training as part of the relief activities by NGOs/ INGOs in the District. Of these, 40 received trainings with completion certificates, and for 3 individuals, trainings are still on going.

*Figure 4.14* ***Trainings Received by PAFs as part of Earthquake Relief***




*Source:* LALRP HH Survey, 2017 based on the responses given

As can be seen from the above figure, the most common form of training received is masonry, carpentry, sewing, weaving and knitting, poultry farming and plumbing. While most men reported to have received training for masonry, carpentry and plumbing, the most common training for women was sewing, weaving and knitting and poultry farming.

The following sub sections provide a more detailed understanding of the key areas of livelihood generation for the PAFs at present. This understanding has in turn informed the development of the LRP and its entitlements later in this report.

**Wage Based Labour**

54% of the PAFs reported undertaking wage labour and masonry as the source of livelihood. This wage labour is primarily daily wage labour and is both semi-skilled (masonry, plumbing, bag weaving etc.) and unskilled work (stone breaking, labour in shops). The PAFs engaging in wage labour are largely concentrated in areas near Naubise and Bogetitar..

The people were trained on construction of houses (both mud and RCC) by the NGOs under the "Food for Work" programme. This programme provided wage based employment to several locals. Those who have successfully completed the masonry trainings report an increase in their average earnings from 600-800 NPR per day to 800-12000 NPR per day. Those involved in agricultural labour get a lower wage, between 500-600 NR/ day. In comparison to men, the women are reported to be paid lower at 250-400 NR/day for the same task.

In recent months, it is being observed that an increase in number of households undertaking wage labour has resulted in the saturation of demand in market and this shortage of work for the people. As a result of this, the PAFs reported to only getting work for 8-15 days in a month as compared to earlier, where most had work for 20 days or more in a month. Furthermore, at the time of ERM visit for the survey most of the construction of houses with NGO aid is nearing completion, therefore the employment opportunities are gradually decreasing skilled and unskilled work.

**Stone Breaking**

A large number of members from the PAFs have reported to be engaged in stone breaking activities, as a primary or secondary source of income. A large number of unskilled women and aged people (above 50 years) are involved in stone breaking activities, earning an amount ranging from 250-400 NPR per day, being paid on a piece rate basis.

*Figure 4.15 Stone Breaking Activities in IDP Camps*

*Source:* ERM site visit, 2017

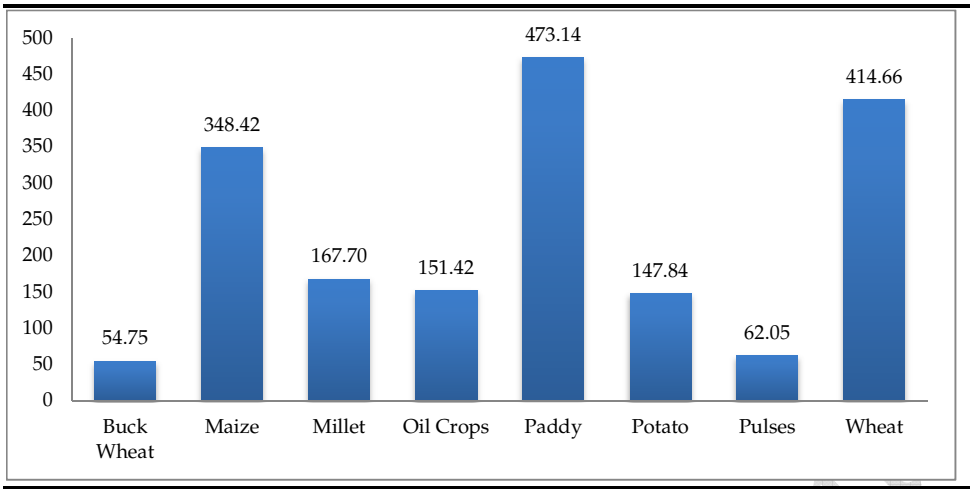
This activity is one of the most prominent sources of income because of its proximity to the IDP camps, especially near Farm Camp and Pradhikaran camp in Dhunche.

However, it is not a preferred source of livelihood for the community as it the daily wage rate is lower than that for other labourers (discussed in previous section). Furthermore, since the people work without gloves or any protection, there is a risk of injury. Lastly, people usually undertake this activity close to their residents itself. There is thus a risk of children getting injured by playing with the tools or rocks, as there is no protection for children.

**Agriculture**

In the pre-earthquake scenario, agriculture was reported to be one of the most important sources of livelihood in the community. The main crops grown in the area include paddy, buck wheat, pulses, oil seeds, maize, potato, corn, millets and vegetables. While crops such as paddy and maize are grown primarily for household consumption, crops such as potato and vegetables are grown both for household consumption and for sale in the market. The households owning irrigated land parcels (*Khet*) typically grow multiple crops (two or more) on their land. On the other hand, those households who own unirrigated land (Bari) tend to grow only a single crop, with certain households growing vegetables, pulses and potatoes on small scales. Most of the land parcels are reported to be unirrigated, and depending upon monsoons and rainfall for irrigation. The average yield for the different crops as reported by the PAFs in 2015 is as shown in the figure below.

*Figure 4.16 Average Yield (Kg/Ha) under Different Crops*



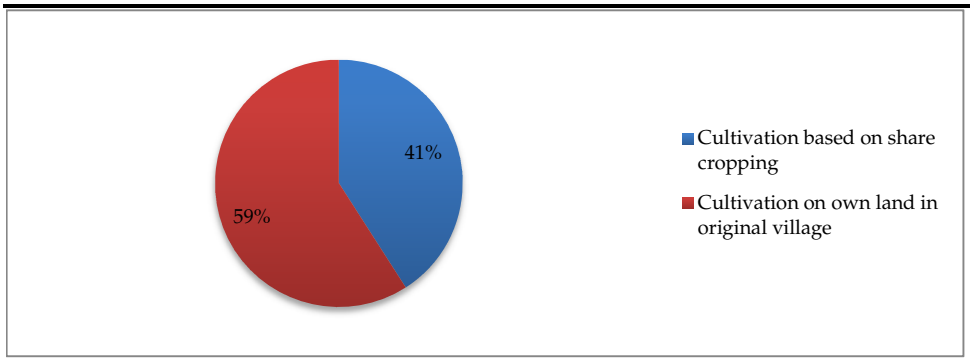

*Source*: R&R Plan HH survey, 2015 based on the responses given

As can be seen from the above figure, the highest average yield was reported to be of paddy, followed by wheat and maize.
However, due to the earthquake, and the damage to agricultural land, there is a marked shift from agriculture to other sources of livelihood. There is also the increased proximity of the PAFs to urban areas and consequently non-farm based livelihoods. As discussed earlier, about 7% of the PAFs reported a dependence on agriculture as a source of livelihood over the last 2 years. These PAFs report that to do cultivation only for their own consumption and not for the market. The following sections provide an understanding of the agriculture being undertaken on rented land and on native land.

### *Agriculture On Rented Land*

Of the PAFs who reported undertaking agriculture, 41% reported to be doing so on share cropping basis on rented land with private land owners in the vicinity of the IDP camps. This form of agriculture is most dominant amongst the PAFs from Gogone, Tiru and Mailung.

*Figure 4.17 Location of Agricultural activities*




*Source*: LALRP HH survey, 2017 based on the responses given

According to the survey, some PAFs are engaging in agriculture on share cropping basis in a group of 4-6 families, which is helping them in sharing of effort. However, this places an additional burden on the household in terms of expenses.

*Figure 4.18 Agricultural Activity in IDP Camps*

*Source:* ERM site visit, 2017

15% of the PAFs expressed a desire to rent/purchase land in the vicinity of the IDP camps for agricultural purposes, instead of cultivating their land in the original village. The reasons for not being able to do so include the high rent and market value of land in the area and lack of available cultivable land.

**Agriculture On Native (earthquake affected villages) Land**

The PAFs who are undertaking agriculture on their native land, in original villages, primarily belong to Haku Besi and Phoolbari. This group of PAFs those are gradually shifting back to their original villages while others visit the villages for short durations for opportunistic cultivation, while staying near Dhunche. One prominent factor for this change is the relatively easier access to these villages from Dhunche post-earthquake as compared to the villages of Tiru and Gogone. The risk of landslides is also considered to be lower in these villages when compared to Tiru and Gogone.

**Livestock Rearing**

In the pre-earthquake scenario, livestock rearing was reported as one of the key sources of income, with 68.75% of the PAFs reporting some form of livestock holding in 2015. Of these, the most common livestock holdings were poultry, followed by goats and cattle. However, post-earthquake, most of the PAFs lost their livestock or saw a sharp reduction in numbers..

While most have tried to rebuild their livestock rearing, 75 PAFs (58% of total) report a reduction in the total number of livestock heads owned, while 4 PAFs (3% of total) reported to have same or increased livestock holdings. This is despite training and support being provided to PAFs by NGOs/ INGOs in poultry farming and boar farming as part of relief work post-earthquake.

*Figure 4.19 Present Livestock Holdings in IDP Camps*

*Source:* ERM site visit, 2017

Some of the reasons for the PAFs not restoring their livestock holdings are:

- lack of money to purchase and maintain the livestock;
- lack of space in IDP camps for keeping the livestock especially larger animals such as boars and cattle;
- lack of grazing land, for goats and cattle/bovine especially in Naubise, Bogetitar, Satbise and Batar; and
- Reluctance by PAFs and community to keep larger number of livestock in IDP camps for hygiene reasons. This issue often flares into conflicts because of the odour and nuisance from poultry and livestock. However, the NGO intervention in this area has helped in training people to undertake such activities in limited space, which could be seen being implemented in Naubise Camp where two or three families have constructed small sheds and are maintaining a limited number of cattle and goats.

*Figure 4.20 Livestock cultivation in limited space in Naubise*

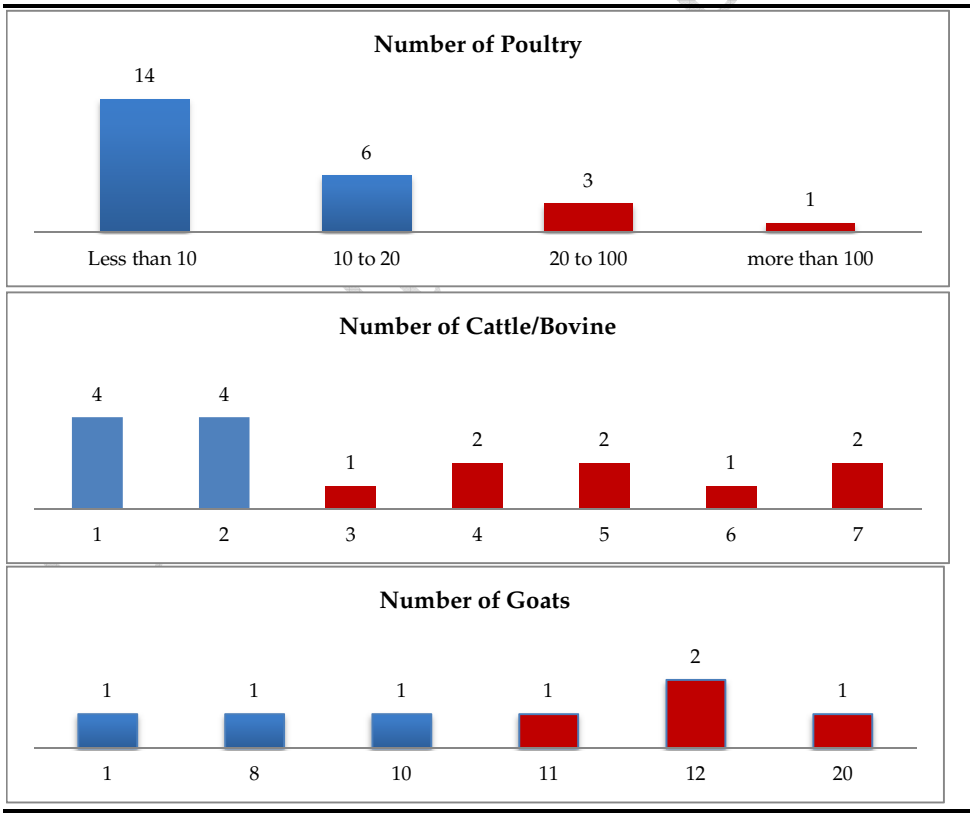
*Source:* ERM site visit, May, 2017

The difference in temperature and climatic conditions between the original villages and present settlements is reported to have resulted in large number of deaths in the livestock heads, which were bought to the present settlements. The families, who continue to maintain their livestock in the original settlements, still have the same sub-species. However, those who are maintaining livestock holdings in the IDP camps are reported to have switched to the sub-species found in the plain regions. This may have implications when people try and move back to their native villages in some time.

In case of PAFs from Haku Besi and Phoolbari who are residing in IDP camps, space constraint have resulted in them either selling their cattle after the earthquake or maintaining them in original villages, where there is sufficient grazing land and suitable climate. In such cases a sizeable number of PAFs have either returned to their native village permanently or keep visiting regularly for the maintenance of livestock.



*Figure 4.21* ***Types of Livestock Holdings across PAFs***




*Source*: LALRP HH survey, 2017 based on the responses given

As can be seen from the above figures, most of the PAFs reported small livestock holdings. In terms of value of livestock holdings it is estimated that those PAFs owning less than 20 poultry, 2 cattle/bovine and 10 goats; are rearing the same for household purposes. The households with more than 20 poultry or 3 cattle and 10 goats (depicted in red) may be engaging in sale of

products such as eggs, milk and meat or have the potential to do so. However, it should be noted that only 3 PAFs reported an income from livestock holdings.

**Poultry**

There have been certain families in the pre-earthquake scenario which maintained poultry in order to fulfil household needs of egg and chicken. However, the occurrence of earthquake resulted in loss/ death of poultry. The people with ample savings could replenish their poultry even after earthquake. The NGOs played a role in training displaced people on poultry management and provided the trainees with the requisite number of poultry in order to take forward the learning, along with food supplies and support in vaccination.
The case study below presents the story of a family undertaking poultry for the first time.

*Figure 4.22 Failure and Success in Poultry Farming*

| Case Study: Failure and success in Poultry |
|---|
| Meera Lama |
| **Detailed Case Study** |
| One PAP - Meera Lama W/O Mengamar Lama from Bogititar IDP Camp, shared her experience on poultry training during the survey undertaken by ERM in May 2017.<br><br>Meera Lama had received NPR 50,000 from one of the NGO (Lumanti) as seed capital to start poultry farm after completing training period with the same NGO. Disbursement of seed capital was not directly given to the beneficiary with the objective of rightful use, rather it was extended through a local entrepreneur in the nearby area in form of supplying chickens worth NPR 50000. Cost of arrangement of poultry shelter was supposed to be borne by beneficiaries. Meera started this poultry farm business with this support. Although this business venture didn't succeed and mostly chickens died during growing period, but Meera had good learning of this business.<br><br>She attributed 'initiating poultry in wrong cycle' as major reason behind failure of her venture into poultry. Based on discussions with her it was understood that poultry farming can be done in 3 cycles in a year. Each cycle is of 3 months duration. The best cycle for growth has been reported to be between December and February, considering the local climate. A period of almost a month between any two cycles, is required for cleaning and drying poultry shed which is necessary for initiating next cycle of farming.<br><br>Meera lama failed in first attempt, but learned from her mistakes and gained confidence to restart poultry farming. She invested her personal saving and established a poultry shed on a rented place, located close to Betrwati (nearest market place from her present residential place). She is paying NPR 7000 per month as rent for area taken for poultry shed and now managing this business in a better way. She visits her poultry shed twice a day and remains busy with other activities during day time. She manages to earn about rupees thirty thousand in one cycle of poultry farm in a year. This is serving as good additional source of income for her now. |
| **Key Inference** |
| A lot of people learn from failures, while engaging in an activity. Meera failed in her first attempt at poultry as all her poultry died in first attempt but could effectively utilise her learning from the failure and is now successfully undertaking poultry. |

While some of the PAFs could gainfully utilise their poultry training after withdrawal of NGO support, a large number of people trained on skills to manage poultry could not take it forward successfully because of the following reasons:

- Limited space for poultry farm near camps;
- Lack of proper understanding of potential diseases and follow up on vaccinations;
- The poultry needs cooler temperature for healthy growth and survival and the relatively hot climate of Naubise and Bogetitar camps led to death of poultry;
- Lack of electricity and water facilities to maintain ambient temperature and limited understanding of active growth cycle of poultry led to death of poultry.

**Small enterprises**

Consultations with PAFs from Haku Besi and Phoolbari indicated that a number of families had small grocery shops, restaurants, tea shops, etc. in their original villages prior to earthquake. It has also been understood from consultations that some of these people also shifted to Dhunche after selling land to UT-1 (prior to earthquake as well as post-earthquake). These people had bought land in and around Dhunche and had set up small shops in the newly purchased land or land rented land being used for residence. These shops are meat shops, tea shops, grocery shops, etc. In this case, the prior experience of managing an enterprise and savings helped restart business enterprises in the new setting.

It was also observed that new enterprises are also being set up in Naubise and Khalde camp areas, but the people venturing in this area for the first time require some handholding support in terms of technical knowledge of managing an enterprise in order to run their venture profitably.

*Figure 4.23 New Business Enterprise in Naubise*

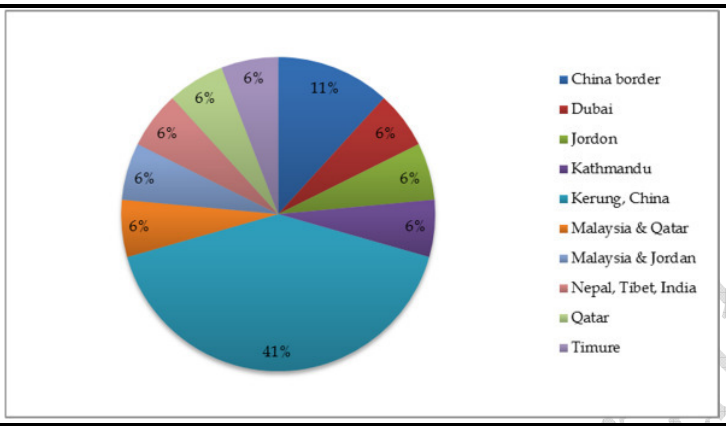
| Case Study: Female Entrepreneurship |
|---|
| Salina Tamang |
| **Detailed Case Study** |
| A lady from Dandagaon, living near Nuabesi IDP camp has opened a small shop near in a small portion of her shelter, around one month back. The shop serves ready to eat local snacks. The lady has set up the shop on a rented land, which the family also uses for accommodation. The rent for the shop is NRS 500 and the material for the temporary camp has been provided by the NGO, ACF. The electricity is generated through solar panels installed in the shop, which has also been provided by ACF.<br>The lady has studied till class 6 and is able to read, write and do basic calculations and hence a little handholding was required on managing the venture independently. She started the shop with an initial investment of NRS 3000 for buying raw material and other ready to eat snacks supplies for 1 month. She earns NRS 250 to 300 per day by selling the snacks. The NGO ACF has supported 7-8 females in the area to set up similar small shops. |
| **Key Inference** |
| A lot of people are setting up small shops near their IDP camps, in which initial infrastructural assistance is provided by NGOs. Females are preferring occupations close to their houses in order to manage both home/kids as well as productively use their |

**Migration to other Countries**

The survey and the consultations undertaken in May, 2017 showed that a lot of young population of the community is increasingly getting interested in foreign employment. About 13 percent of PAFs reported having family members migrate for labour and provided regular remittance. A number of other households also reported having family members who had gone for wage labour to foreign countries for a few years, and had saved money and subsequently returned back to Nepal. On the other hand, approximately 9 percent of the PAFs reported having a family member return from foreign employment due to the earthquake. About 63 percent of the PAFs surveyed, reported no change in the frequency and nature of migration in the household, in pre-earthquake and post-earthquake scenarios. Consultations found that migration to other countries had occurred earlier as well, but the number of people opting for and investing in this option is increasing.

The following figure provides an understanding of the main countries reported for migration.

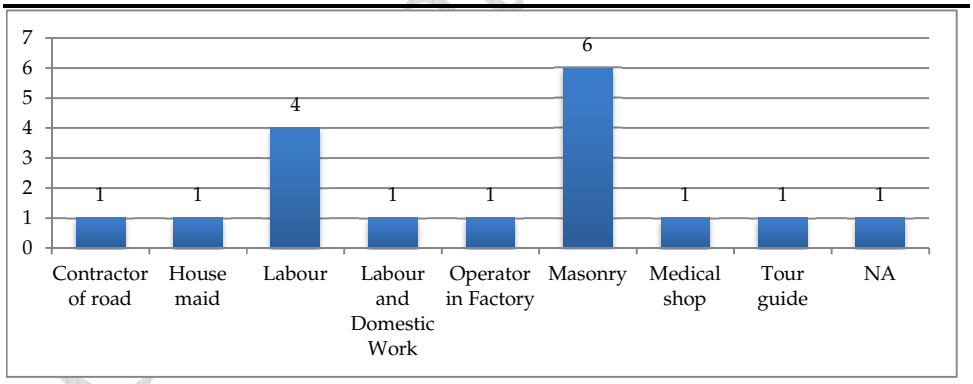
*Figure 4.24 Countries for Migration*




*Source*: LALRP HH survey, 2017 based on the responses given

As can be seen from the above figure, the most common country for migration presently is China (kerung and China-Nepal border). The following figure showcases the nature of work undertaken by those migrating for foreign employment.

*Figure 4.25 Nature of Activities undertaken*




*Source*: LALRP HH survey, 2017 based on the responses given

The women of Tamang community and especially PAFs also travel to foreign countries for a period of 3-4 years. The primary objective of foreign employment is reported to be the savings from the salaries that can be brought to Nepal and put to productive uses like buying land, construction of house, buying assets like trucks, etc.

*Tamang PAF in the village Phoolbari reported to have migrated to Malaysia for the purpose of undertaking wage labour for a period of 3 years. This employment was reported to be arranged through contractors who regularly take people to foreign countries for employment. For the purpose of meeting the expenses of reaching*

*Malaysia and the documentation process, the individual reported to have taken a loan of NR 1, 50,000. In turn, in 3 years, the individual reportedly earned more than NR 5, 50,000 of which he managed to save NR 2, 50,000, which is now used for meeting the larger expenses of the household, such as the education of the younger generation.*

There are a number of manpower/ staffing firms operating out of Kathmandu which deal in sourcing Nepali locals and placing them in factories, restaurants, beauty parlours/ saloons, etc. in countries like Malaysia, Dubai, Qatar, Jordan, etc. They reportedly charge a lump sum fees of around 1.5- 2 lac NPR for males and approx. 60,000 NPR for females, which includes their travel cost. The lodging facilities are provided by the employer or the local contact of these employment firms in the foreign countries, depending on the nature of work and type of agreement.

The beginners/ untrained people start with a basic salary equivalent to 10,000-12,000 NPR and the same is upgraded based on expertise and experience of the employee. During key informant discussions with certain PAFs who have been doing well, it was understood that the salary gets revised to approx. 30,000 NPR and with limited expenditure on lodging, food, etc. the people have reported to save nearly 5-7 lac NPR in a period of 3 years. Thus foreign employment has become one of the major sources of livelihood in the area.

### *4.2.7 Dependence on Natural Resources*

In the pre-earthquake scenario, an important resource for community in terms of livelihood dependence was the natural resources, in terms of forest and riverine resources. The forest resources are commonly used for extraction of timber, firewood (household consumption and sale), for foraging by livestock and collection of medicinal plants and Non Timber Forest Produce (NTFP).

In the 2015 survey, people reported that the river was sparingly used for water for fishing (sustenance and recreational) by approx. 13 households. The river stretch to be affected by the Project was also reported to be used during the dry season for drinking water and household needs such as washing of clothes and utensils and feeding and bathing cattle. Another use of the river was for irrigation where irrigation was being used at one location on 4 ropani plot of land, serving four households. The irrigation system was reported to be an earthen structure with no permanent diversion structure at the intake and was used for the cultivation of paddy during the monsoon.

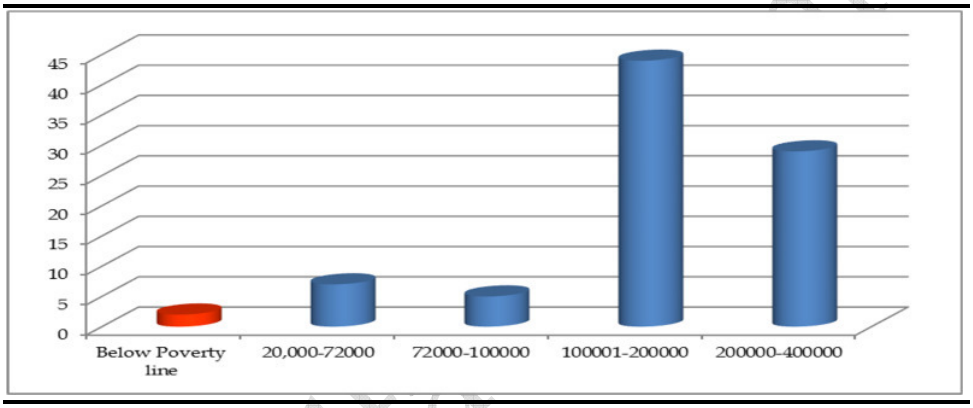
However, in the post-earthquake scenario, the dependence on natural resources reduced to almost negligible, especially for the families livening in the IDP camps. The only usage of natural resources reported is by members of the household who have returned to the original settlements for a temporary or permanent duration. Those living in the IDP camps have replaced the resources they used to get with LPG, solar lighting, and modern medicines. Furthermore, none of the PAFs surveyed reported any fishing activities. However, it should be noted that this is likely to be a temporary situation and

there is a possibility that fishing activities may resume once the local community returns to their original villages.

### 4.2.8 *Annual Income and Expenditure*

The following figure provides an understanding of the average income levels amongst the PAFs surveyed. Most of the PAFs (34%) were reported to have an annual income of 1, 00,001- 2, 00,000 NR. Almost 5% of the PAFs were also reported to have an annual income of more than 4, 00,000 NR. However, a limitation is that these income levels were reported based on approximation and recall value by the PAFs and may not necessarily provide an accurate picture. Furthermore, nearly 30 percent of the PAFs reported to have some form of savings, either in bank accounts or in cash.

***Figure 4.26 Income levels (NR) in PAFs Surveyed***

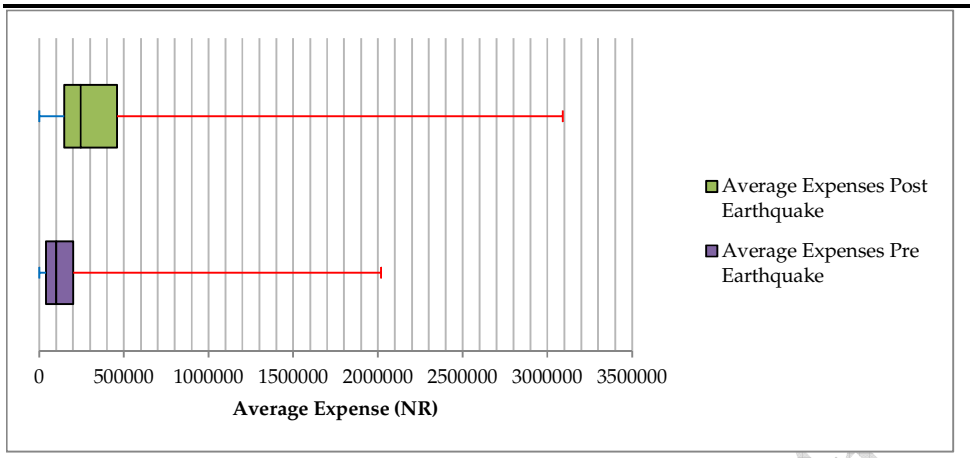



*Source*: LALRP HH survey, 2017 based on the responses given

In terms of expenditure, as can be seen from the figure below, the annual expenditure has increased significantly in the post-earthquake scenario, compared to pre-earthquake. This can also be seen in the fact that median[1] as in seen in the following figure, is reported to have shifted from NR 1,00,800 pre-earthquake to NR 2,45,250 post earthquake.

[1] The median denotes the value or quantity lying at the midpoint of a frequency distribution of observed values or quantities

*Figure 4.27 Expenditure Levels in Pre-Earthquake and Post-Earthquake Scenario*




*Source*: LALRP HH survey, 2017 based on the responses given

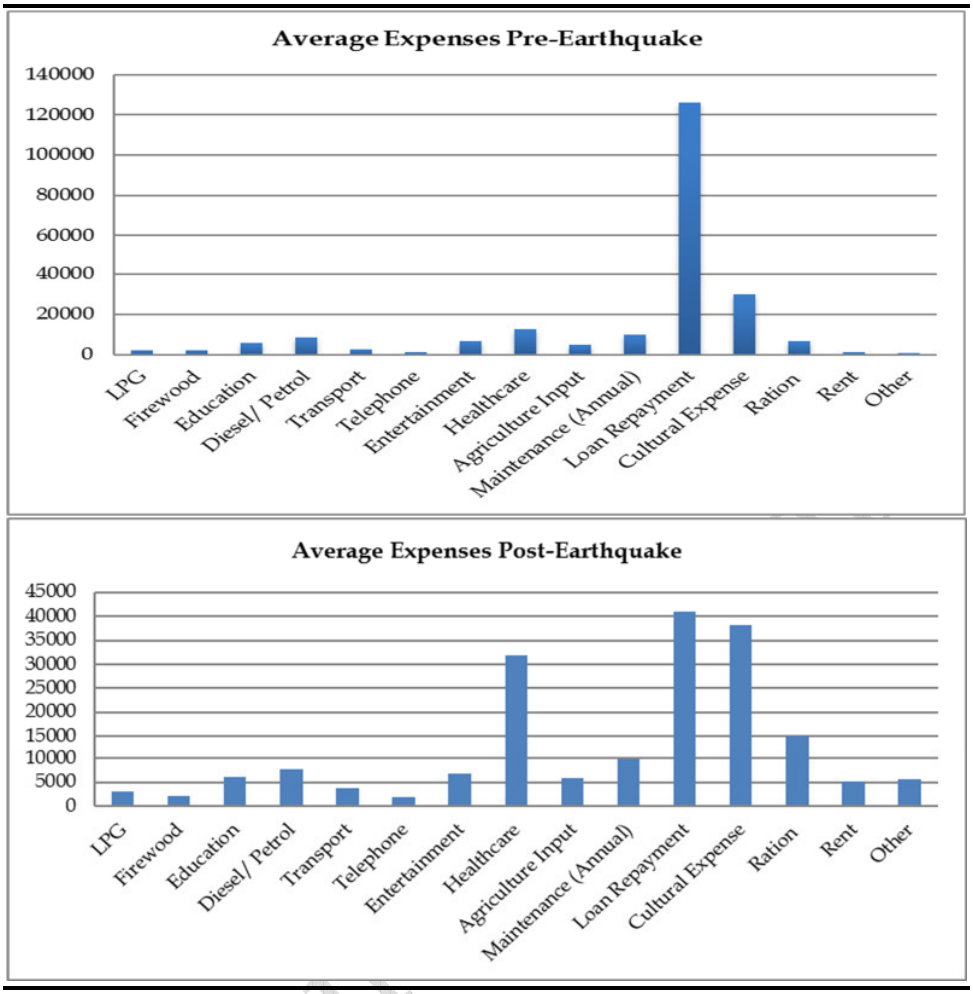
The average annual expenditure is reported to have increased from NR 1,86,749 in per-earthquake scenario to NR 4,20,444 in post-earthquake scenario(refer to ***Figure 4.28***). This is primarily attributed to the following reasons:

- The spending on ration, healthcare, LPG, maintenance, transport, telephone, rent and cultural expenses has increased.
- New expenses have arisen, in the post-earthquake scenario. For instance, earlier the primary fuel source was fuel wood, which was procured free of charge from the neighbouring forest. Now, in the post-earthquake scenario, the PAFs are dependent upon LPG which has to be purchased. Furthermore, any fire wood used also has to be purchased from the market. Similarly, while earlier, the PAFs primarily consumed Kodo millet[1] and vegetables grown in kitchen gardens , they are now dependent upon rice and vegetables, which is purchased from the market;
- While the dependence on agriculture as a source of livelihood has significantly reduced, the average expenditure by PAFs on agricultural input has increased post-earthquake.

The major expenses include loan repayment followed by cultural expenses, healthcare, ration and annual maintenance.

[1] A wild cereal grown in the mountainous regions

*Figure 4.28 Average Expenses Pre-Earthquake and Post-Earthquake*




*Source*: LALRP HH survey, 2017 based on the responses given

One of the reasons attributed for this change in spending patterns, is the proximity to urban areas and an increased access to lifestyle goods and products and higher costs of basic goods, as compared to goods and products accessible to them closer to their villages.

### 4.2.9 *Social and Physical Infrastructure*

This sub section provides an understanding of the physical and social infrastructure accessibility in the Project area and to PAFs and the changes in the same post-earthquake..

*Health Facilities*

In the pre-earthquake scenario, the PAFs had reported a preference for the government hospital in Dhunche, followed by traditional healers, government health post and medicinal plants. Post-earthquake, the access to medical services has improved for the PAFs, which has been accompanied by a reduction in the dependence on traditional and natural medicine.

However, the living conditions post-earthquake have deteriorated leading to increase in diseases prevalent amongst the local community. A common factor is lack of sanitation and hygiene as well as relatively higher temperatures in the plain areas that the people are not used to.

*Electricity*

The main sources of energy for lighting purposes in the Project area, pre-earthquake, were reported to be kerosene and electricity, with a majority of the households being connected to the NEA grid for electricity. The PAFs had reported a dependence on LPG and kerosene for electricity, with none of the PAFs reporting electricity as a source of energy. Apart from kerosene, LPG and electricity, the other key sources of lighting in the Project area; pre-earthquake were reported to be *Diyalo*[1]. However, in the present scenario, most of the PAFs are dependent upon solar energy for lighting purposes. This source of energy is in the form of one or two bulbs connected to a small solar panel for each individual household. These solar panels and bulbs are reported to have been provided by NGOs/INGOs as part of the relief activities. Only the PAFs, who have returned to the original villages, are likely to be using more kerosene and Diyalo.

*Water and Sanitation*

In the pre-earthquake scenario, 45% of the PAFs had reported to having access to piped water at the community level. This tap water was reported to be sourced by the laying of a pipeline from a close by stream to a common location where the community can collect water. On the other hand, 39.17% of the PAFs were reported to be directly dependent upon the springs in the area for drinking water in 2015. In addition to this, some PAFs had also reported dependence upon the river, canal, ponds or dug wells for their daily needs.

However post-earthquake, most of the springs and streams used by the local community for household purposes and irrigation have dried up or disappeared. This has created a severe issue of water availability for those PAFs who wish to return to the original village permanently. In the IDP camps, the local community and PAFs, have access to piped water at the community level.

The PAFs were reported to have an improved access to sanitation in the post-earthquake scenario, with all the IDP camps having community toilets and bathrooms. There were a few households who were reported to have individual toilets as well, but this number of scarce and limited to the households who were economically well-off. However, due to the high population density, these camps have high risks of diseases and sanitation problems.

[1] wooden strips of pine trees and firewood

*Means of Communication*

There is a marked improvement in connectivity and means of communication for the PAFs and local community in the post-earthquake scenario. While, in the complementary baseline, 88% of the surveyed PAFs had reported access to mobile phones, presently 100% of the surveyed PAFs have access to at least one mobile phone in the household. Furthermore, due to the proximity to roads and urban areas, the amount of time spent travelling to key urban centres such as Kathmandu, Dhunche, Betravati etc. has decreased.

### *4.2.10 Vulnerable Population*

It is acknowledged that Tamang community as a whole is an Indigenous group and vulnerable in the context of Nepal. However, in the context of the impact of the earthquake on the community; vulnerability needs to be re-examined. All PAFs are vulnerable due to their pre-earthquake socio-economic status, and, the impacts of the earthquake on shelter and livelihoods. However, in addition to this broader vulnerability, certain PAFs have been identified as even more vulnerable due to certain key socio-economic vulnerabilities. The following vulnerable groups within the larger vulnerable PAF group have been identified:

- Those without any potential source of income;
- Those without any productive agricultural land;
- Physically or Mentally differently abled;
- Elderly (60 years and above); and
- Single women headed households;

It should be noted that there may be households with multiple sources of vulnerability. This also does not detract from the larger vulnerability of the PAFs as a group. The total number of PAFs identified, with one or more form of enhanced socio-economic vulnerability is 114.

*Table 4.9 Vulnerable Groups Identified*

| Type of Vulnerability | Total |
|---|---|
| Broader Vulnerability Identified | 142 PAFs |
| Specific groups with enhanced vulnerability within larger population | |
| Differently Abled | 11 PAPs |
| Lack of any potential source of income | 25 PAFs |
| Landless or Lack of Productive Agricultural land | 76 PAFs |
| Elderly | 39 PAPs |
| Single Women Headed Household | 9 PAFs |

*Source*: LALRP HH survey, 2017 based on the responses given

However, it should be kept in mind, is that this present understanding of the vulnerability of the households is based on the existing conditions and any change in the same would result a change in the vulnerability of the PAFs.

These groups have been identified as vulnerable in keeping with their ability to adjust and adapt to stressors and impacts which may be caused due to the Project or other factors. However, it should be noted that the cause and extent of vulnerability and consequently the ability to adapt varies across these groups. For instance, vulnerabilities associated with lack of any potential source of income, productive land or physically/mentally challenged can be assisted or mitigated through targeted livelihood support mechanisms or diversion of dependence on certain key resources. However, the vulnerabilities associated with old age or gender based vulnerabilities are caused by societal and cultural constraints. For this purpose, specific targeted initiatives are required. These vulnerabilities require a larger change in the socio-cultural setting of the community. Stakeholder Identification and Analysis

This section identifies the various stakeholders relevant to the LALRP implementation process and evaluates their level of influence in the Project and the impact of Project on them.

A stakeholder is "a person, group, or organization that has a direct or indirect stake in a Project/organization because it can affect or be affected by the Project/organization's actions, objectives, and policies". While those stakeholders who are likely to be directly impacted or have a direct impact on the Project activities are known as **Primary Stakeholders**, while those who are likely to have an indirect impact or are to be indirectly impacted are known as **Secondary Stakeholders**.

"Stakeholder mapping" is a process of examining the relative influence that different individuals and groups have over a Project as well as the influence of the Project over them. The purpose of a stakeholder mapping is to:

- Identify each stakeholder group;
- Study their profile and the nature of the stakes;
- Understand each group's specific issues, concerns as well as expectations from the Project
- Gauge their influence on the Project;

The significance of a stakeholder group is categorized considering the magnitude of impact of the Project on the stakeholder or degree of influence (power, proximity) of a stakeholder group on the Project functioning. The significance of the stakeholder group importance for the Project and the requirement for engaging with them is identified as an interaction of the impact and influence. The matrix for significance is as depicted in the table below.

*Table 5.1 Stakeholder Significance and Engagement Requirement*

| | | Influence of/by Stakeholder on Project | | |
|---|---|---|---|---|
| | | **Low** | **Medium** | **High** |
| **Magnitude of Impact of Project** | Negligible | Negligible | Negligible | Negligible |
| | Small | Negligible | Minor | Moderate |
| | Medium | Minor | Moderate | Urgent |
| | Large | Moderate | Urgent | Urgent |

On the basis of this understanding, the following stakeholder groups have been identified and analysed. The following table provides a summary of the stakeholder identification and analysis for the Project. The Stakeholder Engagement Plan provides the detailed stakeholder mapping undertaken.

*Table 5.2 Summary of Stakeholder Identification and Analysis*

| Stakeholder Category | Stakeholder Group | Magnitude of Impact/ Influence | Stakeholder Significance |
|---|---|---|---|
| Primary Stakeholder | | | |

| Stakeholder Category | Stakeholder Group | Magnitude of Impact/ Influence | Stakeholder Significance |
|---|---|---|---|
| Community | Project Affected Families and People | Impact of Project on Stakeholder: Large<br>Influence of Stakeholder on Project: Medium | Urgent |
| | Vulnerable Groups | Impact of Project on Stakeholder: Large<br>Influence of Stakeholder on Project: Low | Moderate |
| | Local Community in AoI | Impact of Project on Stakeholder: Large<br>Influence of Stakeholder on Project: Medium | Urgent |
| Institutional Stakeholders | SIMF Implementation Partners and NGOs | Impact of Project on Stakeholder: Medium<br>Influence of Stakeholder on Project: High | Urgent |
| Government Bodies | Regulatory Authorities | Impact of Project on Stakeholder: Small<br>Influence of Stakeholder on Project: High | Moderate |
| Other Groups | EPC contractors and sub-contractors | Impact of Project on Stakeholder: Medium<br>Influence of Stakeholder on Project: High | Urgent |
| Secondary Stakeholder | | | |
| Community | Local Community Leaders | Impact of Project on Stakeholder: Large<br>Influence of Stakeholder on Project: Medium | Urgent |
| Institutional Stakeholders | Project Financing Agencies | Impact of Project on Stakeholder: Large<br>Influence of Stakeholder on Project: High | Urgent |
| | Gaunpalika/ VDC Institutions | Impact of Project on Stakeholder: Medium<br>Influence of Stakeholder on Project: Low | Minor |
| | Jan Sarokar Samiti | Impact of Project on Stakeholder: Medium<br>Influence of Stakeholder on Project: Medium | Moderate |
| Government Bodies | Rasuwa District Administration | Impact of Project on Stakeholder: Small<br>Influence of Stakeholder on Project: High | Moderate |
| | Government Bodies working on Community Development Activities | Impact of Project on Stakeholder: Small<br>Influence of Stakeholder on Project: Medium | Minor |
| Other Groups | Local Political Groups | Impact of Project on Stakeholder: Medium<br>Influence of Stakeholder on Project: Medium | Moderate |
| | Media | Impact of Project on Stakeholder: Small<br>Influence of Stakeholder on Project: High | Moderate |
| | NGos/CSOs operating in the area | Impact of Project on Stakeholder: Small<br>Influence of Stakeholder on Project: High | Moderate |



## 5.1 *KEY FEEDBACK AND CONCERNS*

As part of the LALRP update, ERM undertook stakeholder consultations with certain key stakeholder groups identified above. While the effort was to get the people to talk about their current issues and concerns, the primary purpose was also to discuss the UT-1 Project and community expectations. However it was clear that the priority of the community was their present condition, and uncertainty of livelihoods and housing. It was extremely

difficult to get people to discuss the Project. ER recorded all these consultations, and some key issues that emerged are summarised below:

- **Access to Relief Support:**
  - The perceived difference in access to relief support across the camps. It was reported that, due to interventions of local political leaders, IDP camps such as Naubise and Bogetitar received most of the relief support from numerous NGOs/ INGOs. However, the camps such as Satbise, with no strong political leader, did not receive any relief support from any NGO/INGO.;
- **Issues related to Housing**
  - The local community representatives reported various issues associated with residing in IDP camps. These issues included, lack of space, health and sanitation issues, as well as the inability to establish a stable of source of livelihood. Due to the lack of space and uncertainty of the duration of stay in IDP camps, many households have been unable to establish a stable of income or initiate a business activity (such as livestock farming or setting up a small shop);
  - The community is more concerned about the housing issue and is also concerned about next steps They have an expectation that NWEDC will also do something about housing issue;
- **Key Learnings from Trainings Received**
  - Many of the local community residents took trainings without fully understanding the skill and it's potential. The primary aim immediately post- earthquake was to get as much relief support as possible. However, this resulted in many members of the community, especially women and youth, in taking trainings in which they had no interest in and subsequently not using the skill gained;
  - According to the discussion with the women groups, most of the trainings provided to women was geared towards household skills, such as sewing and tailoring, vegetable gardening etc. and not livelihood generation. Furthermore, while some women received trainings such as making Pangi[1] no market linkage was provided as part of the trainings. This all resulted in most of the women, using the skills obtained from the training, sporadically and for mostly for meeting household needs only;
  - According to the discussions with certain PAFs and youth representatives, the NGOs/INGOs provided similar trainings in the IDP camps, with a focus on skills such as masonry. This has reportedly resulted in a difference in the demand and supply of masonry jobs. Furthermore, over the last few months, there has been a reduction in the number of masonry or construction labour related jobs available. This is reported to be resultant from most of the reconstruction activities post-earthquake having been completed. Also the training on masonry did not include working with Cement and concrete rather

[1] Pangi is a traditional woolen apron worn by Tamang women. This apron is also a symbol of the women's marital status

with the local material which has limited their opportunity in urban areas;

- **Adequacy of compensation provided:**
  - a number of the land owners who sold their land to the Project, expressed dissatisfaction for the compensation provided for the land and other assets provided by the Project.
  - This was reported to be primarily resultant from the large number of claimants/dependents upon the reportedly non-payment of compensation for certain other assets impacted.
  - It was understood that, in a number of cases, while the land was registered under a single individual's name, the families who were dependent upon the land resided in separate households. This was primarily the case in situations where the land was in the name of one individual, whose children and/or grand children had established separate households after marriage, but the official partition of the land had not been undertaken.
  - Furthermore, in cases where the number of dependents was high, after the division of the compensation, the amount per head was not enough for the individuals to allow for the restoration of the livelihoods in terms of purchase of alternative land or establishing a business.
  - Also, the land owners had earlier asked for NPR 10 lakh per ropani as the compensation amount for the land take. However, this was negotiated to NPR 5 lakh per ropani by the Project.
  - The land owners also preferred the land to be leased by the Project, as it would have provided a regular source of income. However, due to the nature of Project land requirement, the same was not feasible;
  - Also, compensation for the trees and certain structures was not provided by the Project.
- **Impact on access to natural resources:** according to the consultations undertaken, it is understood that the Project has resulted or will result in loss of access to natural resources such as forest resources and fishing resources. The community was of the opinion that the Project activities resulted in the loss of more trees than had been marked as part of the lease agreement. This is reported to primarily be resultant from the debris from the road construction activities falling downslope, onto land that is not part of the lease agreement or purchased from the land owners, and by the migrant labour accessing the forest for firewood.
- **Issues in Project Implementation**
  - The PAFs have a concern that the current Sarokar Samiti for the Project does not have adequate representation of the people from Haku. While all the PAFs (land owners or tenants on Guthi land), reside in Haku VDC and now in IDP camps, the Sarokar Samiti and its deliberations for the Project does not have their participation.;
  - during the consultations undertaken, the community representatives informed ERM that during the negotiations for the land procurement, the Project had promised employment for one member from each impacted family in the Project. However, the members of the community are yet to get employment in the Project. The community

also expressed unhappiness over the fact that contractual work for the access road was awarded to outside contractors instead of the local community.

- Some of the PAFs also had concerns regarding delays in the payment in the access road construction by the responsible sub-contractor. The concerned PAFs had communicated this issue to NWEDC, in a verbal and informal manner. Through the subsequent intervention by NWEDC, half of the payment have been made at the time of the site visit and the remaining was expected to be paid shortly. It was highlighted as a major concern Without 7 days cycle of payment or 15 days cycle of payment, it could become really difficult for the PAFs to get engaged in the construction work for the Project. NWEDC was understood to have taken cognizance of this issue and was in discussions with the sub-contractor to streamline the payment process. This process was reported to be closed at the time of preparation of the LALRP;
- Though PAFs mostly responded that they don't see a major challenge with the influx of workers as there has been good relationship with them in the past. They feel that the labourers will buy from the locals; however they have a concern that wage rates will be reduced because of the influx of the workers from outside;

It is understood, that while the community and other stakeholders have some concerns regarding the Project, the overall perception is positive. The community in most parts, views the Project as a source of local development in the area. This is primarily in the form of improvement in access through the construction of the access road and also employment opportunity generation. The community is aware of the benefit sharing requirements in the PDA.. The relations between the community and NWEDC were further strengthened by the earthquake relief and reconstruction efforts by the Project.

This section provides an assessment of the Project's land acquisition and livelihood impacts, along with the mitigation measures agreed to by NWEDC. These impacts are discussed in the context of the earthquake and the resulting social conditions in the Project area. Table 6.1 summarizes these impacts, but overall, the Project required the:

- Acquisition of 107.79 hectares (ha) of land from 38 land owners and tenants and temporary land lease from 11 individuals, representing 149 Project Affected Families (PAF);
- Acquisition of 36 structures, including primary residences of 12 PAFs, although not all were occupied at the time of acquisition; and
- Acquisition of government-owned Community Forest land managed by five CFUG representing 422 members (families).

*Table 6.1 Summary of Project Related Impacts*

| Type Of Impact | Owners / Families Affected | % Tamang (IP) | Mitigation Process / Timing | Compensation Status |
|---|---|---|---|---|
| Pre-Earthquake Land Acquisition / Resettlement | | | | |
| Private-owned Land: 5.05 ha acquired<br>Guthi Land: 15.5 ha acquired | 38 owners (20 private, 18 Guthi) collectively including 142 families | 89 | Negotiated purchase, cash compensation (2013-14), based on higher than market rates (two rates, slightly higher rate for land near road in Mailung) at that time (rate decided in consultation with land owners and Rasuwa DAO). The rates were reinforced by the Compensation Fixation Committee formed in 2013 at the District level) | Completed in (2014) except for 1 Guthi tenant (8 PAFs) lacking proof of tenancy. NWEDC has committed to providing compensation once tenancy certificate is obtained by this one tenant |
| CFUG Land: 78.6 ha of Government owned, but CFUG managed, forest land acquired | 5 CFUGs involving 422 members from the same eight affected villages. Affected forestland represents around 11% of total forest land administered by these CFUGs | 100 | Lease agreement, led by District Forest Office (10 September 2013), compensation paid for 3856 lost trees/seedlings, felled trees made available to members | Completed in October 2013. Additional compensation pending for trees impacted outside of the Project footprint from construction activities. Compensation amount will be provided to remaining CFUG based on evaluation made by Department |

| Type Of Impact | Owners / Families Affected | % Tamang (IP) | Mitigation Process / Timing | Compensation Status |
|---|---|---|---|---|
| | | | | of Forest in consultation with concerned community forest |
| Loss of trees/crops | Approximately 2554 trees/saplings were impacted (this was based on the socio-economic survey done in 2015). These trees were located on land belonging to 21 land owners, and 53 PAFs | 95 | No stand-alone payments, compensation was incorporated into the land payment. | Completed in (2014) except for 1 Guthi tenant (8 PAFs) lacking proof of tenancy |
| Loss of Structures | 29 structures belonging to 21 families: 7 primary residences, 5 secondary (seasonal) residences, 8 partially constructed residences , 8 sheds, 1 watermills etc | 95 | Cash compensation based on valuation by DUDBC in 2014 | Partially completed in (2014). Payments outstanding for 7 structures which were incomplete at time of valuation; additional payments pending for replacement cost discrepancies for 10 structures |
| Physical Displacement | 7 individuals (5 additional PAFs) lost primary residences in 2015 (other 13 families losing structures did not lose primary residences). | 100 | As above | Completed in 2015, for 7 primary residences. 3 families used money to construct new houses in their village. 4 families constructed houses elsewhere (Dhunche, Thade). |
| Other natural resources | Future reduction in water flow in diverted section could impact community use of river for drinking, washing, cattle-related uses, minor fishing activities, small scale irrigation | 95 | Communal impacts (future), likely to be offset by means of CSR and local benefits programs | Any future impacts identified will be addressed through the GRM in place for the Project and offset by means of CSR and benefit program |
| Post-Earthquake Land Acquisition / Resettlement | | | | |
| Land: 8 ha | 11 Individuals impacted by temporary land take. | 100 | Cash compensation / lease agreement? | Agreement completed on 26 February, 2018 |
| Physical Displacement | An addition 5 individuals have | 100 | Cash compensation + livelihood restoration | Cash compensation completed in March, 2018 |

| Type Of Impact | Owners / Families Affected | % Tamang (IP) | Mitigation Process / Timing | Compensation Status |
|---|---|---|---|---|
| | lost 7 primary residences in 2017. | | | |

## 6.1 IMPACT ON PRIVATE LAND AND GUTHI LAND

### 6.1.1 Context

A total of 107.79 ha of land has been procured for the Project. Of this, 15.53 ha of land is Guthi land and 5.05 ha is private land. The impacted Guthi land belongs to a Monastery at Swayambhu in Kathmandu and comprised of 29 agricultural plots on which 60 PAFs are dependent. The private land take is comprised of 21 land parcels on which 82 PAFs are dependent. The parcels of land already acquired were primarily located in the former Haku VDC in the villages of Tiru, Gogone, Haku Besi, Phoolbari, Thanku, Mailung and Sanu Haku.

The land take of private and Guthi land parcels has resulted in a reduction of the total land holdings and agricultural land available for the PAFs. The parcels of private and Guthi land already acquired for the Project are characterised as either irrigated (khet) or rain fed (Bari) land.

According to the information made available by the District land and agriculture departments, most of these lands do not have high agricultural value. In most instances, the land was used as agricultural land; however 4 to 5 PAFs indicated that they were not cultivating the land recently for various reasons including their land becoming less productive or general lack of access to resources (including manpower and financial resources) to cultivate in the hills. The following table provides an understanding of the land owners/tenants and PAFs impacted by the land take for the Project and the remaining land parcel with them.

*Table 6.2 List of land Loser for UT-1 Project*

| S.No. | Location | Land Loser ID | Number of PAFs associated with land loser | Area lost (in Ha) | Remaining land (in Ha) | Use of Land |
|---|---|---|---|---|---|---|
| **Private Land** | | | | **3.96** | | |
| 1 | Mailung | MAI-25 | 4 | 0.15 | 0.11 | Agriculture |
| 2 | Mailung | MAI-02 | 1 | 0.20 | 0.11 | Agriculture |
| 3 | Mailung | MAI-06 | 4 | 0.10 | 0.03 | Agriculture |
| 4 | Gogone | GOG-03 | 1 | 0.19 | 0.21 | Agriculture |
| 5 | Mailung | MAI-38 | 1 | 0.25 | 0.16 | Agriculture |
| 6 | Gogone | GOG-34 | 5 | 0.15 | Information not available | Agriculture |
| 7 | Mailung | MAI-29 | 3 | 0.15 | 0.53 | Agriculture |
| 8 | Mailung | MAI-37 | 1 | 0.25 | 0.16 | Agriculture |

| S.No. | Location | Land Loser ID | Number of PAFs associated with land loser | Area lost (in Ha) | Remaining land (in Ha) | Use of Land |
|---|---|---|---|---|---|---|
| 9 | Mailung | MAI-01 | 4 | 0.18 | Information not available | Agriculture |
| 10 | Gogone | GOG_07 | 7 | 0.19 | 0.04 | Agriculture |
| 11 | Haku Besi | HAK-15 | | 0.15 | Information not available | Agriculture |
| 12 | Gogone | GOG-39 | 8 | 0.27 | 0.32 | Agriculture |
| 13 | Mailung | MAI-11 | 10 | 0.09 | Information not available | Agriculture |
| 14 | Gogone | GOG-01 | 6 | 0.15 | Information not available | Agriculture |
| 15 | Gogone | GOG-13 | 4 | 0.16 | 0.60 | Agriculture |
| 16 | Mailung | MAI-22 | 3 | 0.16 | Information not available | Agriculture |
| 17 | Mailung | MAI-39 | 3 | 0.21 | 0.16 | Agriculture |
| 18 | Mailung | MAI-32 | 5 | 0.15 | 0.05 | Agriculture |
| 19 | Mailung | MAI-10 | 1 | 0.20 | 0.03 | Agriculture |
| 20 | Gogone | GOG-17 | 17 | 0.59 | Information not available | Agriculture |
| **Swyambhuguthi** | | | | **15.53** | | |
| 21 | Phoolbari | PHO-01 | 1 | 1.89 | 0.01 | Agriculture |
| 22 | Haku Besi | HAK-01 | 5 | 1.44 | 15.00 | Agriculture |
| 23 | Haku Besi | HAK-06 | 1 | 0.15 | 0.21 | Agriculture |
| 24 | Haku Besi | HAK-07 | 3 | 0.15 | 5.00 | Agriculture |
| 25 | Haku Besi | HAK-10 | 3 | 0.68 | 0.03 | Agriculture |
| 26 | Haku Besi | HAK-13 | 4 | 1.6 | 1.05 | Agriculture |
| 27 | Phoolbari | PHO-02 | 2 | 0.49 | 0.26 | Agriculture |
| 28 | Haku Besi | HAK-17 | 1 | 0.18 | 0.04 | Agriculture |
| 29 | Haku Besi | HAK-18 | 1 | 0.18 | 0.01 | Agriculture |
| 30 | Phoolbari | PHO-04 | 8 | 0.06 | 1.00 | Agriculture |
| 31 | Phoolbari | PHO-12 | 7 | 0.40 | 6.50 | Agriculture |
| 32 | Haku Besi | HAK-10 | 3 | 0.70 | 0.03 | Agriculture |
| 33 | Haku Besi | HAK-19 | 5 | 1.47 | 1.00 | Agriculture |
| 34 | Phoolbari | PHO-19 | 3 | 2.60 | 9.00 | Agriculture |
| 35 | Thanku | THA-01 | 7 | 0.65 | 0.00 | Agriculture |
| 36 | Haku Besi | HAK-26 | 2 | 1.09 | Information not available | Agriculture |
| 37 | Haku Besi | HAK-24 | 2 | 1.25 | 0.01 | Agriculture |
| 38 | Phoolbari | PHO-22 | 2 | 0.54 | 0.05 | Agriculture |

*Source:* NEWDC, 2014 and Data collected by ERM, 2015

**Note:**

1. **This information, especially the remaining land is based on consultation and individual interviews with the PAFs and is not based on review of the family's land records There could be discrepancies between what was reported and what is actually in possession and being used.**

Seven PAFs have lost all land parcels belonging to them (0.65 ha) and the houses they used to live in. However, they were able to purchase replacement land with the compensation money, which was paid in advance of the land take. These land owners bought land near Dhunche (near the road) in an area with improved access by public road.

### 6.1.2 *Land Acquisition Process*

This section provides an understanding of the land take process for the private land and Guthi land.

***Private Land***

The private land take process for the Project was undertaken on the basis of negotiated settlements[1] with the land owners in most of the cases. The following table provides an understanding of the key timelines for the land take process.

***Table 6.3 Timeline of Private Land take***

| Year | Process |
|---|---|
| 2007 | Land Identification for Power House |
| 2009 | Land Survey for Power House |
| 2010 | Land Finalization for Power House and Initiation of land procurement Process |
| September – October 2012 | Public Meetings at Mailung, Haku Besi and Gogone |
| December 2012 | Measurement of private lands |
| January 2013 | More Meetings in the community |
| February 2013 | Land Price negotiations with land owners |
| March 2013 | Community Meeting and finalization of compensation amount |
| May 2013 | Payment of Compensation by District Administrative Office (DAO) to remaining land owners |
| June 2013 | Asset Evaluation |
| August 2013 | Request to DAO to facilitate the land take process for the families having internal problems with payment sharing |
| 2014 | Initiation of road construction activities and completion of complimentary ESIA |

*Source:* Consultations undertaken during site visit, 2015

As can be seen from the above table, the asset valuation for the Project was undertaken separately, after the completion of the negotiations for the land take and initiation of the compensation payment process. The process for the private land take by NWEDC involved the following key steps:

- surveys for land identification;
- the assessment of existing land value of the plots of land identified;
- negotiations with the land owners for the rate of the land parcels;
- Payment of compensation amount; and
- Transfer of ownership and tenancy rights to NWEDC.

The following sub-sections provide an understanding of the key steps identified:

(1) [1] PS 5 defines negotiated settlement as a situation where buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail.

*Identification and Survey of Land Parcels*

The land identification activity was initiated in 2007 through visual reconnaissance and surveys. These surveys were undertaken by the Project team in 2009 to 2010. All the relevant cadastral maps were obtained from Rasuwa District Survey Office. The Project layout maps were geo-referenced on the cadastral maps to identify the private land parcels. The Rasuwa District Land Revenue Office and Lands and Survey Department provided the following information for the identified parcels:

- Category of land/Grade of land;
- Area of Land;
- Land Owner's Name; and

VDC/ward number and other details

During this stage of the process only limited consultation was undertaken with key informants to identify land ownership, no negotiations or engagement with the land owners or local community were undertaken.

*Land Valuation*

NWEDC initiated the land parcel valuation process in 2007. For the purpose of assessing the value of the land identified, the Project depended upon the information available with the land records department. During the consultations with the land department, it was mentioned that the land type in the Project area was consistent with the government records and the grade of land also informed the assessment of rates for the land.

For the purpose of the fixing the rate of the land compensation, NWEDC, in consultation with the District authorities, identified the compensation rates payable at NR 5 lakh per *ropani*[1] for the land procurement, which was based on the following data:

- District Administration Office published land rates per ropani.
- Transaction details of similar land in the last 2-3 years;
- Private transactions in the current year; and
- Land transaction rates for other projects in the area;
- General understanding of the market rate in the area.

It is common practice in the area that land registration and transactions are usually done at lower rates to avoid taxation; hence, the general understanding of the market rate in the local area, which was established by NWEDC, was essential.

These rates were also reinforced by the Compensation Fixation Committee (CFC) formed at the district level in 2013.

(2) [1] Unit of land in Nepal (1 ha = 19.66 ropani);

*Process for Negotiation and Agreement on Rates*

Upon the completion of the land finalization and market assessment, NWEDC initiate the process of negotiations with the land owners through its land team. This process included meetings with the land owners, which was initiated in 2012. In some cases, NWEDC conducted the meetings at an individual household level; however, it was primarily undertaken at the community level to get a sense of the general willingness of the community towards selling the land and the expectation of the community on land valuation.

Meetings were primarily undertaken at the ward level and mutually acceptable rates were agreed. The first negotiation for the private land rates took place in Mailung, followed by Gogone and Haku Besi. The purpose of these meetings was to provide the land owners and other community representatives with information pertaining to the Project, the land requirement for the Project, and the proposed entitlements/compensation.

These meetings were followed by a public hearing, held in March 2013, after the completion of the EIA. The purpose of the public hearing was to provide a more detailed Project understanding and finalize the compensation amount for the land purchase.

According to the information made available during the ERM consultations in 2015, the land owners had initially demanded a compensation rate of NR 10 lakh per *ropani*, which was subsequently negotiated to NR 5 lakh per *ropani*. The first agreement was made in Mailung, which actually set the precedent for the rest of the wards to follow. For the land plots located along the road in Mailung, a higher rate of NR 6,50,000 was offered.

*Payment of Compensation*

Some of the key aspects related to the compensation process were as follows:

- The compensation for the land take was paid through cheques in the early months (April- May) of 2013, which was prior to the hand-over of the land to the Project. This was primarily done to allow the impacted land owners to purchase alternate land parcels or invest in other sources of livelihood prior to the loss of land, and thus minimize the impacts from the sale of land.
- Some of the families from Gogone, however, did not accept the compensation, as they did not agree with the compensation rate offered. In these cases, the cheques were deposited with the Rasuwa District Administrative Office (DAO), to be collected by the land owners at a later date.
- Some of the families did not accept the compensation due to internal conflicts within the family. In 13 land parcels, there were questions pertaining to ownership of the land. In these cases, the DAO was

requested to resolve ownership issues. The DAO facilitated separation of the plot of the land owned by head of family ultimately resulting in the partition of family, at least on paper.

DAO office published a notice, through which claimants were asked to raise any objection within 21 days of publishing of the notice. A copy of the Notice published by DAO is shown in ***Figure 2.1.***

*Figure 2.1 Land Procurement-related Notice Issued by District Administration Office*

नेपाल सरकार
गृह मन्त्रालय
जिल्ला प्रशासन कार्यालय
रसुवा

**माथिल्लो त्रिशुली १ जलविद्युत आयोजनाले जग्गा अधिग्रहण गर्ने सूचना**

प्रथम पटक प्रकाशित मिति २०७०/०१/०९

नेपाल सरकारबाट अनुमती प्राप्त माथिल्लो त्रिशुली १ जलविद्युत आयोजनाको विभिन्न संरचना निर्माण कार्यको लागि आवश्यक पर्ने तपसिलमा उल्लेखित जग्गाहरु अधिग्रहण गर्नु पर्ने भएकोले सो जग्गाहरु प्राप्त गर्नको लागि प्राप्ती ऐन २०३४ को दफा ९ क प्रयोजनार्थ सम्बन्धित सबैको जानकारीको लागि यो २१ दिने सूचना प्रकाशित गरिएको छ ।

| सि. नं. | साविक कि.नं. | हालको कि.नं. | गा.वि.स. | ज.ध.को नाम | बाबु वा पतिको नाम | जग्गाको क्षेत्रफल | प्राप्त गर्नु पर्ने जग्गाको क्षेत्रफल |
|---|---|---|---|---|---|---|---|
| १ | १०८ | १०८ | हाकु - ९ | क्रिङ तामाङ | सन्च तामाङ | १-१४-३-२ | १-१४-३-२ |
| २ | ११४ | ११४ | हाकु - ९ | दर्ता घले | नुर्गेल घले | ३-३-३-२ | ३-३-३-२ |
| ३ | ११५ | ११५ | हाकु - ९ | तामामा तामाङ | भर्वो फुन्चो | ११-८-१-० | ११-८-१-० |
| ४ | ११६ | १५२ | हाकु - ९ | वाङलामा तामाङ | गोम्बो तामाङ | ५-४-२-० | ५-४-२-० |
| ५ | ११६ | १५५ | हाकु - ९ | फुर्वा तामाङ | गोम्बो तामाङ | २-०-०-० | २-०-०-० |
| ६ | ११६ | १५६ | हाकु - ९ | सोनाम तामाङनी | पति गोम्बो तामाङ | १-०-०-० | १-०-०-० |
| ७ | ११७ | १७१ | हाकु - ९ | छ्योवाङ तामाङ | दुन्दुप तामाङ | ५-०-०-० | ५-०-०-० |
| ८ | ११७ | १७२ | हाकु - ९ | वीरमान तामाङ | दुन्दुप तामाङ | ५-०-०-० | ५-०-०-० |
| ९ | ११७ | १७३ | हाकु - ९ | निमा तामाङ | वीरमान तामाङ | ४-०-२-३ | ४-०-२-३ |
| १० | ११८ | १६७ | हाकु - ९ | साजन तामाङ | ल्हानुर्पु तामाङ | ३-०-०-० | ३-०-०-० |
| ११ | ११८ | १६८ | हाकु - ९ | अजय तामाङ | ल्हाक्पा तामाङ | ३-०-०-० | ३-०-०-० |
| १२ | ११८ | १६९ | हाकु - ९ | चन्द्रमान तामाङ | जीतमान तामाङ | ३-०-०-० | ३-०-०-० |
| १३ | ११८ | १७० | हाकु - ९ | निमा डोम्बों तामाङनी | पति सुब्बा तामाङ | ३-३-३-० | ३-३-३-० |

***Note:*** The Date mentioned in the Notice is Bikram Sambat (YMD) (B.S) (2070/01/09) Gregorian Calendar (A.D)- (April 22, 2013). *Note: This notice was not issued under the Land Acquisition Act, 2034 BS (1977)*

The family disputes were on two counts: in some cases, while the land owners were from the same family, they resided in separate households, thereby increasing the number of families impacted. In other cases, while the families had divided into separate households, the land ownership had not been transferred.

The issue of ownership was ultimately resolved with facilitation by DAO for the 13 land parcels, which also entailed the division of the land parcels. NWEDC submitted the compensation money with Nepal Bank Limited Natural Disaster Fund A/C for subsequent disbursal to land losers and requested for transfer of lands in name of 'Nepal Water And Energy Development Company Private Limited'. The DAO office further administered the cheques to the identified land owners. The entire process was completed by August 2013.

*Summary of the Private Land Purchase Process*

On the basis of the understanding of the land take process for private land thus developed, the following key points had been identified by ERM in 2015:

- The option of replacement land was not provided to the land owners by the Company. Consultations undertaken by ERM as part of the LRP preparation in 2015 in the Haku VDC and Dhunche with the various stakeholders found that obtaining alternate land of comparable quality within reasonable proximity of these communities is difficult. As a result, monetised compensation was agreed upon by the community in the VDC meetings.
- The rate of compensation decided was higher than the prevalent market rates of NR 10,000-50,000 per ropani prevailing at the time. This appreciated value was resultant from the Project's understanding of the importance of land holdings in the community and the value addition done on the land, with the aim of allowing the land owners to purchase and prepare alternative pieces of land, wherever they could identify such parcels.
- The rate also reportedly took into account the potential appreciation of the land value in the area in the near future and the business importance the access road will have in the future because of its strategic location and connecting to the China border, thereby serving as an important trade corridor. However, it should be noted that since then, the 'Border Road Initiative (BRI) Project by China has started construction in the area. This has resulted in property prices reportedly increasing by up to 10 times in the Rasuwa District, especially where the road route is proposed;
- From a broader understanding, the rates offered captured the agricultural potential and the tree potential of these lands. However according to the discussion with the local community, this understanding was not clearly communicated to them at the time of negotiations;
- The following figure provides an understanding of the compensation rates fixed for the various VDCs. It was evident that the District rates for all land falling under Haku VDC (Ward 1-9) was between NR 16,000 and 19,000 per ropani. The rate of NR 5,00,000 per ropani was applicable for urban area of Dhunche VDC.

*Figure 2.2 Rasuwa District Market Land Rates*

सि.नं. १ देखि ३९ सम्ममा लेखिए भन्दा बाहेकका यस जिल्लाका गा.वि.स.हरुको जग्गाको न्यूनतम मूल्याङ्कन निम्न बमोजिम रहनेछन् ।

| सि.नं. | गा.वि.स. | वडा नं. | खेत (प्रति रोपनी रु.) | पाखो (प्रति रोपनी रु.) |
|---|---|---|---|---|
| १ | गतलाङ | १-७ | १५,०००।- | १०,०००।- |
| | | ८,९ | १२,०००।- | ९,०००।- |
| २ | गोल्जुङ | १-९ | १६,०००।- | १२,०००।- |
| ३ | चिलिमे | १-३ | ३६,०००।- | १५,०००।- |
| | | ४-९ | २१,०००।- | ११,०००।- |
| ४ | टिमुरे | १-९ | | ३१,०००।- |
| ५ | ठूलोगाउँ | १-९ | २४,०००।- | १७,०००।- |
| ६ | डाँडागाउँ | १-९ | १८,०००।- | १४,०००।- |
| ७ | थुमन | १-९ | १६,०००।- | ११,०००।- |
| ८ | थैबुङ | १,२,३ | ४,००,०००।- | ३,५०,०००।- |
| | | बजार आसपास ५,६,७ | ५,००,०००।- | ४,००,०००।- |
| | | ४,८,९ | ५०,०००।- | ४०,०००।- |
| ९ | धुन्चे | ५,६,७,८ | ५,००,०००।- | ५,००,०००।- |
| | | १,२,३,४ | १,००,००० | ८०,०००।- |
| | | ९ | ४६,०००।- | ४१,०००।- |
| १० | बृद्धिम | १-९ | २१,०००।- | १६,०००।- |
| ११ | भोर्ले | १-९ | ७६,०००।- | ३१,०००।- |
| १२ | यार्सा | १-९ | १६,०००।- | १३,०००।- |
| १३ | राम्चे | १-९ | २६,०००।- | १८,०००।- |
| १४ | लहरेपौवा | १ | ४,००,०००।- | ३,००,०००।- |
| | | २,३,४,५ | २,५०,०००।- | १,००,०००।- |
| | | ६,७,८,९ | ६१,०००।- | ४१,०००।- |
| १५ | लाङटाङ | १-९ | | ५१,०००।- |
| १६ | सरमथली | १-९ | ४१,०००।- | २९,०००।- |
| १७ | स्याफ्रु | १,२,६,७,८ | ७५,०००।- | ६०,०००।- |
| | | ३,४,५,९ | ५,००,०००।- | ५,००,०००।- |
| १८ | हाकु | १-९ | १६,०००।- | ११,०००।- |

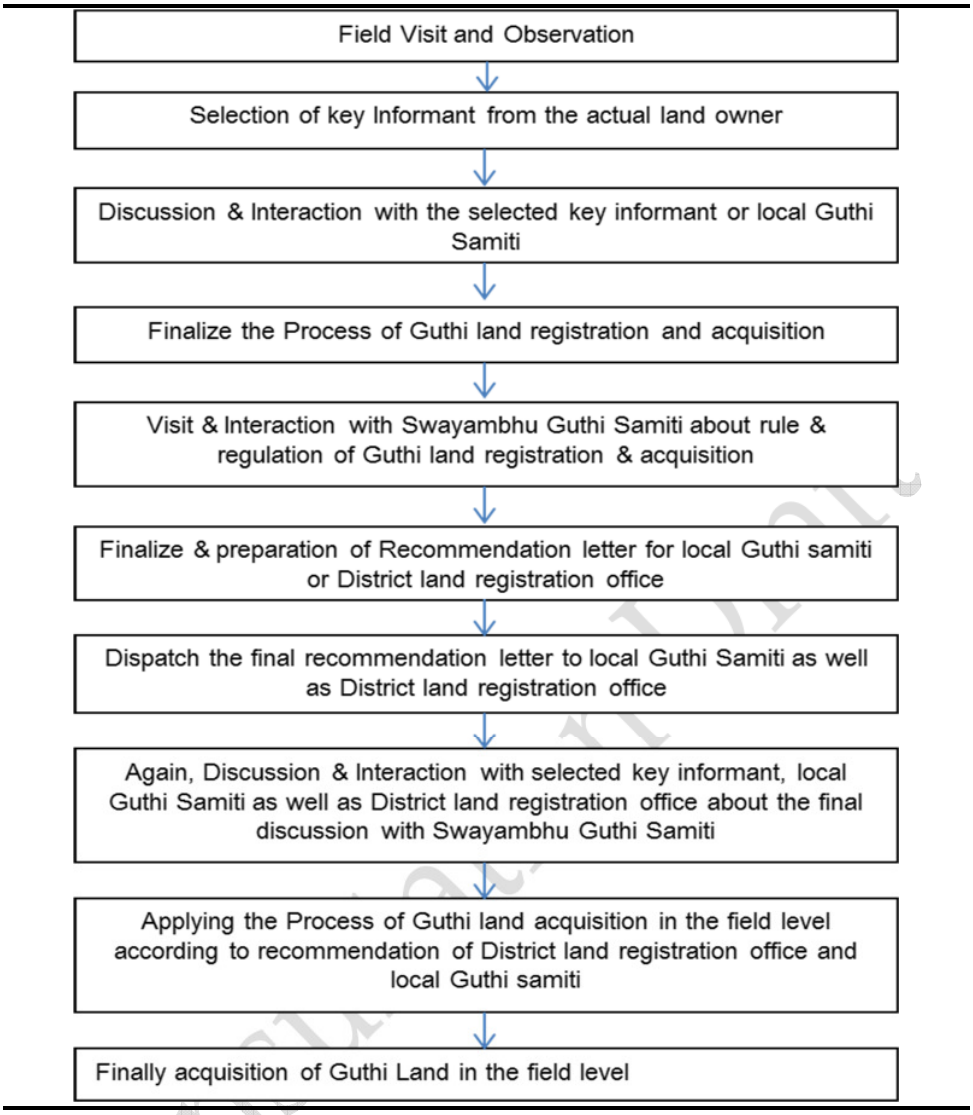
*Source*: Minimum Rate of Rasuwa District, 2014

As Figure 2.2 indicates, while the land rates for the VDCs in the Rasuwa District ranged from NR 15,000-20,000 per ropani, the rates of Dhunche were substantially higher at NR 5,00,000 per ropani. This variation resulted from the compensation rates provided by other hydropower projects in the area, which have set a higher benchmark on rates.

### *Guthi Land*

The Project's Guthi land take process included the transfer of tenancy rights based on negotiated settlements with the tenancy right holders (locally known as those with *Mohiyani Hak*). This process was undertaken on the principle that NWEDC treated the Guthi land as equivalent to private land. This was based on the understanding that due to the long-standing dependence of the tenants on the land, the potential Project impacts were comparable to those on private land owners. Figure 2.3 depicts the Guthi land take process.

*Figure 2.3 Guthi Tenancy Rights Transfer Process*




NWEDC representatives and local villagers of Haku Besi (Ward no 7 & 3) met on 19th January 2013 to discuss the rates and terms of transfer of the tenancy rights. Subsequently, NWEDC held a meeting at its office in Kathmandu with Guthi land tenants of Hakubesi in which 16 villagers were present. Some of the key decisions taken in the meetings were as follows:

- Compensation rate @ 5 lakhs NR per ropani was agreed upon, which was equal to the rate offered for the private land;
- Priority would be given to affected tenants for Project employment;
- Priority would be given to local people for Project employment; and
- NWEDC would pay 10 percent of the total compensation amount in advance, on demand by the land owners, so as to allow them to clear tax arrears for many years associated with the Guthi land tenancy.

In summary, the Guthi land take process was similar to the land take process for the private land; was based on negotiated settlements with the tenants;

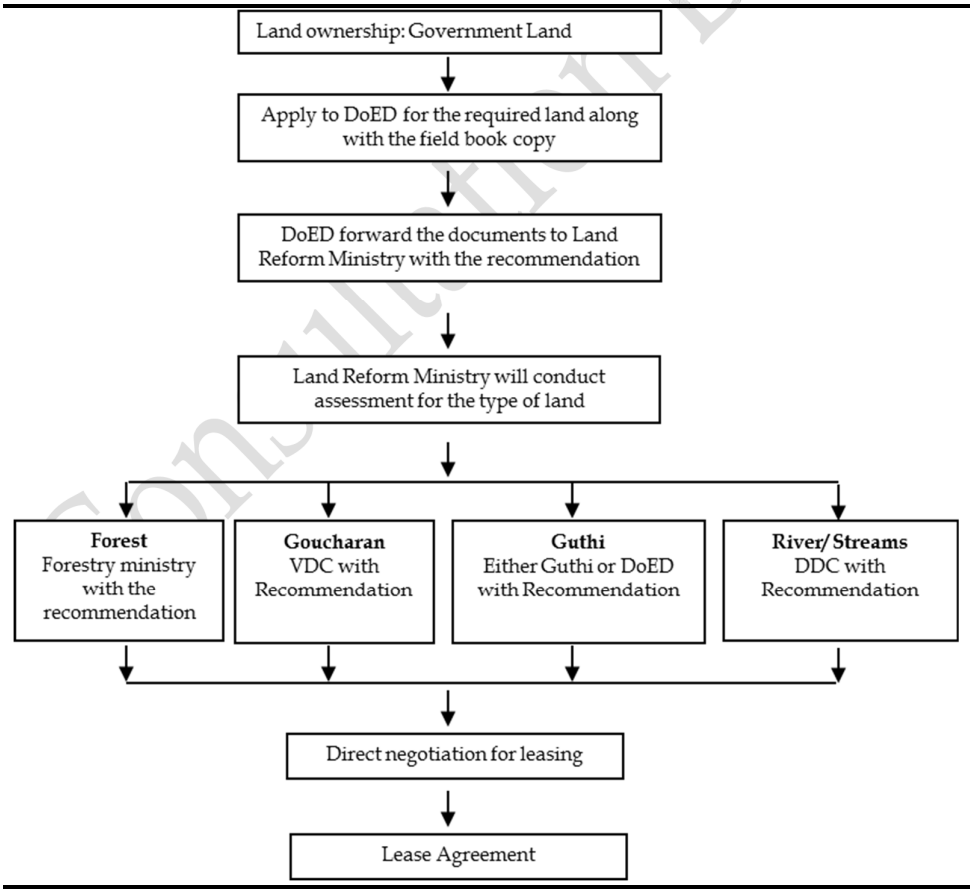
and the rates offered for the Guthi land were similar to those offered for the private land.

*Government Land*

The Project requires government and forestland for the access road, switchyard and power house camp, spoil areas, and the head works. The process of land take is described in the following figure.

NWEDC filed an application for the lease of the land with the Nepal Department of Electricity Development (DoED), who then forwarded it to the Land Reform Ministry for the assessment of the land and for its recommendations. Upon the completion of the assessment and receipt of recommendations from the Forest Department, Guthi, VDC and DDC, NWEDC undertook direct negotiations with the DoED to finalize the lease agreement (Figure 2.4).

*Figure 2.4 Process for Government land procurement (through Lease)*




Consultations identified one PAF living in Gogone who was growing trees on a small plot of Government-owned (but not Community Forest) land. NWEDC has agreed to provide compensation to this PAF later in 2018. No other private user rights over any non-CFUG Government land was identified.

### *6.1.3 PS 5 Applicability*

ERM undertook a review of the existing legislation in place pertaining to land acquisition and undertook an analysis of the applicability of PS 5 for this Project. The land take process for the Project was based on negotiated settlements with the land owners and Guthi tenants. A partial Government intervention was resorted to by NWEDC for selected cases in which NWEDC was not able to procure land through negotiated settlement, although this was not a full-fledged land expropriation process under law.

To assess if PS 5 is triggered, the process of land purchase, and the role of the government was analysed. The DAO indicated their role was to facilitate land procurement for the Project. A notice was issued by the DAO to land owners who had land ownership disputes within the family and not because of their objections to the selling of land per se. Through the notice, claimants were asked to raise any objection within 21 days of the publication of the notice.

The compensation fixation committee, to ensure credibility and strong basis to the rate offered, decided upon the rates, which was similar to the rate offered to other land losers for the Project. **At the end, the issue of ownership was resolved with facilitation by DAO for 13 land parcels, which also entailed the division of the land parcels**. The DAO office further administered the cheques (the money was submitted by NWEDC) to the identified land owners. The whole process was completed by August 2013. Hence the role of the DAO as a facilitator to ensure closure of the land purchase process was endorsed by NWEDC.

Furthermore, according to the information made available by NWEDC:

- The existing Law of Nepal provides flexibility to the company (Memorandum of Article, and Association of Article) to acquire any assets or property required for the Project.
- NWEDC also indicated that the process followed was not a formal Land Acquisition Act (LAA) process, but a process of facilitating the negotiated settlement between the company and the land owners in case of family disputes over land ownership among some families.
- The intervention of the DAO was required to assure that the process of establishing land ownership and reaching agreements between claimants on the division of the compensation amount was done fairly, amicably and transparently. The administration's involvement also added credibility to the process.

Consultation with the Jan Sarokar Samiti (JSS) found that there was a general support in the community for the Project. Consultations with JSS indicated that the land rates offered to the people was more than people could have expected if they sold land on the open market. People also understand the benefits of the Project access road being developed. Haku Besi currently does

not have access to any road (apart from village tracts). However, since then, the Nepal- China Road Project has been initiated, which will also improve the connectivity in the region.

Based on the detailed review of the land procurement process, supported by observations and consultations in the field, discussion with the NWEDC management as well as the DAO, the following reasons were identified for the triggering of PS 5 for the Project:

- **Issuance of Survey License prior to Negotiations**: One of the key reasons for the triggering of the PS 5 is that the survey license for the Project was issued prior to the negotiation process with the land owners. This implied that if people were not ready to sell their land to the Project, alternate options in terms of procuring this land through government led land acquisition process could have been triggered.
- **Community Preference for Land Lease**: Consultations with the community found that the preferred choice of the community was leasing the land to the company and not direct selling of the land in most of the instances. This option was perceived to have provided continued source of income for the private land owners. The option however was not considered by the company owing to the permanent requirement of land for certain structures;
- **Government Involvement:** The asset valuation was undertaken in a manner which replicated the government land acquisition process and was done by the DUBDC office, Nuwakot division. The compensation for asset loss, which was calculated post the deduction of scrap value and the depreciation cost of the asset, was therefore not based on the negotiation per se or on the principle of replacement value.
- **Physical Displacement**: the Project land requirements have resulted in the physical displacement of seven land owners. This physical displacement resulted from the primary residence of these land owners being located on the land impacted. However, it is understood that most of these land owners had alternative houses located in the Project area which are now being used as the primary residence. In cases where the land owner did not have alternative residence, the same was purchased/ constructed by the affected family with the compensation amount received.
- **Payment of Compensation**: While the compensation in most of the instances was paid in cheque, there were certain land owners who did not accept the compensation amount. In such cases, NWEDC submitted the amount with the DAO office, and the land owners were required to collect the amount from the DAO office.

The LRP was thus prepared in 2015 with the primary objective of meeting the PS 5 requirements. This LALRP has also been formulated in keeping with the requirements of the applicable reference framework, including PS 5.

### 6.1.4 *Existing Mitigation Measures*

The land lost was compensated at rates reportedly higher than the market rate in the area. This compensation amount was determined based on the evaluation report prepared by the Nepal Government's Department of Urban Development and Building Construction, Nuwakot District based Division Office.

The land loss was compensated at rates that were negotiated and which reportedly were higher than the market rate in the area (refer to Annex C for further details). NWEDC has already paid land value to land owners and the tenants for land in all the cases where there was evidence of ownership or tenancy. There was no difference in rates paid to owners and tenants and both kind of impacted families received NPR 5 lakhs per *ropani*[1]. According to the information made available during the consultations with the local community in Haku VDC and the Project proponents, it was understood that community accepted this approach. Differential rates were however paid for the land located close to the road in Mailung; the amount paid was NPR 6.5 lakhs per *ropani* for land near to the road, while others received NPR 5 lakhs per *ropani*.

Land for land options was not considered feasible owing to general lack of availability of similar kind of land in the area. More importantly, the community preferred receiving cash compensation as it provided diversified options to the families for income generation and improvement in standards of living which is evident from the choices already made by the PAFs for utilisation of the compensation money.

To facilitate the land transaction the Project also took certain steps:

- Both private land owners and Guthi tenants received a total of 5 lakh NPR per ropani; however in case of Guthi land, 10% of the payment amount was paid as advance to facilitate resolving of the tax and tenancy rights related issues associated with the land;
- The payment amount was paid before taking possession of the land to facilitate purchase of alternative land and construction of houses by the land owners;

### 6.1.5 *Residual Impacts and Emerging Issues Post Earthquake*

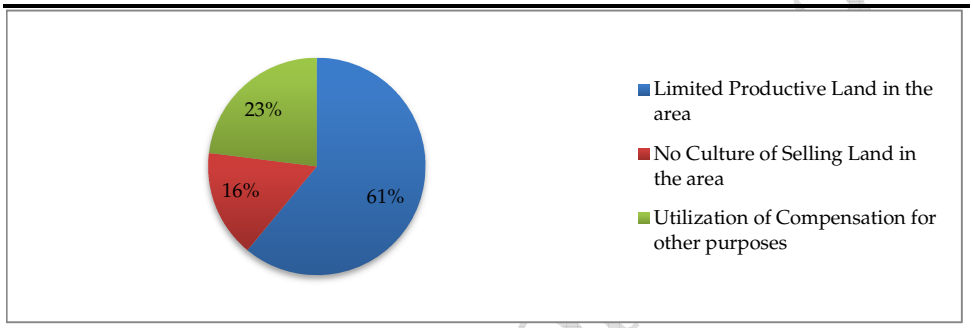
Some of the issues that have emerged after the land take process and post-earthquake, ware summarised below:

- Access to fertile land in the Project area in this region is a challenge. One of the concerns of the PAFs was that the land lost to the Project is in proximity to the river and was more fertile than any replacement parcels

[1] Unit of land in Nepal (1 ha = 19.66 ropani);

of land that PAF is able to purchase. This is so because these replacement parcels will be located uphill closer to the settlements, and the land parcels located in the valley were mostly unavailable for purchase. To obtain the same crop yield from these less fertile parcels of land, the PAF will be required to undertake cultivation across larger parcels of land or diversify their livelihood for replacing the lost agricultural production. This issue was further accentuated post-earthquake, where most of the land in the Project area has been damaged due to landslides and fissures. This has resulted in the reduction of cultivable land available for purchase. In terms of the land already owned by the PAFs, while most can be repaired for use, the PAFs are reportedly unable to afford the cost of the same.

*Figure 6.5 Reasons for Difficulty in purchasing replacement land*




*Source*: LRP HH survey, 2015

- Community consultations found that PAFs preferred to give their land on lease rather than selling it as they feel, in the current scenario of shortage, value of land will increase and in the short term, lease will give an ongoing income.;
- From the consultations undertaken with the PAFs it is evident that while they were aware that there will be limited or no replacement land available for cultivation, they still were not averse to giving their land to the Project. This is because the Rasuwa District rates were quite low at that time in comparison to what Project offered and the people saw this as a good opportunity. The compensation has positively increased the income of the families.
- The community is waiting for potential development in the area with the coming of the access road and also employment opportunities with the hydropower development. It is understood that it was this expectation of development benefits along with the compensation rates offered that resulted in the PAFs to agree to give their land to the Project willingly.
- The other issue is to do with the reduction of the benefits through the division of land payment among the families. In cases, where the compensation amount has not seen much division, the conditions of the families have improved in terms of allowing the families to construct/purchase new houses or land in Kathmandu/ Dhunche/ Ramche and meet certain key expenses such as medical expenses, payment of debts and socio-cultural expenses such as marriages as well as allowing for a certain portion of the money to be saved for lean periods. Where

compensation was divided, the amount for each family was not enough to make a step change in their incomes.

- Payment amount was seen as income of the family which should be equally divided. In most of the cases however the amount was mostly divided among the male members. In some of the instances, a part of the compensation was also paid to the daughters, who were married in the same community. The parents kept either an equal portion of the land or a very small portion of the complete amount to meet their own needs.
- In the case of Haku Besi and Phoolbari, people despite cultivating the Guthi land, mention lack of ownership/tenancy rights of such land as per the records of the government.
- there are also certain cases, in which owing to lack of relevant documents pertaining to tenancy rights over Guthi land, 8 PAFs of the Guthi land could not be compensated. The Company is agreeable to pay compensation amount in cases where the tenancy rights are confirmed.

***Box 6.1 Case Study: Guthi land users with lack of access to tenancy rights***

The cadastral survey was conducted 37 years back in Nepal and the ownership issues unsettled or developed later than that are not covered. This holds true for both Guthi land and the private land. In the Project areas (in Phoolbari hamlet), there are some HHs which could not show the tenancy certificate and hence were not considered for compensation by NWEDC. The people are also not sure of the quantum of land actually being impacted by the Project for which they have no documentary evidence. This land is primarily supposed to be taken for the access road. For the present such records are just maintained in the name of Guthi Corporation. The Project representatives reported that compensation cannot be provided without legal documents or the records maintained with the records office at the Rasuwa District level. In future if the tenants are able to provide valid tenancy certificate NWEDC is committed to provide compensation for the land and other entitlements agreed for other families. The number of such claims could be aprox. 8 depending upon whom finally receives the tenancy certificate or how the families tilling the land decide to share the compensation.

*Source:* ERM Site Visit, 2015

- There is another instance in which one of the PAFs from Gogone had planted trees on government land, which was subsequently impacted by the Project. The loss of trees was not compensated.

*Utilization of Compensation Amount Paid*

The patterns in the utilisation of compensation can be seen from the following

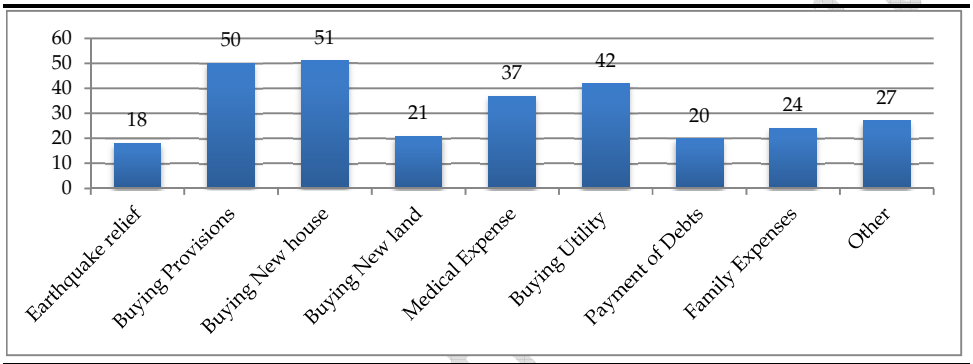
- Sale of land to the company opened up considerable opportunities, especially for some of the families that never had access to such disposable incomes. In cases where the compensation amount was high even after division in the family, lands were purchased in Kathmandu or Dhunche and in most of the cases put on rent partially or fully, thus adding to the family income.
- In some cases, the amount of land lost and consequently the compensation amount was small. Often this amount was further divided among family members, leaving very little for the actual family engaged in cultivation on the land. These households have reportedly struggled to put the money to

any effective use, and have instead used the compensation amount to meet the daily household needs and to educate their children.

- Pre-earthquake, most PAFs reported to have saved at least a portion of the compensation amount received. However, post-earthquake, a number of the PAFs used the compensation amount to cope with the earthquake impacts;
- About 40 percent of the PAFs have bought/constructed a new house in the original village with the compensation amount. However, most of these houses were severely damaged by the earthquake.

The following figure provides an understanding of the utilization of the compensation received by the PAFs.

*Figure 6.6* ***Utilization of Compensation by PAFs***




*Source*: LALRP HH survey, 2017, based on responses given

### *6.1.6 Additional Mitigation Measures*

NWEDC shall take the following additional mitigation measures to reduce the impacts:

- Provide assurance to the 8 PAFs lacking tenancy rights that compensation will be paid as and when such rights are established and the necessary documentations are made available to NWEDC. If the PAFs are not able to provide certificates for their tenancy, provide livelihood support to mitigate livelihood loss from that land;
- Grant preference to the PAFs for direct/indirect Project employment opportunities and livelihood restoration options;
- Identify and provide additional social and livelihood support to especially vulnerable families.
- Provide compensation and help restore the livelihood for the one PAF from Gogone who lost their trees cultivation areas.

## 6.2 LOSS OF STRUCTURE

### 6.2.1 Context

The Project has resulted in an impact on 29 residential and non-residential structures located in the Project footprint area. These 29 structures belonged to 21 PAFs and included houses, sheds, and a water mills. In addition to this, the Project is currently in the process of procuring 7 more structures from residents residing in Mailung for an alternative camp area. The negotiations and decision making for these 7 structures is presently under process. The total number of structure then would become 36.The following table presents a summary of the kind of structures impacted by the Project.

*Table 6.4 Summary of Impacted Structures*

| Type of Structures | Number of Structures |
|---|---|
| Structures already impacted | |
| Residential structures | 7 primary residences and 5 seasonal residences. (12 residential structures) |
| Partially constructed residences | 8 |
| Cow Shed | 8 |
| Water Mill | 1 |
| Total structures already impacted | 29 |
| Structures under consideration | |
| Residential structures | 7 |
| Grand Total | 36 |

As indicated above, the Project resulted in the loss of primary residence for seven PAFs in 2015. These seven PAFs have constructed replacement structures in their villages or on alternative land in Thade and Dhunche from the compensation money. The remaining 13 PAFs already had an alternative house in their villages, which was the primary residence.

NWEDC did recently acquire the seven primary residences (impact on additional 5 PAFs) on the Mailung HEP site, but the earthquake had damaged all of these structures and all of the families had already been displaced at the time of acquisition and were living in IDP camps. Hence the total PAFs impacted by loss of primary residential structure is 12.

### 6.2.2 Structure Valuation Process

The valuation of structures was undertaken through the Government by the Department of Urban Development & Building Construction (DUDBC). As has been discussed previously, this valuation process was initiated after the negotiations for the land take and during the payment of compensation for the land required.

DUDBC conducted a site visit and measured and photographed the various structures affected by the Project. Structure owners were present in most

cases. The valuation amount was determined using the parameters discussed below.

- Earth work and foundation;
- Masonry;
- Roofing (including use of CGI sheet roofing);
- Door frames and door and window shutters; and
- Plaster work.

*Figure 6.7 Asset Inventory undertaken during LRP Preparation in 2015*

*Source:* ERM site visit, 2015

DUDBC based the structure valuation on Rasuwa District Unit Rate Schedule (per square foot or cubic meter) for various aspects of the construction mentioned above. The Rate Schedule is annually published and captures the unit rate for:

- Raw materials included in the construction including the transportation cost;
- Labour types including skilled, semi-skilled and skilled workers etc.

DUDBC assessed 22 structures for compensation. NWEDC has paid compensation for 20 of these structures to date, only two seasonal cowshed have not yet been compensated. There were, however, some discrepancies in the payments made for the assets relative to the deduction of a depreciation cost, addition of scrap value, and whether compensation included a 13 percent VAT.

Seven additional structures were subsequently identified that were not assessed by DUDBC. These structures included:

- Two residential structures for which construction was initiated prior to land take discussions, but construction was never completed;
- Four residential structures for which construction started after land take discussions were completed; and
- One cowshed for which construction was intiated prior to land take discussions, but construction was never completed.

In order to develop an understanding of these seven structures, ERM undertook a valuation of the structures using the DUBDC methodology. The

ERM survey team recorded the detailed of the structures in the presence of the structure owner. The structures which were not accessible due to the difficult terrain were measured through visual observation, through the use of cameras and hand held video camcorders, in the presence of the structure owners.

### *6.2.3 Mitigation Measures already Undertaken*

The valuation of the structures located on the private land was undertaken through the Government by the Department of Urban Development & Building Construction (DUDBC), Division Office at Nuwakot. The unit rate for the structures was based on the Rasuwa District rate schedule for various aspects of construction, including raw material and labour used. The compensation amount was paid to the PAFs in 2013-2014 prior to taking possession of the land. This was to allow the PAFs to purchase alternative land/structure or build a new structure in the land remaining prior to the Project taking possession of the land. Refer to Section 6.2.2 for a detailed understanding of the process followed.

### *6.2.4 Residual Impacts and Emerging Issues Post Earthquake*

Seven structures (6 residential structures and 1 cow shed) were not considered for compensation by NWEDC in 2015 as these structures were incomplete at the time of valuation. Amongst the remaining 22 structures that were considered for compensation, there were the following discrepancies in the evaluation process:

- The compensation amount determined for 10 structures was done after the deduction of the depreciation cost @ 2.5% and scrap value amount @ 10%;
- The compensation amount determined for 12 structures was done without any deduction and inclusive of 13% Value Added Tax (VAT)

Furthermore, payment for 2 of the 22 structures has not yet been made. In summary, replacement value was not provided for the 12 structures compensated.

The 2015 earthquake resulted in an impact on all structures across the AoI. There was possibly partial or complete destruction of the alternative residential structures used by the PAFs. Most of the PAFs are reported to be living in IDP camps post the earthquake and few have yet to undertake repair activities in their villages.

### *6.2.5 Additional Mitigation Measures*

NWEDC has committed to the following additional mitigation measures:

- Compensate the 7 uncompensated structures at replacement value, without deduction of depreciation cost and scrap value and inclusive of VAT;

- Provide additional compensation for 10 structures, which were not paid replacement value, for the depreciation cost and scrap value deducted and VAT not paid;
- Compensate the Mailung HEP structure owners at replacement value, without deduction of depreciation cost and scrap value and inclusive of VAT, in consultation with the DAO office and *Jan Sarokar Samiti*.
- Provide shifting support where necessary.

NWEDC has committed to completing the compensation process by June 2018.

## 6.3 IMPACT DUE TO LOSS OF CROPS AND TREES

This section provides an understanding of the loss of crop and trees on the impacted private and Guthi land.

### 6.3.1 Context

*Loss of Crops*

Agriculture was one of the key sources of livelihood and sustenance for the community in the Project area pre-earthquake. Most of the crops and vegetables produced on the land were for sustenance and met the needs of the PAFs for a period of 6 to 9 months in a year. For the remaining months the families reported that they purchase the required produce from the local markets.

Most of this land was reported to be partially or completely destroyed due to the earthquake. However, PAFs are optimistic that most of this land can be cleared and repaired with some capital cost.

*Loss of Trees*

The trees in the land impacted by the Project ranged from timber trees such as Sal, fruit bearing trees such as Mango and other trees for firewood.

***Table 6.5 Tree loss on the Private and Guthi land parcels***

| S. No | Name of Tree | Usage | Number of Trees on Impacted Land parcels |
|---|---|---|---|
| 1. | Aaru | Fruit | 7 |
| 2. | Amala | Fruit | 51 |
| 3. | Amba | Fruit | 8 |
| 4. | Ambak | Fruit | 7 |
| 5. | Amriso | Fodder | 5 |
| 6. | Anjer | Fruit | 4 |
| 7. | Bamboo | | 1 grove |
| 8. | Banana | Fruit | 21 groves |
| 9. | Bhauwa | | 10 |
| 10. | Chilaune | Timber | 233 |

| S. No | Name of Tree | Usage | Number of Trees on Impacted Land parcels |
|---|---|---|---|
| 11. | Chitwar | Used in making rope | 1 |
| 12. | Chuletro | Fodder | 1 |
| 13. | Churi | Fruit/timber | 12 |
| 14. | Daar | Fodder | 75 |
| 15. | Dalchini | Spice | 3 |
| 16. | Dodhela | Fodder | 3 |
| 17. | Dube | Timber | 60 |
| 18. | Dune | Fodder | 50 |
| 19. | Gadu | Fodder | 18 |
| 20. | Gorkha Mala | Used for religious purposes | 1 |
| 21. | Jamir (lemon species) | Fruit | 1 |
| 22. | Kafal | Fruit | 126 |
| 23. | Kangiyo | Fodder | 5 |
| 24. | Kapro | Fodder | 1 |
| 25. | Kayon | Fodder | 20 |
| 26. | Khanayo | Fruit | 70 |
| 27. | Kimbu | Fodder | 36 |
| 28. | Kniu | Fodder | 3 |
| 29. | Koirala | fodder & vegetable | 5 |
| 30. | Kutmeru | Timber/Fodder | 1 |
| 31. | Lakuri | Medicinal | 1 |
| 32. | Lemon | Fruit | 3 |
| 33. | Mahua | Fruit | 16 |
| 34. | Mango | Fruit | 3 |
| 35. | Nigalu (bamboo kind) | Fodder | 3 |
| 36. | Orange | Fruit | 3 |
| 37. | Peepal | Timber | 1 |
| 38. | Sahajh | | 2 |
| 39. | Sal | Timber | 1018 |
| 40. | Seemal | | 19 |
| 41. | Sette | Timber/Firewood | 17 |
| 42. | Tanki | Fodder | 26 |
| 43. | Tune | Timber | 1 |
| 44. | Turi | Fodder | 1 |
| 45. | Uttis | Timber | 618 |
| 46. | White Ciris | Timber/fodder/ fire wood | 4 |
| 47. | Yellow Wood | Timber / fire wood | 1 |

*Source:* ERM site visit, 2015 based on responses given

The Project's land take is estimated to impact approximately 2,554 trees/saplings of 21 PAFs. Some of the trees affected on the private land belonging to the PAFs from Gogone, Tiru and Mailung were damaged due to the road construction activities, while the few remaining ones were destroyed by the earthquake. In case of Guthi land, most of the trees were destroyed by the earthquake. In total, 21 PAFs reported to have trees on their land

*To the extent possible, an attempt was made to document the loss of trees due to the Project activities and their value in 2015. However, in certain cases, these parcels were inaccessible or already affected; in such cases the assessment of the number of trees lost was based on the recall value, further corroborated with the community members and NWEDC, wherever possible.*

### 6.3.2 *Crop and Tree Valuation*

The 20 sale deeds for private land do not explicitly include the structures, crops and trees impacted by the land take. On the other hand, the agreement for the transfer of the 18 Guthi land tenancy rights does explicitly include the curtilage, crops, and permanent and temporary structures. ERM's consultations with the community, however, found that the community was not aware about the methodology on how the rates were derived and if the crops and trees were included in the compensation. The community representatives stated that NWEDC had indicated the land owners could harvest the standing crops.

NWEDC indicates that for most of the land owners, the compensation for the land included the crops and trees; structures were valued and compensated separately. The relatively high compensation rate provided by NWEDC indicates that crop and tree compensation was included.

ERM had the following observations in 2015:

- During the valuation process undertaken by NWEDC, no valuation of the crops or parcel specific land use documentation was undertaken;
- The private land owners reported to not being aware of the compensation amount including the crop and tree compensation.

ERM, as part of the assessment, undertook a land use profile of the impacted land and developed an understanding of the cultivation in the area. The current land use profile of the acquired land parcels were established through walk through of the site and in cases of inaccessible areas, through visual observations using cameras and hand held camcorders. In this process, it was observed that most of the land impacted, which is presently not physically occupied yet by the Project, was either under cultivation or had been cultivated in the preceding years. Most of the households reporting present cultivation on the land were from the Tole Haku Besi and Phoolbari. However, this land may have been damaged by the earthquake.

### 6.3.3 *Existing Mitigation Measures*

*Crop loss*

As part of the sale/lease agreement with the land owners it was agreed that they would be allowed to harvest standing crop at the time of the land take.

- As the land owners were allowed to harvest the standing crops, no additional crop compensation was provided for the same.
- As the land prices was negotiated it is assumed that the rate covered the longer term livelihood loss from cultivation.. In any case the opportunity

given to harvest the standing crops mitigated the loss to a great extent for the said year.

*Tree loss*

NWEDC team communicated that the land sale agreement included any loss of trees which may be standing on the land at the time of purchase. The land owners were also allowed to cut the trees and take the timber post the sale of the land.

### *6.3.4 Residual Impacts and Emerging Issues Post Earthquake*

*Crop loss*

The crop loss was already captured in the compensation amount paid for the land. In some cases, especially in Haku Besi and Phoolbari, some of the HHs even after receiving the payment of the land continued to grow the crops; they are reportedly aware that no compensation would be provided for the same as the PAFs were asked to not plant any new crops on the land after the payment of compensation. However, most of the crops were damaged due to the earthquake even before the Project allowed the harvest of the standing crop. Furthermore, the transition loss, while preparing a similar land for cultivation and getting crops from it, has not been accounted for presently.

*Tree Loss*

- During the consultations with the land owners, it was reported that the local community did not have a clear understanding of the tree loss being included in the compensation amount as per the agreement. While the agreement with the Guthi land tenants and Swyambhuguthi clearly states that the land value includes the loss of trees, there is no such clause in the private land agreements;
- Furthermore, it was reported that the land owners were not aware of the provision of cutting the trees and taking the timber as part of the sale agreement.

### *6.3.5 Additional Mitigation Measures*

*Crop loss*

NWEDC has committed to the following additional mitigation measures:

- Alternate livelihood options/ skill trainings will be provided for the PAFs, for those who do not wish to return to their original village and undertake agriculture;
- Agricultural training or support will be provided for those PAFs who wish to return to their original village and undertake agriculture;
- Transition allowance will be provided to each PAF, aimed at providing support to the families while they develop other skill sets/ livelihood

options as identified in the LALRP. The transition allowance for the PAFs has been calculated on the basis of the minimum wage applicable in the Rasuwa District for skilled workmen. This transition cost is to be paid for the duration of the training plus six months during which time the PAFs are expected to be able to re-establish their cultivation cycle or establish an alternative source of livelihood based on the livelihood restoration support identified in ***Section 7***

*Tree Loss*

Compensation will be provided for the tree loss at replacement value. The Project will also consider providing sampling of similar tree species to the PAFs for planting in their land plots. The compensation requirement especially for the tree will be paid through an escrow amount dedicated for the Project. The compensations for the tree losses are proposed to be closed by the first quarter of 2018

## 6.4 IMPACT ON USE OF COMMUNITY FOREST

### 6.4.1 Context

The Project activities are expected to impact 78.6 ha of Community Forest. This forestland belongs to the Dhunche and Haku VDCs and is under the supervision of five CFUG. The Project would impact approximately 11 percent of the total forest managed by the five CFUGs.

***Table 6.6 Community Forest Affected by the Project***

| SN | Name of community forest | Present Status of CFUG after reorganisation | Location ( User Groups) | Total area (ha) | Impacted Area (ha) | CFUG members | Number of trees/ seedlings to be cut |
|---|---|---|---|---|---|---|---|
| 1 | Daksin Kalika | Daksin Kalika | Haku-8,9 | 373.92 | 17.25 | 175 | 330 |
| 2 | Dharnasila Kanya | Dharnasila Kanya | Haku-9 | 126.86 | 24.57 | 60 | 736 |
| 3 | Bratar | Bratar | Haku-7 | 14.22 | 0.99 | 45 | 105 |
| 4 | Lumbudanda | Lumbudanda | Haku-7 | | 9.85 | 34 | 138 |
| 5 | Labingpakha Tutudanda | Larbangpakha | Haku-3 Haku-3 | 206.36 | 23.96 | 108 | 308 |
| | **Total** | | | **707.14** | **76.62** | **422** | **1617 trees/2239 seedlings (total 3856** |

*Source:* NWEDC, 2015

Consultation with the Ilaka (sub-district) Forest official found that the quality of forest in the Project area was quite poor, and that NTFP species with high market potential were limited and restricted to primarily the upper regions of the mountains. Grazing land was not adequate in the forest. The dependence on the Community Forest in the Project area in the pre-earthquake scenario can thus be summarised as follows:

- The individual dependence on the Community Forests was reported to be negligible while at a community level, there was some dependence for the collection of timber and NTFPs. The individual dependence was reported to be negligible due to the location and poor quality of the forest to be impacted;
- The community used these forests primarily for the purpose of collection of timber for construction purposes, firewood, NTFP collection such as honey, collection of wild fruits, herbs and mushrooms, medicinal Plants and grass for rope and fodder. While the timber, firewood and medicinal Plants were for self-consumption, the NTFPs and food products were collected for both self-consumption as well as sale, thereby providing an additional source of income for the households.

Furthermore, as only 10.83% of the total land under the CFUGs was impacted, and the impacted land was in the low regions; which are considered poor in terms of productivity and value of species, the overall impact from the loss of Community Forest was reported to be minor.

*Community Forest Lease Process*

The process of land take of Community Forest was led by the Rasuwa District Forest Office (DFO). The forestland required for the Project, though owned by the government, is in reality managed and protected by five CFUGs, representing 422 families. The forestland lease is likely to result in impacts such as the loss of access to forest resources (e.g. firewood, fodder, timber, food, medicine) and the cutting of 3,856 trees.

Upon receiving the application for the forestland, the DFO called for a general assembly of each affected CFUG. As part of these meetings, an understanding of the land requirements and its potential impacts was provided to the committee members and recommendations were sought from the members in regards to the process of land take to be adopted. Based on the feedback from these meetings, the DFO presented a report to the Nepal Ministry of Forest, which then was forwarded it to the Council of Ministers for its review and approval of the lease agreement. After the payment of the lease fee by NWEDC, the DFO signed the lease agreement. The detailed process followed for the Community Forest acquisition is described in more detail in ***Annex B***

*Participation of the Community Forest Committees and its Members*

The DFO met with four of the CFUG or Community Forest Committees (*Dakshin Kalika*, *Lumba Tanda, Dharna Shila Kanya Devi*, and *Haku besi)* in December 2014 and February 2015.

*Figure 6.8 Consultations with Community Forest User Group*

*Source:* ERM site visit, 2015

The community was consulted on two occasions during the land take process for the Community Forest land. The first consultation was undertaken during the initial stages of land identification and tree demarcation, the second consultations were held before the cutting of the trees. As part of these meetings, it was agreed that a tree cutting cost of NR 600 per tree would be paid through the hiring of local labour. Also, the logs of the cut trees were to be stockpiled, and after evaluation by the DFO, handed over to the CFUG for selling at agreed rate to potential buyers. These buyers have till now either been the community or the contractors hired by the CFUG. The money is not to be shared with the DFO; however, the accounts of the committee are checked by the DFO from time to time.

Furthermore, the CFUG raised concerns about potential impacts to other trees outside the lease area during the access road construction. There is a provision under the lease agreement between Forest Department and NWEDC for the compensation for any trees impacted outside the lease area.

*Box 6.2 Certain Key Terms and Conditions of the Forestland Lease*

Some of the key terms and conditions of the land lease with the Department of Forest are as follows:

- The Project shall as a compensation effect plantation of various species of sapling suitable to the local environment in a place as specified by the DFO on a total land of 82 ha inclusive of 76.62 ha of forestland to be used by the Project and 5 ha equivalent to the number of plants at the ration of 1: 2 for 3,856 trees and plants and handed over to the concerned Forest Office subsequent to raising them for 5 years as per the Availing of Forest Land for Other Purpose Procedure, 2063.
- The Project to procure a private first class land adjacent to the national forest of the Rasuwa District equivalent to 1.4 ha of land within the Community Forest area out of the total area to be occupied by the physical infrastructure of the Project (4.01) shall be purchased and the title thereof shall be transferred in the name of the Government of Nepal within one year from the date of issues of Electricity Generation License and shall effect plantation therein and handover the same to the concerned Rasuwa District Forest Office (DFO) subsequent to the rearing up of plants for 5 years.
- 1617 No. of trees and 2239 plants identified in the record as requiring removal for the Project by the DFO shall be removed by the Project with the consent and order of the DFO. Such trees shall be fallen and stalked in the area as specified by the DFO at the cost of the Project and handed over to the concerned CFUG through the DFO for the management

thereof. The trees and plants other than those shall be of Government of Nepal and these plants shall be conserved.
- The trees to be fallen from the Community Forest shall be earmarked by the DFO within the quantity of annual approved removal capacity as specified in the approved action plan of the concerned CFUG to the extent possible and managed for cause to be managed accordingly
- In the case of any loss or damage out of the forest area made available in the course of construction of the infrastructure or any other construction works, the maintenance, reconstruction and repair thereof shall be carried out by the Project itself. In case of loss or damages to trees and plants, an action shall be taken as per the monitoring report of the DFO in accordance with Forest Act and Rules

*Source:* Land Lease Agreement between Department of Forest, Babar Mahal and NWEDC, Kathmandu

NWEDC has also agreed to provide funding to the CFUGs to monitor and protect their forests during construction.

*Summary of the Process Followed for Community Forest*

The following key observations have been made by ERM:

- There were no informal settlers rights or disputes identified on the government land required for the Project and this was confirmed during consultations;
- The valuation of the tree was undertaken by the DFO in course of the survey exercise.
- The CFUG committees were a part of the tree identification and marking done by the DFO;
- The DFO maintains records of trees, with photographs before and after cutting of the tree, for validation purposes;
- The CFUG member representatives informed that initially they did not agree with the tree cutting. However, after an understanding of the potential income to be generated from the tree cutting and with the assurance from the DFO that trees will be replanted, the community agreed for the cutting of the trees in the lease area;
- Project construction, especially of the access road, should significantly increase the CFUG revenue from compensation for cutting of tress and selling of the timber. In 2015, almost 1,200 trees were cut mostly to enable the construction of the access road.
- It should be noted, however, that a substantial portion of the Community Forests is reported to have been damaged due to landslides from earthquake. The exact extent of damage to the forest has not yet been accessed.

### *6.4.2 Existing Mitigation Measures*

The DFO authorized the removal of 3,856 trees and seedlings in Community Forests by the Project. The process of removal of trees/seedlings is discussed below:

- The trees identified shall be felled and stalked in the area as specified by the DFO and handed over to the concerned CFUG through the DFO for the management thereof. The CFUGs may then undertake the sale of the trees and seedlings cut as they view appropriate;
- In addition to handing over the fell trees/seedlings to the CFUGs, the Project has also provided monetary compensation for the trees/seedlings lost. This additional compensation has been paid to the CFUGs to support the Community Forests.

The following table provides an understanding of the compensation amount paid to the CFUGs.

*Table 6.7 Cash Compensation paid to CFUG*

| Description | Quantity | Amount | Remarks |
|---|---|---|---|
| Dakshin Kali Community Forest Group / 1st Group | | | |
| Sal Tree | 638 CFT | 1,91,400 | |
| Pine Tree | 889.5 CFT | 1,33,425 | |
| Others | 1008CFT | 75,600 | |
| Fire Wood | 2112.91 CFT | 33,806 | 4.22 Chatta[1] |
| Total | 4648.41 CFT | 4,34,231 | |
| Darnashila Community Forest Group / 2nd Group | | | |
| Sal Tree | 507 CFT | 1,52,100 | |
| Pine Tree | 61.27 | 9,191 | |
| Others | 2623.99CFT | 1,96,799 | |
| Fire Wood | 3249.73 CFT | 51,995 | 6.49 Chatta |
| Total | 6441.99 CFT | 4,10,085 | |
| Lumbu Danda / 3rd Group | | | |
| Sal Tree | 0 | 0 | |
| Pine Tree | 10.5 | 1,575 | |
| Others | 879.5 | 65,963 | |
| Fire Wood | 1,105 | 17,680 | 2.21 Chatta |
| Total | 1995 | 85,218 | |

*Source:* NWEDC, 2015

This cash compensation amount is reported to be higher than that agreed with the CFUGs.

### 6.4.3 Residual Impacts and Emerging Issues Post Earthquake

Despite the existing mitigation measures in place, the following concerns were highlighted during the community consultations:

- A number of trees in the Community Forest area outside the lease area of the road were impacted due to the construction activities and the debris from the blasting and excavation being dumped downslope, for which compensation was not provided to the user groups. The CFUG maintains that the permission from the user groups was taken only for the trees falling within the ROW for the road and there

[1] In Nepal, fuel wood is measured in Chatta; its dimension is 20′ ×5′ ×5′. A stack of 5′ ×5′ ×5′ is called quarter chatta.

are grievances that the extra trees damaged owing to the construction of the access road were not compensated Furthermore, big boulders and rubble material from road construction and blasting had affected certain sections of the Community Forest, which CFUGs maintain has not been considered for compensation. Consultations with Lumbu danda CFUG found that more than 5 complaints were made to the Ilaka officer and the Project (both officially and unofficially), and the Ilaka officer had finally agreed to inspect the Community Forest areas being affected by the access road construction (somewhere in the last week of February 2015).

While lease area for the access road is 30-meters-wide, but the way the lease area is measured in hilly terrain remains a matter of concern for the community. Consultations with local communities indicted that if the lease area is measured horizontally, in the hilly terrain, the vertical slope affected could be anywhere between 60 to 120 meters in distance. CFUG representatives contend this has resulted in the loss of more trees than originally understood.

- The firewood for the construction labour camps is reportedly being sourced from the surrounding Community Forest, for which the CFUGs have not been compensated. NWEDC indicates that the contract agreements require the sub-contractor to provide cooking fuel for the labourers.

*Figure 6.9 Firewood sourced from the Community Forest for the Labour Camp*

*Source*: ERM site visit, 2015

- The Gorkha earthquake and subsequent landslides resulted in extensive damage to the Community Forest area. Since the earthquake occurred before the inspection by the Ilaka officer on the complaints could be completed, there is no clarity on the additional trees that were actually impacted by the Project activities;
- In the post-earthquake scenario, a re-assessment is required of the number of trees to be impacted by the Project
- Also, the overall dependence on the Community Forest by the local community has reduced in the post-earthquake scenario and since the community moved to reside in the IDP camps, which does not allow them to access the Community Forest area regularly. The dependence on Community Forest land may increase once the local community starts

moving back to the original villages. However, the timeline for the same cannot be determined presently.

### *6.4.4 Additional Mitigation Measures*

NWEDC has committed to the following additional mitigation measures:

- Provide compensation for any trees damaged by construction activities outside the lease area. This compensation shall be undertaken in keeping with the provisions of the forest lease agreement signed between NWEDC and the DFO, which states that, "*In the case of any loss or damage out of the forest area made available in the course of construction of the infrastructure or any other construction works, the maintenance, reconstruction and repair thereof shall be carried out by the Project itself. In case of loss or damages to trees and Plants, an action shall be taken as per the monitoring report of the DFO in accordance with Forest Act and Rules*". This payment of compensation will be undertaken on a regular basis, in a timeline agreed upon with the CFUGs;
- Prohibit firewood collection by the construction workers and ensure there is provision of alternate fuels for cooking and heating;
- Adopt, provide training in, and implement a Worker Code of Conduct that clearly informs construction workers to avoid damaging the Community Forests;
- Conduct training and capacity building of the CFUGs for rejuvenation and management of community forest area;
- Provide financial support to the CFUG in managing and protecting the Community Forests;
- Establish a Grievance Mechanism to ensure any CFUG concerns are quickly identified and addressed through grievance process of the Project; and
- Provide compensation and help restore the livelihood for the one PAF who lost their trees cultivation areas.

## *6.5 IMPACT ON NATURAL RESOURCES*

### *6.5.1 Context*

The Project will result in the loss for forest used for non-timber forest products and will reduce flow in the 11.84 km long diversion segment between the dam and the powerhouse. Water from this river segment was used during the dry season for drinking water, household uses such as clothes washing, and watering cattle. Proposed environmental flows would still be sufficient to support these uses. This segment of the Trishuli River was also used for the following purposes:

- Fishing – about 13 families reported sustenance or recreational fishing in the river, but do not rely on fish for protein or income. The proposed environmental flows will still support fish use of and migration through the diversion segment.

- Irrigation – one water intake has been used to irrigate a small area supporting four families. Monsoon flows will continue to be spilled at the dam site and flow down the diversion segment.
- Cremation – during stakeholder consultation, one cremation site previously used by the Dalits was identified on the west bank of the Trishuli River along the diversion reach, but it has reportedly not been used in many years and other sites further downstream are now preferred.

### *6.5.2 Existing Mitigation Measures*

No mitigation measures were identified for the loss of natural resources

### *6.5.3 Residual Impacts and Emerging Issues Post Earthquake*

Since the earthquake, however, most families have left the area and their use or dependence on natural resources along the diversion segment has been at least temporarily reduced to almost negligible. The only usage of natural resources is reported by members of the household who have returned to their original settlements for a temporary or permanent duration. Those living in the IDP camps have replaced the resources they used previously with LPG, solar lighting, and modern medicines. Furthermore, none of the PAFs surveyed reported any fishing activities. It should be noted, however, that this is likely to be a temporary situation and fishing activities may resume once the local community returns to their native villages

### *6.5.4 Additional Mitigation Measures*

Since none of the PAFs reported fishing for recreation or livelihood purposes, or other dependence on natural resources, no additional mitigation measure have been identified. If any claims emerge in the future, they will be dealt with through the Project's GRM. NWEDC will also conduct a rapid survey of the Project area to confirm fishing activity and livelihood dependence at least three months prior to start to construction.

## *6.6 IMPACT DUE TO CREATION OF EMPLOYMENT OPPORTUNITY*

A potential positive impact from the Project is expected to be in terms of the livelihood opportunities to be created by the Project. These livelihood opportunities are expected to be in the form of jobs for unskilled, semi-skilled and skilled labour, petty contracts direct employment opportunities and creation of market/ indirect benefits for small businesses. Another positive impact will be the opening up of access to Mailung, Dhunche and cities such as Kathmandu, through the construction of the access road. In order to maximize on these positive impacts/benefits, the Project will develop the following management plans as committed in the PDA:

- Local Benefit Sharing Plan;
- Employment and Skill Training Plan; and
- Industrial Benefit Sharing Plan.

The Plans are being prepared and finalized by NWEDC, in consultation with the government. Since, most of these employment opportunities will be created at the contractor level, the bidding documents for the contractors will have to include provisions to ensure that the requirements of these Plans are met.

## 6.7 GAPS AGAINST WBG PS 5 AND ADB REQUIREMENTS

Based on the understanding of the scope of the land take requirement of the Project, land take process and asset valuation process followed for the Project, a gap assessment was undertaken of the Project against the WBG PS requirements and relevant ADB requirements. This gap assessment in 2015 summarised what has already been done, and what remained to be done to close the remaining gaps. The summary of the gap assessment thus undertaken is provided in this section. On the basis of this, assessment, the requirement and scope of the LALRP has been defined.

*Table 6.8 Gap assessment in the existing process against WBG PS 5 and ADB*

| S.No. | Type of Loss | Observation | Gaps |
|---|---|---|---|
| | **Land Loss** | | |
| 1 | Loss of land including:<br>• Private<br>• Guthi<br>• Government<br>• Forest | • Cash compensation equivalent to market value including the other transaction cost was paid<br>• The compensation amount was decided through negotiations ;<br>• The compensation for people with valid land titles and tenancy certificate has been completed | • 8 PAFs (associated with 1 tenant) with lack of access to tenancy certificate over Guthi land, though reportedly using it could not be made payment; *NWEDC however confirmed that, should these people be able to get the tenancy certificate, payment will be made to them like the rest of the tenants.* |
| | **Landlessness** | | |
| 2 | Landlessness | • 7 PAFs lost all land and structure in 2015. They were paid compensation and they bought an alternate land together and constructed new houses there. They continued to reside in the old house at the Project site pre-earthquake. Post-earthquake they moved to the IDP camps | • No significant gap |
| | **Residential loss** | | |
| 3 | Physical Displacement | In 7 instances, the household was the primary residence. With the compensation amount, they<br>• Either constructed a new house with the compensation amount; | • No significant gap |

| S.No. | Type of Loss | Observation | Gaps |
|---|---|---|---|
| | | • Shifted to the alternate house available with them;<br><br>Of these 7, in one instance, the old house was damaged during road construction, which was compensated by the Project and a new house was constructed at the same location.<br><br>In 6 instances, it was alleged that though there was alternate house available for residential purposes, new construction was started for the purpose of compensation. The compensation was paid early and new houses were constructed either in Haku VDC or in Kathmandu.<br><br>The Project is presently in negotiation for procuring an additional 7 structures, which are all primary residences | |
| | **Non-Residential Loss** | | |
| 4 | Loss of structure | • Out of the total 29 structures impacted in 2015, in 10 cases the compensation amount was paid after the deduction of a scrap value of 2.5% and depreciation value of 10% on the reduced amount after deduction of the scrap value.<br>• On the other hand, in cases an additional 13% VAT was paid on the total valuation, without deducting the scrap value or depreciation value; this was primarily done in case of new houses;<br>• Right to salvage materials from the existing structure, even if compensated. | 7 more structures were identified in 2015 which were not considered for compensation.<br>• 2 of these structures were incomplete and hence not considered for valuation and therefore no compensation was paid;<br>• In 5 other instances the structures were constructed, while the negotiation on rates was completed and some of the land parcels (with potential infighting in the families), related issues were being facilitated by the DAO.<br><br>The compensation amount was paid in 10 cases after the deduction of a scrap value of 2.5% and depreciation value of 10% on the reduced amount after deduction of the scrap value.<br><br>This difference in compensation amount paid will be closed by the first quarter of 2018. |
| | **Livelihood Loss** | | |
| 5 | Crop | • Harvesting was allowed for the standing crops. | • As part of the negotiation process, the land owners reported to not being aware of |

| S.No. | Type of Loss | Observation | Gaps |
|---|---|---|---|
| | | • NWEDC indicated that the compensation paid for the land was an appreciated value, aimed at also allowing for a compensation of crops on the land. | the compensation amount including the crop and tree compensation<br>• However for the families starting cultivation in a new plot of land or switch to a non-agriculture based livelihood there will be transition support. |
| 6 | Trees on Private land | • Individually owned tree loss either not there or not accounted for<br>• Cash compensation for fruit bearing and timber trees based on the annual net market value multiplied by the remaining productive years were apparently not identified and compensated for.<br>• NWEDC indicated that the compensation paid for the land was an appreciated value, aimed at also allowing for a compensation of crops on the land.<br>• A number of trees on private land are understood to have been destroyed and uprooted due to the earthquake and subsequent landslides. Albeit an assessment of the number of trees damaged by the earthquake has not been undertaken | • Due to the fact that there was no documentation of the trees located on the private and guthi land, there may be instances where adequate compensation was not paid for the same |
| | **Natural Resources Loss** | | |
| 7 | Loss of Community Forests | • For tree loss in the Community Forest compensation was provided to the CFUGs in keeping with the provisions for the Forest Act 1993 and Forest Regulation of 1995<br>• NWEDC however maintains that extra/ additional amount compensation for CFUG is being paid.<br>• A significant proportion of the CFUG land has been reported to have been damaged due to the earthquake and following landslides. No assessment has been undertaken of the number of trees damaged. | • Loss of trees outside the Community Forest area has not been accounted for presently, as reported by CFUG.<br>• Such losses will be compensated as per legal provisions of the lease agreement |
| 8 | Fishery Loss | • Fishing was identified as impact by 13 HHs surveyed in 2015, | • No significant gap |

| S.No. | Type of Loss | Observation | Gaps |
|---|---|---|---|
| | | especially from the purpose of livelihood.<br>• These 13 families were reported to engage in fishing and having it as one of the sources of income.<br>• Transition support (seed capital or one time compensation) was identified as an entitlement to be provided along with livelihood support in 2015<br>• However, post-earthquake, none of the PAFs have reported undertaking fishing, for livelihood or recreation purposes | |
| | **Vulnerability** | | |
| 9 | Vulnerability | • Vulnerable households were not identified during the survey process; | • Additional entitlement or support for vulnerable PAFs required.<br>• The identification of such families to be an ongoing exercise and preference in the LALRP based on the vulnerability levels. |
| | **Gender based impacts** | | |
| 10 | Gender | • Not accounted for previously | • Women participation in LALRP implementation and monitoring process to be improved through the Gender Action Plan and SEP. |
| | **Stakeholder Engagement** | | |
| 11 | Stakeholder engagement | • Stakeholder engagement was undertaken during ESIA process and as part of land negotiation. | • Lack of adequate stakeholder engagement and lack of access to formal grievance redressal mechanism was identified as other key gap. |

# 7 LIVELIHOOD RESTORATION PLAN

This section frames the entitlement for the Project affected families and covers the additional mitigation measures agreed to by NWEDC and described in the previous chapter. These entitlements have been defined in keeping with the LRP formulated in 2015 and the changes that have occurred in the socio-economic baseline of the AoI and the profile of the PAFs since then.

## 7.1 CONTEXT

Livelihood restoration measures are required to mitigate adverse project impacts on affected communities (i.e., to mitigate economic displacement caused by Project-related acquisition of arable land and associated loss of access to natural resources). The selection of appropriate livelihood restoration strategies has, however, been greatly complicated by the effects of the 2015 earthquake, which devastated PAFs' homes, lands, and access to resources, forcing many of them into temporary IDP camps, and completely interrupting their livelihoods. Nearly all of the PAFs are in flux and uncertain about their future plans, with many still living in IDP camps three years after the earthquake. In this context, it is difficult to separate livelihood restoration needs associated with Project impacts (for which the project is responsible) with similar larger scale relief needs associated with earthquake impacts (for which the Government is responsible).

Project discussions with PAFs on the topic of livelihood restoration have spanned the pre-earthquake and post-earthquake scenarios: the most recent surveys and discussions occurred in 2017, while the bulk of PAFs were still resident in multiple IDP camps and prospects for re-establishing housing and agriculture in the project area were very uncertain. Some of the families want to return to their home villages, others seem to prefer being closer to some of the larger towns and the more diverse economic opportunities they offer, and still others are afraid to return to their villages for fear of more earthquakes, but also do not have the skills to be marketable in the larger towns.

In this context, a "one size fits all approach" is not appropriate. This *Consultation Draft* Livelihood Restoration Plan takes a more flexible approach, focusing on helping the PAFs address their basic need of constructing safe housing, while presenting a range of stable livelihood options. As Government reconstruction grants have started to flow, some of PAFs have begun to return to the Project area to rebuild their houses and cultivate their land. This suggests that Project-related livelihood restoration options should focus on gaining access to arable land (either in their original villages or elsewhere), in order to achieve long term rehabilitation.

Recognizing that the situation on the ground is still evolving, the Project plans to continue engaging with PAFs through the forthcoming FPIC process to

determine optimal livelihood restoration strategies - and associated PAF priorities - in the post-earthquake context. NWEDC will update the LALRP to reflect these preferred strategies and options.

Some of the critical aspects to be kept in mind for the formulation and implementation of the LALRP are discussed in the subsequent sub sections. This context has in turn informed the identification of specific entitlements and the implementation mechanism.

### *7.1.1 Present Residence and Associated Vulnerabilities*

- While UT-1 has supported the PAFs in the earthquake relief efforts, the PAFs are still in a state of flux and uncertainty, with lack of clarity on the permanent residence and their inability to find steady sources of income to meet their livelihood needs.
- In their current places of residence, it has been reported that though the income of PAFs has increased in certain cases, their expenditure has increased by a much greater proportion.

### *7.1.2 Project Compensation Money and Impact on Livelihood*

- PAFs from Haku Besi and Phoolbari, received higher compensation amounts as they had on an average larger parcels of land. This enabled them to have greater flexibility of utilising it for purchasing land, investing in purchase of trucks or setting up small business enterprises.
- A few PAFs from Haku Besi and Phoolbari bought land near Dhunche to set up their own small enterprise in Dhunche, even prior to earthquake in some cases. Nearly 4 PAFs from Haku Besi and Phoolbari reported to have bought trucks and started transport services.
- In contrast, the PAFs from Gogone and Tiru, have received on an average approx. 2-4 lakh NR per family. Due to this limited amount of disposable money it was primarily used for buying household provisions, earthquake relief, and similar activities, and could not be invested in land and other remunerative assets.
- Of the total 142 PAFs, approximately 7 PAFs have settled in Kathmandu using their compensation to buy land there.

### *7.1.3 Aftermath of the Earthquake and immediate relief activities*

Immediately following the Gorkha earthquake, a number of relief activities were undertaken by NGOs/INGOs as well as by NWEDC in the earthquake affected area. Post-earthquake, the local community established IDP camps in the Rasuwa and Nuwakot districts. The relief activities undertaken by the NGOs/ INGOs in the area were led and coordinated by the DAO. NWEDC was reportedly given responsibility for the relief activities in the Haku VDC till December 2015.

NWEDC provided relief in the form of evacuation support through helicopters, with preference being given to the elderly, the physically challenged and the physically injured. In addition to this, NWEDC also provided relief material in the form of tin sheds, bamboo, daily provisions and food supplies in the IDP camps. In these relief activities, no differentiation was made between PAFs and Non-PAFs. NWEDC continues to support the development of social and physical infrastructures in the area, through the rebuilding of two schools (Haku Besi and Dhunche), one health centre and removing rubble from local roads.

In addition to this, a number of NGOs/ INGOs provided relief support in the area in terms of daily provisions, food and skill based trainings and livelihood support. However, despite, all this support, the local community sentiments in the area is characterised by a deep sense of instability and uncertainty, with no near visibility of a home and secured livelihood. Presently, the government, through the National Reconstruction Authority (NRA), and NGOs such as the Dhurmus Shanthali Foundation are in the process of constructing alternative housing for those villages, whose land has been declared inhabitable post-earthquake. While some households in the Project area have also returned back to their original habitation on a permanent and temporary basis, some continue to reside in the IDP camps due to fear of safety and risk of landslides.

### *7.1.4 Post-Earthquake- Livelihood Changes in Project Area*

Post the earthquake, most of the people in the former Haku VDC were rendered homeless and had lost either all or a larger part of their assets. The people started searching for new areas to settle, which could prove to be safer (as well as affordable for them), in light of the aftershocks of earthquake and consequent landslides.

The PFAs were largely engaged in subsistence livelihoods prior to earthquake. The people cultivated their own land in their original villages and the produce was primarily used for self-consumption. The need for other utilities (e.g., dairy products, poultry) was fulfilled from their livestock and poultry, while the rest could be brought from the local shops in the village. *Kodo* used to be the staple diet of the people, while rice was selectively used or used for limited part of the year and especially during festivities. Hence, the need for earning additional livelihood was limited. The youths in some instances had started venturing outside the country in search of employment opportunities. Selling of the extra produce, livestock and its products constituted other sources of income, which helped meet the basic needs which could not be produced in the village.

NWEDC's land compensation changed the economic status of the affected families, especially in cases where a PAF received a large payment. In the Haku Besi area, the amount received per PAF was relatively higher and the pattern of investment was also different as compared to Gogone. PAFs from Haku Besi area bought alternate land either in Kathmandu, Dhunche, or

Ramche, either as investment or for constructing house or using the constructed building for renting purposes. Some of the PAFs also invested their money in buying trucks for a transportation business. A lot of PAFs either upgraded their existing house or constructed a new house in native village.

After the earthquake, the PAFs, who traditionally engaged in land and livestock based livelihoods to a large extent, did not venture out in search of livelihood for the initial few months. The relief support provided by NGOs and Government and their personal savings (including compensation money from UT-1 in some cases) helped these displaced people to stay afloat for a few months. However, 10 to 12 months after earthquake, the external aid started diminishing and the people had to resort to searching for sources of livelihoods. During this time, certain PAFs:

- Started visiting their original villages to initiate cultivation on land remaining after earthquake;
- Started evaluating possibilities of renting land near their IDP camps to initiate cultivation near their places of residence;
- Started looking for jobs as wage labourers which would fetch them earnings on a daily/ weekly basis. The activities requiring limited skill, e.g., working as unskilled construction labour, stone breaking, etc. were one of the prominent sources of livelihood initially.

The efforts of the PAFs, to some extent were augmented by the NGO/INGO interventions in terms of livelihood trainings, which helped them learn new skills to enhance income. The NGOs (focussed on livelihoods) were active near Naubise and Bogetitar areas and their intervention were limited to areas around Dhunche.

### *7.1.5 NGO activity in the Rasuwa District*

The influx of NGOs began right after the earthquake and the level of grants was at its peak during that period. There have been developmental efforts in areas of provision of supplies, reconstruction, trainings, etc. during the period between May 2015 and May 2016 in the IDP camps; involving the local community in the Project area. The number of NGOs active in Rasuwa District during the first year post earthquake was reportedly 200 (some of them directly on the ground while others through their local NGO partners) and it reduced to nearly 20 to 25 in the first quarter of the second year (2017), and has continued decreasing gradually. During the consultations with NRA Project implementation Officer (PIO) in March, 2017, it was mentioned that during this time there were nearly 18 NGOs and INGOs involved in various interventions which revolve around livelihood, capacity building, house reconstruction, WASH, child care, education etc. Some of the key NGOs and their area of interest are discussed subsequently.

*Table 7.1 Key NGOs in Rasuwa District According to Area of Interest*

| NGO/INGO | Area of Interest |
|---|---|
| Build Change; | Housing Reconstruction |
| Lumanti; (with Parivartan Nepal) | Housing Reconstruction and livelihood restoration |
| Nepal Red Cross; | Housing Reconstruction |
| Batas Foundation; | Housing Reconstruction |
| Manekor. | Housing Reconstruction and livelihood restoration |
| LaCCoS | Livelihood Restoration |

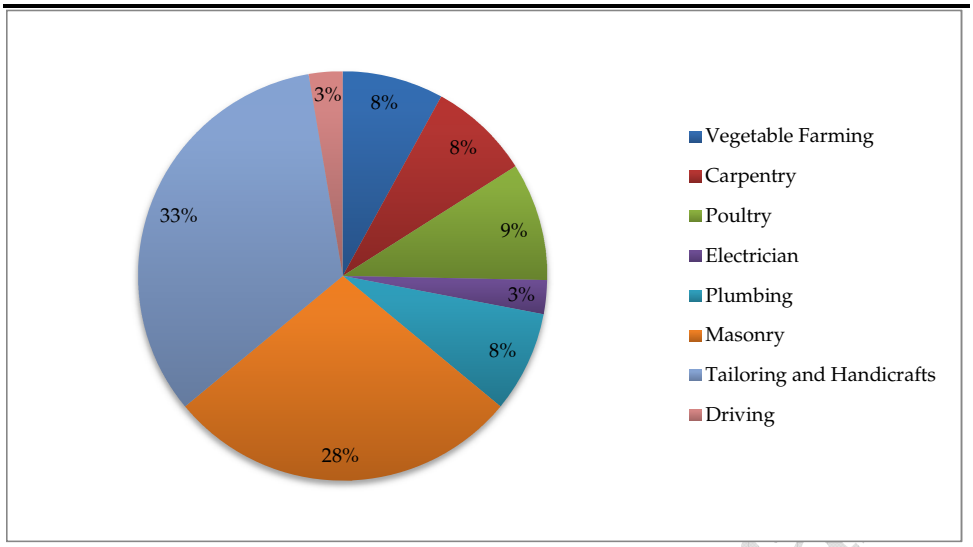
The current activities are reported to the NRA in quarterly coordination meetings. Most of the INGOs and national level prominent NGOs (like Parivartan Nepal), bilateral and multilateral agencies are operating in the Rasuwa District through selected local NGO partners who have a long standing presence and resources in the area. The key NGOs presently active in the IDP camps of Naubise and Batar include Manekor, LACCOS and Lumanti. Lumanti has also been undertaking livelihood restoration trainings in the IDP camps, in collaboration with Parivartan Nepal. Consultations with the NGOs indicated that most of these interventions related to livelihood support and training will be over in the period from June to October, 2017 and there is lack of clarity on further fund availability for these kinds of interventions.

In Dhunche area, where the PAFs of Haku Besi and Phoolbari are residing, very few interventions have been undertaken by above mentioned NGOs. The limited number of trainings provided to PAFs has been through Cottage and Small Industries Board.

*Trainings Provided to PAFs*

The trainings conducted for the PAFs range from group level trainings (e.g. Training for electrician, mason etc.) to individual and household level training (vegetable farming, poultry and boar farming, etc.). From the discussions undertaken with the PAFs and other trainees in general, it is understood that these trainings were aimed at allowing for PAFs to sustain themselves and rebuild their livelihoods, both in Nepal or through foreign employment. The following figure shows the trainings received by the PAFs on different skills in detail.

*Figure 7.1 Details of the trainings undertaken by PAFs*




*Source:* LALRP HH Survey, 2017 based on the responses given

*Table 7.2 Livelihood Support by Main NGOs in Rasuwa District*

| NGOs | Men Focused | Women Focused | Men and Women Focused | Other support | Funding Support |
|---|---|---|---|---|---|
| Manekor | • Tourism Capacity Building<br>• Sherpa/mountaineering/ porter Training<br>• Plumbing training<br>• Electrician Training<br>• First aid Veterinary training | • Machines for Spice grinders<br>• Tailoring training<br>• Sewing Machines | • Bakery and Cooking Training<br>• Infrastructure support<br>• Water Sanitation and Hygiene training<br>• Seed capital for enterprises<br>• Farming equipment<br>• Ground apple cultivation<br>• Coffee machines for tourist lodges<br>• Boar Farming | • Provision of Accommodation and travel for those attending training<br>• Drinking Water provision for impacted villages<br>• Establishment of user committees<br>• Market linkages | • UNDP<br>• DfID<br>• LWF<br>• Save the Children |
| **LACCOS** | • Training for Tomato farming<br>• Driver training<br>• Electrician training<br>• Mobile repair training<br>• Mechanic training | | • Livelihood Promotion Programme<br>• Local Governance Community Development Programme<br>• Sustainable Action for Food Security and Resilience Programme | • Financial Assistance immediately post-earthquake<br>• Irrigation and water systems<br>• Construction of training centre<br>• Market place for vegetables and other produce<br>• Water Supply to local schools | • USAID |
| **Lumanti (in collaboration with Parivartan Nepal)** | • Plumbing training<br>• Electrician Training | • Daka making training | • Poultry farming training<br>• Vegetable farming training<br>• Boar farming training<br>• Seed capital for poultry and boar farming<br>• Soap making training | • Reconstruction Assistance to NRA | NA |

*Source:* Limited consultations with NGO

The prominent names of training providers reported by the PAFs in the survey conducted in May, 2017 are:

- Small and Cottage Industries Development Board;
- ACF;
- Gharelu;
- Asia;
- Parivartan Nepal; and
- Lumanti.

The NGOs have undertaken the livelihood trainings in order to build capacities of the people in their areas of operation in Rasuwa District on certain basic skills. The NGOs have been very active in areas near Naubise, Bogetitar, Satbise and Batar, where one or more people from Project affected families have been reported to have attended one or more skill trainings. However, the scenario in Dhunche is remarkably different where skill trainings have not been received by a majority of PAFs. The following table provides an understanding of the manner in which Lumanti (supported by Parivartan Nepal) provided various trainings to people residing in Naubise camp (people from Gogone, Tiru, Mailung etc.).

*Table 7.3 Details of Training (earthquake affected families residing in Naubise Camp)*

| Training | Number of People per Batch | Duration per batch | Support Provided to beneficiaries by Lumanti supported by Parivartan Nepal |
|---|---|---|---|
| Poultry Farming | No batch size limitation | 7 days | • Accommodation<br>• Meals<br>• Travel Allowance based on the following:<br>o 1 hour of walking: NPR 100<br>o Bus travel: ticket refund |
| Vegetable Farming | No batch size limitation | 7 days | |
| Driving | ~20 | 21 days | |
| Plumbing | ~20-25 | 390 hours/ 65 days | |
| Masonry | ~25 | 7 days | |
| Electrician | ~20 | 390 hours/ 65 days | |
| Daka Making | ~20-25 | 390 hours/ 65 days | |

*Note:* Consultations with PAFs in Naubise IDP camp

In addition to the NGOs, the cottage industry department in Dhunche also provides certain trainings, as discussed in the following table.

*Table 7.4 Trainings provided by the Cottage Industry Department in Dhunche*

| S. | Training Head | Location | Target | Duration | Women | Men | Total Trained |
|---|---|---|---|---|---|---|---|
| 1 | Daka making | Bhorle | 10 | 03 months | 10 | | 10 |
| 2 | Industrial Growth Programme | | | | | | |
| 2.1 | Daka making | Danda gaon | 10 | 2 months | 12 | | 12 |
| 2.2 | Hosiery making | Danda Gaon | 10 | 45 days | 15 | | 15 |
| 2.3 | Hosiery making | Thullu Gaon | 10 | 45 days | 21 | | 21 |
| 2.4 | Daka making | Thullu Gaon | 10 | 2 months | 12 | | 12 |
| 3 | Advanced Entrepreneurship | | 20 | | | | |

| S. | Training Head | Location | Target | Duration | Women | Men | Total Trained |
|---|---|---|---|---|---|---|---|
| 4 | Shyama Making (conventional Enterprise growth programme) | Syaphru Bazaar | 10 | 45 days | 10 | | 10 |
| 5 | Shyama Making (capacity development and employment programme | Syaphru Bazaar | 10 | 45 days | 15 | | 15 |
| 6 | Youth Entrepreneurship and Industrial Manpower Development Programme | | 20 | | | | |
| 7 | Entrepreneurship Development Training | Syaphru | 20 | 10 days | | | 0 |
| 8 | Specific Training Programme for Earthquake Affected People | | 100 | | | | |
| 8.1 | Sewing and Tailoring | Bogetitar | | 3 months | 12 | | 12 |
| 8.2 | Worker training | Jivjive | | 45 days | 2 | 9 | 11 |
| 8.3 | Mechanic | Bogetitar | | 45 days | | 22 | 22 |
| 8.4 | House wiring | Thambuchet | | 45 days | 3 | 14 | 17 |
| 8.5 | Plumbing | Thambuchet | | 45 days | | 15 | 15 |
| 8.6 | Worker training | Thullu Syaphru | | 45 days | | 15 | 15 |
| 8.7 | Worker training | Ramche | | 45 days | | 10 | 10 |
| 9 | Capacity Development | | 16 | | | | |
| 9.1 | Sewing and knitting training for prison inmates | Dhunche Prison | | 3 months | | 10 | 10 |
| 9.2 | Sewing and knitting training | Dhunche office | | 3 months | 11 | | 11 |
| 9.3 | Nepali handmade paper making | Bogetitar | | 2 months | 8 | 2 | 10 |
| 9.4 | Aaran Improvement and Remission Training | Kalikasthan | | 15 days | 5 | 5 | 10 |
| 9.5 | Jacket making | Itpare | | 45 days | 5 | 9 | 14 |
| 9.6 | Bracelet and Necklace making | Ghaderi danda | | 15 days | 9 | 1 | 10 |

*Source:* Small and Cottage Industries Development Board; Dhunche

The intent of undertaking skill trainings and the extent of their utilisation varies among families. The story of one family having undertaken multiple skill trainings is captured in the figure below.

*Figure 7.2 Case Study of Family with Multiple Skill Trainings*

| Case Study: Name of the Person and Name of case study |
|---|
| UrjanSing Tamang.: multiple trainings received |
| **Detailed Case Study** |
| UrjanSing Tamang, a resident of Bogetitar IDP camp presently received Masonry training for 45 days from Cottage and Small Industries department and Masonry training from ACF for 7 days. He also received training for 45 days for Carpentry from Cottage and Small Industries.<br>His wife Jejhum Tamang received sewing and knitting training for 45 days from Paribartan Nepal and his daughter Samjhana Tamang received sewing and knitting training for 90 days from Cottage Industries. In spite of attending many skill trainings, this family couldn't convert the trainings into gainful livelihood opportunities. It was understood that the Masonry training by ACF was for mud houses, which has limited market after the failure of mud houses to withstand earthquake and landslides. Similarly, the carpentry and other masonry training is reported to have not given regular employment.<br>The sewing and knitting trainings provided to the females in the house is without market linkage, which led to stopping of these activities after withdrawal of NGO support. Urjan Singh's daughter while being consulted mentioned that she is not interested to pursue sewing and knitting related livelihood in future. Thus, the numerous trainings undertaken by this family have not proved helpful in providing a stable source of income to this family. |
| **Key Inference** |
| Some people who undertook training, may have done so, without understanding the usefulness or requirements of the trainings. Certain people have also undertaken trainings just to get the daily allowance and meals. It has been reported that some of the trainings may not have been relevant to the present market conditions. The presence of multiple NGOs/INGOs in the area, resulted in same people getting multiple trainings; however, market linkage and actual desirability or ability may have been ignored |

The discussions with the local community on the trainings have helped in understanding their takeaways from the training and the challenges in fully utilising the learning which are listed below:

- A lot of households in the IDP camps (except Batar and Satbise) have received one or more livelihood trainings;
- The number and range of trainings by NGOs was larger in Naubise and Bogetitar areas, as compared to Dhunche;
- Most of the people have been trained on basic skills, which were scaled up and beneficially utilised by certain people and could not prove helpful for many others;
- People having received masonry, plumbing, electrician trainings have been able to gain some employment in the nearby areas and urban centres;
- Women of some families have engaged in small collective vegetable gardens to meet their daily family requirements. The seeds are provided by the NGOs and the entire operation is also presently regulated by NGO representatives. However, the independent functionality and success of these groups will be understood after the NGO support is withdrawn;
- Some of the people trained on masonry skills have reported to be trained on construction earthquake resistant houses, which they think is an essential skill in Nepal; and
- The people who got trained as carpenters reported that the training has been essential for building a new skill, but the demand of this skill is not extensive and hence earnings are irregular.
- As part of the various earthquake relief and skill building activities, the NGOs identified specific skill training for each of the groups was identified keeping in mind the expectations, capacity and practical feasibility of each activity identified for each group.
- The initial assessments undertaken by the NGOs on each target group helped them in identification of behavioural patterns and expectations of each group (enlisted in), which helped in charting out the implementation Plan for the training activities. these characteristics for the main groups, is as listed below

*Table 7.5 Characteristics and Expectation of Target Groups*

| Target Groups | Characteristics |
|---|---|
| **Women's Groups** | • The members of which engage in different activities like handicraft, hotels, business enterprise, poultry, etc.; hence there is not much competition;<br>• Expects clear communication and transparency in terms of support provided, timelines of various activities;<br>• Want clarity in the group selection criteria;<br>• Good field agent is critical for successful intervention with this group. |
| **Men's Group (25-40 years)** | • They are the main breadwinners of the family and hence tend to turn self-centred when opportunity comes, especially in the given scenario, where the source of income are less;<br>• A considerable proportion of this group is illiterate and hence less aware;<br>• The educated and financially comfortable individuals take responsibility for the group at large and emerge as opinion leaders and decision makers for the group;<br>• This group has an inclination towards working as construction labourers /masons as it is considered as a masculine activity;<br>• The illiterate members of this group are apprehensive of working/ attending trainings in groups, especially with literate folks. |
| **Youth Group (17-25 years)** | • Energetic and quick learners;<br>• Clear decision making and thought process;<br>• Involvement in the development and welfare of the community;<br>• Open to working in groups<br>• Interested in conducting adult literacy classes for the community |

The trainings provided some skills and cash based support, but its utilisation petered out after the withdrawal of NGO support and facilitation. Only some people could translate the trainings provided into gainful employment (mostly in occupations like masonry) or undertaking poultry farming activities. Since the period between January 2016 and April 2017 witnessed a lot of activity on reconstruction and rehabilitation front, there was a huge requirement of masons, which was fulfilled by some of these trained people.

Some of the general reasons identified for the trainings being unsuccessful are enlisted below.

- Apparent lack of willingness of individuals to pursue regular employment;
- There are certain people who attended training just for the sake of being engaged and to earn the allowances being paid to attend trainings;
- A large part of the community people do not want women to go out and work for low wages;
- People have limited understanding and awareness about the scope and possibilities of employment and need elongated period of hand holding;
- In some PAFs, the people are engaged in foreign employment, which fetches comfortable income. The family members of such families are less interested in making an effort even after receiving trainings.

Furthermore, the women trained on tailoring, weaving and mat making could not continue with the same after withdrawal of NGO support. The people were trained with basic skills of tailoring and handicrafts, which equipped

them enough to manage household needs. However, these trainings could not result in income generating activities because of the following reasons:

- Lack of advanced or specialist skills and the general interest in taking things forward without support;
- There was reportedly poor finishing of the products which limited their sale in the market; and
- Lack of market linkage provided as part of the training.

### *7.1.6 Consideration in the Identification of Entitlements going forward*

- The people from Gogone and Tiru with lesser savings and practically no access to land for cultivation would need intervention at a greater level in order to restore their livelihood;
- Land based livelihood options will not be feasible for PAFs residing in Naubise, Batar, Bogetitar, Khalde and Satbise due to saturation of land around these areas and higher rates for rent or purchase;
- The prospects of involving PAFs who have shifted to Kathmandu permanently are weak, and should be re-confirmed at the time of implementation;
- In trainings involving group based activities, it is essential to segregate people with limited education from educated people in order to ensure better learning of members of each group;
- Trainings which would help gaining better salaries in foreign countries have been identified for LALRP in order to assist the people looking for foreign employment.

It is in keeping with this context, the LALRP has been formulated, with the aim of restoring the livelihoods of the PAFs. However, it is to be noted that this LALRP has been designed and developed in keeping with the present socio-economic and residential status of the PAFs. This status is in a state of uncertainty and flux and as such the LALRP is a living document and the Micro Plans/ entitlements for each PAF will need to be agreed and finalized only after consultation with the PAFs.

Furthermore the additional land take being planned by the Project will be guided by this LALRP itself, in terms of principles of livelihood restoration, and benefits and entitlements to be given to eligible entities.

## *7.2 PRINCIPLES GOVERNING THE RESETTLEMENT AND REHABILITATION PROCESS*

The LALRP for the Project will be implemented in accordance to the following principles:

- Restore, if not improve, the living standards of the PAFs to pre-Project levels;

- Provide livelihood support to all the PAFs, such that at least one member of the PAFs, depending on their skills and age, age-appropriateness will be provided with either:
  - Direct employment with the Project;
  - Contract business opportunities with the Project;
  - Training on occupational skills with market linkage support;
  - Seed capital for business in line with existing skills and additional technical support; or
  - Special allowances in case of the elderly and physically and mentally differently abled who cannot be engaged in livelihood generation activities.
- Ensure the PAFs are able to sustain their livelihoods once support from the Project ends;
- Integrate gender equality into all components of the entitlements to ensure practical and tailored benefits for women and vulnerable households;
- Finalize the LALRP after obtaining input from the PAFs during the FPIC process;
- Implement the LALRP in a participatory and consultative manner;
  Establish Key Performance Indicators and monitor the effectiveness of the LALRP throughout its implementation, making adjustments as needed to ensure success.

While the entire PAF group is considered vulnerable, even within this larger group, there needs to be a prioritisation of the more vulnerable PAFs:

- Those without any productive agricultural land and those without any potential source of income;
- Physically and Mentally differently abled individuals;
- Elderly (60 years and above)
- Single women headed households
- Those still residing in IDP camps
- Other PAFs

### *7.2.1 Process Commitments*

- This LALRP shall be implemented taking in cognizance the other commitments made as part of the SIMF for the Project;
- A formal disclosure of the final implementation Plan, the phases of its implementation, coverage of number of members from each PAF in each phase will be undertaken;
- Agreement and consent will be sought on micro Plans for each PAF by the implementation partner, prior to initiating implementation.
- As part of the discussions on the micro Plan, a verification will be undertaken of the individual entitlements identified per PAF.

## 7.3 *ELIGIBLE ENTITIES IDENTIFIED*

The eligible entities for entitlement have been identified on the basis of the impact assessment process. Based on the understanding so developed, the following losses are identified for LALRP support:

- Loss of Structure with formal rights on land- Those PAFs whose house/ structure was impacted and who have formal rights on land
- Loss of Structure without formal rights on land – Those PAFs who have been using house/structures without proper land documents - e.g. encroachers;
- Loss of Livelihood – Impacted PAFs due to loss of private land and Guthi land with formal rights/certificates on land;
- Loss of Livelihood- Impacted PAFs without ownership certificate;
- Loss of non-residential structures;
- Community Property Users; like members of impacted CFUGs; and
- Vulnerable Population as identified in ***Section 4.2.10***-This group can be bifurcated into two groups-
    - Vulnerable PAPs/ PAFs who cannot be engaged in Livelihood Activities and
    - Vulnerable PAPs/PAFs who can be engaged in livelihood activities

## 7.4 *ENTITLEMENTS FOR RESETTLEMENT AND REHABILITATION*

The following table provides a description of entitlements and assistance proposed to PAFs, in addition to the compensation already disbursed by the Project. It should be noted that most of the PAFs will be eligible for more than one category of entitlements; depending upon the profile of the PAF and the nature of impacts. In such cases, the PAFs shall be eligible for all entitlements identified under various criteria. However, no duplication of entitlements (except for cash compensation where relevant) shall take place.

*Table 7.6 Summary of identified entitlements for impacted entities*

| Impact | Entity | Approximate Number | Rationale | Entitlement |
|---|---|---|---|---|
| **Loss of Structure and Livelihood** | PAFs with formal rights / Lal Purza or Tenancy Certificates[1] | • 20 Land owners with Lal Purza, whose land has been bought by the Project.<br>• 17 Land owners with Tenancy Certificate (for Guthi land) who land has been procured by the Project.<br>• 1 land owner without tenancy certificate (for Guthi land) whose land has been procured by the Project | • The people have lost land as well as structures (residential and non-residential);<br>• The land sold to the Project has been compensated for at considerably higher market rates Cash compensation of 5 lakh/ ropani was paid. The market rate prevalent at the time of land transaction was NPR 10,000-50,000 per ropani;<br>• People continued to use/reside in the land till the earthquake. | • Priority for direct employment/ contractual employment and opportunities or<br>• Livelihood Support<br>• Transition Support for those undergoing training, for the duration of the training (expected to vary from 15 days to 6 months depending upon the training) and additional six months, calculated based on the minimum wage of NR 8,000[2] per month |
| | Impact on structure (both residential and non-residential structures ) on land with formal rights | • 29 structures (18 PAFs) have been impacted by the Project, as identified in the LRP made in April 2015.<br>• The complete compensation has not been paid in 19 of the total 29 structures identified.<br>• In addition to this, 7 additional structures | • The structures comprised of residential and non-residential structures;<br>• The residential structures primarily comprise of secondary residents used by the community during agricultural cycles;<br>• The non-residential structures comprised of water mills and cowsheds.<br>• The valuation of the structures was undertaken by DUBCD, Nuwakot division and compensation was paid for, based on the valuation | • Pay compensation for the 12 structures; already assessed by DUBDC; at replacement value, without deduction of depreciation cost and scrap value and inclusive of VAT;<br>• For the 7 structures not evaluated in 2015 and the new 7 structures under consideration, pay replacement value, in consultation with the DAO office and Jan Sarokar Samiti;<br>• Shifting allowance where required ( most families are not living in these structures). |

[1] As mentioned earlier, the Tenancy Certificates were obtained for the land parcel to be sold by the families, with the assistance of Project.

[2] https://www.minimum-wage.org/international/nepal)

| Impact | Entity | Approximate Number | Rationale | Entitlement |
|---|---|---|---|---|
| | | are under consideration by NWEDC<br>• A total of 14 primary residential structures belonging to 12 PAFS have been impacted. | | |
| **Loss of livelihood** | Livelihoods based on land with formal or informal rights (without tenancy rights) | • 142 PAFs | • The people using these land parcels have lost land linked livelihoods. | • Priority for direct employment/ contractual employment and opportunities or Livelihood Support as discussed subsequently<br>• Transition Support for those undergoing training, for the duration of the training (expected to vary from 15 days to 6 months depending upon the training)and additional six months, calculated based on the minimum wage of NR 8,000 per month |
| **Common property** | Community Forest User Groups | 5 CFUGs | • | • Compensation for trees to the CFUGs (refer Section 6.4) through Escrow fund<br>• Support in rebuilding Community Forest- if demanded and feasible ;<br>• Support in forest management initiatives to do improve remaining forest cover and/or rehabilitate destroyed areas<br>• Training and capacity building of the CFUGs for rejuvenation and management of Community Forest area.<br>• Financial Literacy training to the CFUG members for the management of cash compensation received |
| Are ableVulnerable Groups | Vulnerable Individuals/PAFs who can be engaged in livelihood activities | • Lack of Any potential source of income: 25 PAFs<br>• Landless or lack of productive agricultural land: 76 PAFs | This group is comprised of those who are currently in an enhanced vulnerable position due to their socio-economic standing, but can be engaged in livelihood generating activities. | • Preference in livelihood restoration for direct employment, petty contracts and contractual work generated by the Project or Preference in livelihood support;<br>• Transition Support for those undergoing training, for the duration of the training (expected to vary from 15 days to 6 months depending upon the training) and |

| Impact | Entity | Approximate Number | Rationale | Entitlement |
|---|---|---|---|---|
| | | • Singled Women Headed Households: 9 PAFs | | additional one year, calculated based on the minimum wage of NR 8,000 |
| | Vulnerable Individuals/ PAFs who cannot be engaged in Livelihood Activities | • Differently Abled:5 individuals<br>• Elderly: 7 individuals | • This group comprises of those who may be unable to undertake livelihood generating activities and are thus dependent upon other family members for maintaining them. | • Transition allowance based on minimum wage of NR 8000 per month for a maximum of 2 years, till the families that support them are able to restore their livelihoods and have stable incomes.<br>• Each such vulnerable individual or family to be monitored and additional support considered where necessary. |
| Temporary loss of livelihood | PAFs giving land on lease basis | • NWEDC is presently negotiating with 7 PAFs | • This category of PAFs may be impacted by the future land procurement for the Project | • The land shall be leased in keeping with then prevalent replacement value;<br>• Adequate compensation shall be provided at replacement value for the structure, tree and crop loss if these need to be removed.<br>• The land should be restored to the original state at the time of return |

On the basis of these entitlements, an Entitlement Matrix has been prepared for the Project, and is attached as ***Annex D***. The entitlements in the entitlement matrix have been identified based on the eligibility criteria established above and the preferences of the PAFs surveyed. The following table provides a summary of the number of individuals identified against each key entitlement identified.

*Table 7.7 Livelihood Entitlement Options summary*

| S. No. | Entitlement | Number of People |
|---|---|---|
| Employment and contract Opportunities | Direct Employment | 52 |
| | Contractual Opportunities | 6 |
| | Wage based Work | 20 |
| Skill Enhancement Trainings | Poultry | 19 |
| | Boar Farming | 4 |
| | Goat Farming | 8 |
| | Driver/ Mechanic | 16 |
| | Masonry | 12 |
| | Electrician/ Plumbing | 13 |
| | Cooking | 6 |
| | Computer | 21 |
| | Tailoring/ Sewing/ Knitting | 38 |
| Seed Capital for Business Enterprise | Seed Capital for Business Enterprise | 7 |
| Transition support to vulnerable individuals/families | Transition allowance | 12 |
| **Total** | | **234** |

*Source:* LALRPHH Survey, 2017

It should be noted that this is an indicative list, based on the preliminary feedback of the PAFs. Also, presently this list reflects multiple choices identified by the PAFs. This shall be verified and finalized as part of the Micro Plan formulation discussed subsequently.

## 7.5 PROCESS OF IMPLEMENTATION OF ENTITLEMENTS IDENTIFIED

This section provides a description of the key steps to be followed during the implementation of the entitlements identified. The ***Section 8***and ***Section9*** provide an understanding of the roles and responsibilities, resource requirements and reporting and monitoring mechanisms for the LALRP.

### 7.5.1 *Disclosure of LALRP*

The Draft LALRP shall be reviewed by NWEDC and the Lenders against the applicable reference framework and any changes required shall be identified. Once the LALRP has been updated with the comments, a non-technical summary of the same shall be disclosed to the local community and PAFs. This disclosure shall be undertaken in keeping with the process identified in Stakeholder Engagement Plan and consensus shall be sought from the PAFs on the basic contents of the same. It should be noted here that consensus is not

sought on the individual PAF level entitlements, but rather on the entitlements identified at the broad eligibility level. Furthermore, input shall be sought from the community on the process of implementation and the proposed implementation schedule. This disclosure process is expected to be undertaken in the first half of 2018.

### *7.5.2 Identification of an Implementation Partner and Other Associated Organizations*

The entitlements thus identified, are to be implemented by an implementation partner. Once there is a consensus to the LALRP and its provisions, NWEDC shall identify an implementation partner. The eligibility criteria for the Implementation partner are as identified in ***Annex E***.

The implementation partner will in turn identify NGOs/ INGOs, government bodies and other partners for implementing specific entitlements identified. A typical Terms of Reference for the Implementation Partner is provided in ***Annex E.***

### *7.5.3 Individual PAF Micro Plans and Agreements*

It should be noted that as part of the LALRP update survey, the PAFs have identified certain preferences for livelihood support from the Project, based on which the overall entitlements under this LALRP have been formulated. Once an agreement is reached on the entitlement framework of the LALRP, the implementation partner shall formulate a tentative Plan for each individual PAF (hereafter referred to as Micro Plans). These micro Plans should be based on the entitlement framework and the preferences identified, however, should provide flexibility in terms of the trainings preferred.

The implementation partner shall then undertake consultations (in the form of structured interviews) with each individual PAF, to discuss the micro Plans formulated. It is understood that due to the impacts of the earthquake, the socio-economic profile and residential status of the PAFs is in a state of flux and dynamism. In keeping with this as part of these consultations detailed discussions shall be undertaken on the present status of the PAF livelihoods and their preferences.

This consultation will take into account the current status of the PAFs, their locations, their current (or temporary livelihood), their choice of the support needed and agreed duration. Once consent is reached on the contents of the Plan, a formal agreement shall be signed with each PAF.
This agreement should provide an understanding of the following:

- Identification number of PAF (in keeping with that provided in the LALRP)
- Residence (original and present) details;
- Household level details;

- Details of Impacted Assets (along with layout and pictures wherever possible);
- Entitlements identified; and
- Timeline for implementation of the entitlements identified.

This agreement will be considered as the final document for implementation of LALRP.

### *7.5.4 Implementation of Specific Entitlements*

Once the micro Plans are disclosed and the agreements signed, the implementation partner shall undertake the implementation of the R&R entitlements identified. It should be noted that while the micro Plans are to be signed at an individual PAF level, the implementation of the entitlements should be undertaken in groups; to allow for time and monetary efficiency. Furthermore, the implementation of the entitlements will be largely dependent upon the residence of the PAFs at the time of implementation. Thus, the process of implementation shall be reviewed and updated as necessary, in keeping with aspects such as access, livelihood profile, resettlement options etc.

The key steps to be followed in each of the entitlements are discussed in the following Table 7.8.

For the purpose of ensuring the smooth implementation and the achievement of the targets set, the following Key Performance Indicators have been identified. These KPIs are to be used in the process of planning the interventions as well as the future monitoring which is to be undertaken and allowing for mid-course corrections; if required.

*Table 7.8 Implementation of Specific Entitlements*

| Approx. Number of Entitled Entities | Lessons Learned from Past Experience &Objective | Key Steps |
|---|---|---|
| Cash Compensation | | |
| • 2 who have been assessed but not paid compensation<br>• 10 who have not been paid replacement value<br>• 7 who were not considered for compensation | NWEDC has paid the structure owners cash compensation based on the evaluation of DUBDC. However, 2 of the 29 structure owners were not paid the compensation amount. 10 of the 29 structure owners were paid compensation after deduction of depreciation cost and scrap value. Furthermore, there were 7 incomplete structures which were not considered for compensation.<br><br>The purpose of this entitlement is to provide all impacted structures with a compensation amount at replacement value. Furthermore, the process of implementation is aimed at ensuring the proper utilization of the compensation amount received by the PAFs.<br><br>In case of additional land take, the rate offered should be in keeping with the then present replacement value | Planning<br>• Preferably the cash compensation shall be paid through cheques. However, the access to banking facilities shall be assessed. If banking facilities are not readily accessible by most PAFs, the Project may consider paying the compensation in cash;<br>• the bank details of each PAF which will be used for receiving/encashing the cheques for cash compensation shall be collected and verified;<br>Implementation<br>• In case of no bank accounts, and if desired by the PAF, provide assistance in setting up of bank accounts. This assistance may be in the form of helping the PAFs get in touch with Banks, understanding the procedures and Do's and Don'ts of maintaining bank accounts and completing the formalities for opening a bank account;<br>• Conduct money management/financial literacy trainings, prior to releasing cash compensation, to enable the entitled entities to effectively manage the money received and to invest the same in asset replacement/enhancement activities;<br>• To the extent possible, the compensation shall be released to both men and women members of the household.<br>• At the time of disbursing the compensation, ensure at least one VDC representative or District administrative representative is in attendance.<br>• Once the compensation amount has been released to the PAFs, a receipt of acknowledgement shall be signed and the entitlement shall be closed. However, the PAFs shall be provided with sufficient time to verify the compensation amount received in keeping with that identified in the micro Plan; |
| Priority in Employment Opportunity | | |
| • Direct Employment: 52<br>• Contractual Opportunities: 6<br>• Wage based Work: 20 | Presently, certain local community members are engaged as petty contractors and semi-skilled and unskilled labourers in the road construction.<br><br>This entitlement is aimed at providing preference in employment to at least one | Planning<br>• The priority for employment will be given to the members of enhanced vulnerable households, who are fit enough to take up and sustain employment opportunities provided by the Project<br>• This entitlement shall be implemented in keeping with the Employment and Skill Training Plan formulated for the Project. while the details of this entitlement are provided in the ESTP for the Project, some of the key steps are given as follows: |

| Approx. Number of Entitled Entities | Lessons Learned from Past Experience &Objective | Key Steps |
|---|---|---|
| | willing and eligible adult member per PAF, with an employment opportunity in the Project. This shall be subject to vacancies, and suitability of the candidates in terms of skill requirements<br><br>This employment in turn shall allow for the PAFs employed to seek opportunities in other avenues or projects, based on the experience and skill set gained | ○ Identification of employment avenues in the Project, including undertaking a detailed mapping of the positions where there is scope of employment (both permanent and contractual) over the span of Project lifecycle.<br>○ Mapping of the skills and educational requirements for each position;<br>○ Detailed mapping of the existing skill set amongst the PAFs. this will include a final consultation and agreement on the demographic details made available as part of the LALRP formulation;<br>○ Making a list of the eligible candidates from the PAFs based on the LARP survey data and further agreements with the PAFs ;<br>○ Creation of a year wise Plan of recruitment and skill enhancement (ESTP). It is understood that it may not be possible for the Project to recruit all eligible PAFs in a single instance. Thus a staggered recruitment Plan may be developed within the larger ESTP to allow for the engagement of the PAFs and local community members on a rotational basis (for unskilled and semi-skilled work);<br>○ This possibility of engaging individuals for certain time periods and/or on a rotational basis shall be discussed with the PAFs;<br>Implementation<br>• In keeping with the recruitment Plan formulated, provide induction training to the PAFs, prior to initiation of work activities. This induction training shall be in keeping with the overall systems and practices of the Project and shall provide an understanding of the job description, safety precautions to be undertaken, the grievance mechanism accessible etc.<br>• Provide hand holding assistance to the PAFs for fulfilling the documentation requirement for the Project;<br>• Undertake regular monitoring for the first two years, to ensure that the PAF are:<br>○ Able to work in a new environment<br>○ Not removed from the job after short period of employment and are able to generate livelihood for longer period of time and even after the construction stage;<br>○ Not discriminated against and are fairly treated and given ample opportunity to learn and work at site. |
| Training & Capacity Building and linkage to Project employment or other avenues | | |
| • Driver/ Mechanic: 16<br>• Masonry: 12<br>• Electrician/ Plumbing: 13<br>• Cooking: 6 | The skills and capacities of the PAFs are limited in nature. This in turn proves hindrances in their ability to avail the economic opportunities created by the various hydroelectric projects in the area. Thus, in order to facilitate the | Planning<br>• This entitlement shall be implemented in keeping with the larger ESTP being formulated for the Project<br>• Based on the present estimates of number of individuals per training, a detailed implementation Plan shall be formulated for each training. While identifying the specific implementation Plan, the primary purpose shall be to increase the existing skill sets in the community, to allow them to |

| Approx. Number of Entitled Entities | Lessons Learned from Past Experience &Objective | Key Steps |
|---|---|---|
| • Computer: 21<br>• Tailoring/Sewing /knitting: 38 | enhancement of skill levels in the community and subsequently the employment of locals in the projects and also to other income generating avenues, the Project has identified the need to build/improve skills and capacities of the affected PAFs. The various types of trainings identified include:<br><br>• Technical training such as the handling of machinery;<br>• Vocational training such as wielding, carpentry, computer operations, plumbing, masonry for men and tailoring/stitching of dress, embroidery for women. | exploit the opportunities created by the existing markets in sectors such as textile, tourism and fashion, hydropower projects in the area and other developments such as the Nepal- china road, earthquake resettlement activities etc. for this purpose, a market assessment shall be undertaken of the existing market scenario and potential opportunities in the coming 5-10 years;<br>• This implementation Plan shall include details pertaining to total number of individuals to be covered, number of batches, number of training days in a batch and every month, the number of candidates per batch, the minimum eligibility requirements for each, the skills to be imparted during the training, etc.;<br>• Furthermore, while planning for these trainings, those PAFs who already have certain knowledge shall be identified, as should those who have no understanding but wish to learn. The training sessions may thus be split into beginners level courses and more in depth advanced courses;<br>• This Plan shall then be disclosed to the PAFs, in term of the necessary skill level required, the eligibility criteria for the same and the time lines to be followed in the implementation of the intervention. This disclosure will be undertaken in keeping with the disclosure process identified in the SEP.<br>• Based on the PAF's feedback, the implementation Plans shall be revised<br>• Once the micro Plans are finalized, the implementation Plans for each type of training shall be updated and finalized with the final number of individuals per training;<br>**Implementation**<br>• Implementation of the trainings identified, in keeping with the ESTP put in place<br>• To the extent possible, these trainings shall be undertaken in the local Nepali or Tamang language, and using local experiences or examples and material which is being used in the area;<br>• In keeping with the literacy level of the PAFs, these trainings shall be based, to the extent possible, on visual and hands-on experiences;<br>• The PAFs, who successfully complete the trainings, shall be given certificates of completion and letters of recommendation. These will be aimed at allowing the PAFs to utilize the skills gained for generating employment;<br>• The PAFs who successfully complete the trainings shall be given priority in employment in the Project, directly or indirectly, based on the requirement at that point of time based on the commitments in the Nepal Employment and Skill Training Plan;<br>• If they cannot be absorbed into the Project, employment options would be found for them in sectors in which they have been trained and assistance shall be provided in terms of initiating communication, informing the PAFs of the opportunities, assisting them in applying for the same etc.; |

| Approx. Number of Entitled Entities | Lessons Learned from Past Experience &Objective | Key Steps |
|---|---|---|
| | | • Furthermore, for trainings such as tailoring, sewing, cooking etc. if the trained individuals are not absorbed into the Project, the option of providing market linkages shall be made available. In consultation with the PAFs, the possibility of creating groups within the PAFs should be explored.<br>• In case of market linkages, the Project would assist the PAFs by identifying potential partners in the market, who may require the particular skill in question and assist the PAFs in holding negotiations with these stakeholders including finalization of contractual terms and conditions;<br>• In addition to market linkage, NWEDC should explore the possibility of establishing groups amongst the PAFs post training completion. These groups should be designed in a manner to be self-sustaining, with a clear organization structure and with the purpose of allowing the PAFs to undertake livelihood activities as a group. NWEDC shall then assist these groups by enabling market linkage;<br>• In case any of the PAFs wish to undertake business opportunities (such as for tailoring, sewing, cooking etc.) based on the trainings received, they should be provided with training on business enterprise and seed capital as discussed subsequently, |
| Training on Livestock, poultry and boar farming followed by monetary and technical assistance for Livestock Rearing by the PAFs | | |
| • Poultry: 19<br>• Boar Farming: 4<br>• Goat Farming: 8 | As part of the earthquake relief, NGOs active in the area have provided numerous trainings and seed capital support for poultry farming. While some of the PAFs could gainfully utilise their poultry training after withdrawal of NGO support, a large number of people trained on skills to manage poultry could not take it forward successfully because of reasons as discussed in ***Section 7.1.5***<br><br>According to the consultations undertaken it is understood that there is an apparent inclination towards increasing livestock holdings, such as buffaloes, pigs, goats and poultry, for the increased income generation in the family. | Planning<br>• For this entitlement, one of the key criteria to be kept in consideration is restricting the number of people being trained on the same skill/livestock. This would avoid saturation of the market for a product;<br>• Furthermore, while identifying the eligible entities for these training, care should be taken to ensure that the eligible PAFs have access to ample space for the livestock holdings, resources to maintain the livestock holdings including medical expenses involved for vaccinations, electricity and water supply and that it would not result in a conflict within the community;<br>• From the discussions with the local community, it was understood that while the community members did not mind livestock holdings of buffaloes and goats in the immediate vicinity of the residences, they were not too keen on the poultry and boar farming within the village. This was understood to be due to the foul odour from these farming;<br>• The Project may also consider identifying common areas for maintaining all the livestock holdings generated for a village/ settlement on the outskirts of the residential area. These areas may be identified in consultation with the eligible entities and local community. However, it is possible that ample land for this purpose may not be readily available, and may have to be procured (purchased/ rented) for this purpose. The Project may facilitate these negotiations and provide seed capital for the same;<br>• Furthermore, while planning for these trainings, those PAFs who already have certain knowledge shall be identified, as should those who have no understanding but wish to learn. The training sessions may thus be split into beginners level courses and more in depth advanced courses; |

| Approx. Number of Entitled Entities | Lessons Learned from Past Experience &Objective | Key Steps |
|---|---|---|
| | | • A Plan of implementation shall be drawn for each type of livestock head. This implementation Plan shall include the number of training days in a batch and every month, the number of candidates per batch, the minimum eligibility requirements for each, the skills to be imparted during the training, etc.;<br>• This Plan shall then be disclosed to the PAFs, in term of the necessary resources required, the eligibility criteria for the same and the time lines to be followed in the implementation of the intervention. This disclosure will be undertaken in keeping with the disclosure process identified in the SEP.<br>• Based on the PAF's feedback, the implementation Plans shall be revised<br>• Once the micro Plans are finalized, the implementation Plans for each type of training shall be updated and finalized with the final number of individuals per training;<br>Implementation<br>• Implementation of the trainings identified, in keeping with the ESTP put in place<br>• To the extent possible, these trainings shall be undertaken in the local Nepali or Tamang language, and using local experiences or examples and material which is being used in the area;<br>• In addition to the PAF specific trainings, the Project may also consider holding awareness workshops for the larger community with the District agriculture and livestock department for the livestock holding and enhancement programmes and practices, the means by which the productivity of an animal can be organically increased, the ideal species/hybrids of livestock to be maintained keeping in mind the local conditions etc.<br>• The Project may also consider providing seed capital/ start up for the PAFs who successfully complete the trainings. This support may be in the form of providing chicks/sows/ calves/lambs or for providing loans for procuring the same. This support may be identified in consultation with the local community. From the discussion with the local community during the LALRP formulation, one of the supports identified was the purchase of a buffalo calf. According to the women consultation, the local community wanted the Project to provide them with one calf for every calf purchased by the community. This would allow each household to own at least two buffaloes. However, each PAF is understood to have a different ability and preference. The PAF specific preferences shall be identified at the Micro Plan finalization stage;<br>• The Project may also consider tying up with the PAFs who successfully complete these trainings for procuring the produce, such as milk, meat and eggs for the Project camp and site office;<br>• The Project shall provide veterinary support in the form of regular check-ups (at least 6 monthly) for the livestock holdings, to ensure the health and maintenance of the livestock holdings of the community. This veterinary support may also be extended to the local community as part of the Project's CSR activities; |

| Approx. Number of Entitled Entities | Lessons Learned from Past Experience &Objective | Key Steps |
|---|---|---|
| | | • For those PAFs interested in developing their livestock holdings as a business venture and not wanting to restrict themselves to selling to the Project, the Project shall provide training on business enterprise and seed capital as discussed subsequently, |
| Training on Business enterprise and seed capital for starting business | | |
| 7 PAFs | According to the consultations undertaken, 7 PAFs have shown an inclination in either undertaking business or receiving training on business enterprises. These PAFs are those who wish to undertake activities such as establishing a restaurant, hotel or small stores etc. from the discussion with the local community, there were a small proportion of households who were undertaking business activities in the pre-earthquake scenario. However, most of these PAFs, suffered significant financial losses due to the earthquake.<br><br>In addition to this, as discussed earlier, there may be certain PAFs, who receive skill training and wish to convert the same into enterprise opportunities. | Planning<br>• This entitlement shall be implemented in keeping with the larger ESTP being formulated for the Project<br>• During the disclosure process and finalization of micro Plans, through consultations, specific business activities/ enterprises shall be identified for which training may be provided. Some of the opportunities identified during the LALRP formulation include restaurants, hotels and small inns, provision stores, serving as tourist guides or Sherpas, establishing and running heritage walks such as the Tamang trails etc.<br>• Some of the trainings to be provided, such as basic accounting and financial literacy or communication skills, may be common across enterprise preferences. While certain trainings may be specific to specific business Plans, such as housekeeping or cooking etc.<br>• Based on the trainings identified, develop specific implementation Plans for each training. This implementation Plan shall include details pertaining to total number of individuals to be covered, number of batches, number of training days in a batch and every month, the number of candidates per batch, the minimum eligibility requirements for each, the skills to be imparted during the training, etc.;<br>• Furthermore, while planning for these trainings, those PAFs who already have certain knowledge shall be identified, as should those who have no understanding but wish to learn. The training sessions may thus be split into beginners level courses and more in depth advanced courses;<br>• This Plan shall then be disclosed to the PAFs, in term of the necessary skill level required, the eligibility criteria for the same and the time lines to be followed in the implementation of the intervention. This disclosure will be undertaken in keeping with the disclosure process identified in the SEP.<br>• Based on the PAF's feedback, the implementation Plans shall be revised<br>• Once the micro Plans are finalized, the implementation Plans for each type of training shall be updated and finalized with the final number of individuals per training;<br>Implementation<br>• To the extent possible, these trainings shall be undertaken in the local Nepali or Tamang language, and using local experiences or examples and material which is being used in the area;<br>• There are certain PAFs who are unable to converse in Nepali, Hindi and English. The Project may provide a basic language course for these households in at least one of these languages; |

| Approx. Number of Entitled Entities | Lessons Learned from Past Experience &Objective | Key Steps |
|---|---|---|
| | | • The PAFs, who successfully complete the trainings, shall be given certificates of completion and letters of recommendation. These will be aimed at allowing the PAFs to utilize the skills gained for generating business;<br>• The Project, in consultation, with the PAFs, may also assist in providing seed capital or market linkage support, as required by the PAFs;<br>• The Project shall establish business relationships with the PAFs who successfully complete the training, in line with the requirements of Local Benefit Sharing Management Plan and Industrial Benefit Plan formulated for the Project |
| Transition Support | | |
| Elderly- 7 PAPs<br>Differently Abled- 5 PAPs | As stated earlier, there are certain PAPs, who due to age or physical/mental limitations may be unable to actively engage in livelihood generating activities. It is understood that these PAPs are completely dependent upon the economically active family members, which creates pressure on these earning members in terms of number of mouths to feed. This pressure has been accentuated since the earthquake, due to issues associated with livelihood generation activities.<br><br>In order to reduce the financial pressure on the economically active members of the households and to provide certain level of autonomy and independence to the dependent PAPs, the Project shall provide a 2 transition allowanceto the elderly (60 years and above) and physically/mentally differently abled who cannot be engaged in livelihood generating activities. This allowance shall be provided for 2 years till the time the families supporting them are expected to | Planning<br>• As part of the LALRP formulation, 12 PAPs have been identified who may require transition support. As part of the Micro Plan finalization, these PAPs shall be verified, and the final number of eligible PAPs shall be identified;<br>• It should be clearly explained to the PAFs, that these PAPs are only eligible for this allowance till the time they are not engaged in any income generating activities.;<br>• It should also be clearly communicated to the PAFs that this entitlement is available to those PAPs who are identified under this category at the time of the cut-off. This is so because it is assumed that the other PAPs and PAFs will be enabled to restore their livelihoods based on the other entitlements;<br>• This allowance shall preferably be paid through cheques, in the name of the PAP. However, the access to banking facilities shall be assessed. If banking facilities are not readily accessible by most PAFs, the Project may consider paying the compensation in cash;<br>• the bank details of each PAP which will be used for receiving/encashing the cheques for cash compensation shall be collected and verified;<br>Implementation<br>• In case of no bank accounts, and if desired by the PAP, provide assistance in setting up of bank accounts. This assistance may be in the form of helping the PAFs get in touch with Banks, understanding the procedures and Do's and Don'ts of maintaining bank accounts and completing the formalities for opening a bank account;<br>• Conduct money management/financial literacy trainings, to enable the entitled entities to effectively manage the money received and to invest the same in asset;<br>• This allowance shall be paid on a monthly basis.;<br>• |

| Approx. Number of Entitled Entities | Lessons Learned from Past Experience &Objective | Key Steps |
|---|---|---|
| | restore their livelihoods and achive stable incomes. | |

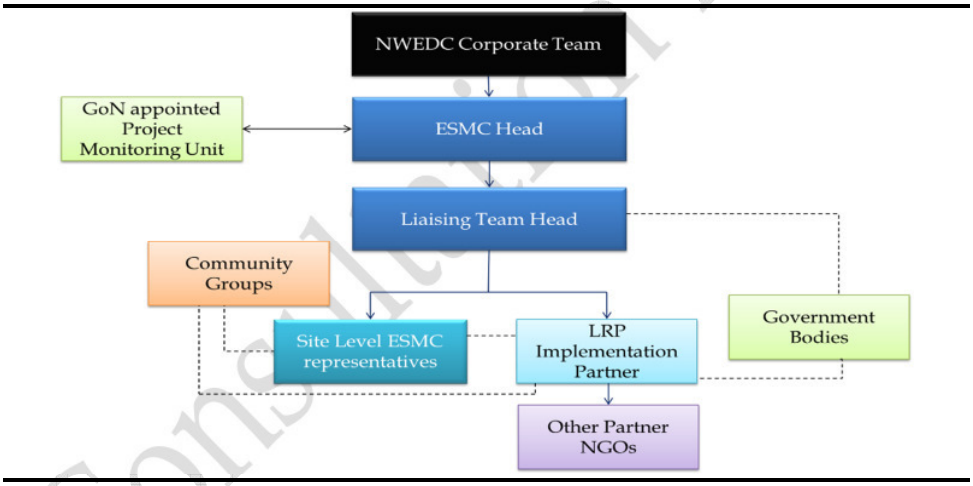
# 8 IMPLEMENTATION MECHANISM

As discussed previously, the implementation of the LALRP will be undertaken with the help of an implementation partner. This section provides an understanding of the overall implementation process for the LALRP. This section includes a discussion on the resource requirements and relation to the SIMF as a whole.

## 8.1 MANPOWER REQUIREMENTS

This section provides an understanding of the manpower requirements for the LALRP designed for the Project, keeping in context the Project development timelines and the existing and proposed management structure. The organization structure for LALRP implementation is depicted in the following figure*Error! Reference source not found.*.

***Figure 8.1 Reporting Structure for LALRP Implementation***




This institutional structure may be further strengthened or get extra support as required through the implementation of the LALRP.

### 8.1.1 Internal Resources

As can be seen in the Figure 8.1*Error! Reference source not found.*, the overall responsibility for the implementation of the LALRP is with NWEDC. This process shall be led by the Environmental and Social Management cell (ESMC) that will be established in NWEDC. The Social Manager will report to the Environment and Social Manager at NWEDC and will be supported by Community Liaison officers (CLOs) who will be primarily responsible for undertaking regular interaction and mobilisation activities with the community.

There are presently two CLOs engaged at the Project site, one of whom is a Tamang PAF. In addition to this the Project will recruit a female community mobilizer prior to implementation of LALRP. This team, in collaboration with the external parties, will be responsible for the implementation and monitoring of the LALRP.

### *8.1.2 External Resources*

The internal LALRP implementation team will also consider involving external parties, in addition to the Implementation Partner, for the implementation of the LALRP. These external parties include relevant government departments, NGOs and civil society organizations, the *Jan Sarokar Samiti* and any other community organization identified during the course of the implementation of the LALRP. An implementation partner having expertise with the on ground implementation of R&R and enhancement projects shall be recruited for the day to day implementation of the LALRP, in keeping with the entitlement framework and principles identified. In addition to the implementation partner, NGOs/ INGOs may be identified for the implementation of specific components like training, skill building, financial literacy, livestock management, and boar farming. District departments will also be consulted and engaged for organising training for the PAFs. Some of the NGOs/INGOs and government departments identified as part of the LALRP formulation include:

- Manekor;
- LaCCoS
- Lumanti;
- Parivartan Nepal;
- ACF;
- Gharelu;
- Asia;
- Small and Cottage Industries Development Board;
- District Agriculture Department; and
- Government training centres

### *8.1.3 Roles and Responsibilities*

The roles and responsibilities of the key entities engaged in implementation of LALRP are outlined below.

*Roles and Responsibilities of the Social Manager*

- Identifying implementing partners/agencies for imparting training on specialised skills and other areas;
- Overseeing the implementation process and ensuring completion of milestones in line with the principles put in place and the pre-defined timelines;

- Coordinating with the Environmental and Social Manager and NWEDC corporate team for support required.
- Coordination with the EPC contractors for provision of employment opportunity during the construction stage;
- Review of the R&R options and updating based on further consultation with each of the PAFs;

*Roles and Responsibilities of the Community Liaison Officers*

The Community Liaison Officer (CLO) will be responsible for the following:

- Coordination with the implementing partners/agencies for imparting training on specialised skills and other aspects of LALRP implementation;
- Based on the community needs already identified, prioritise the immediate requirements and support the community in meeting such development requirements proper selection of beneficiaries for different livelihood training components;
- Ensuring gender parity in targeted training programs for the PAFs;
- Looking for opportunities of direct employment of the members of the PAFs (both trained by the Project and other skilled people);
- Acting as the focal point for registering, documenting and coordinating with the Grievance Redressal Cell (Refer to Stakeholder Engagement Plan) for grievances registered by the community on LALRP implementation;

*Roles and Responsibilities of the Implementation Partner*

The typical roles and responsibilities of an implementation partner are as listed below.

- Conducting one to one interaction with the PAFs, based on the entitlement matrix, in order to finalise the micro plans for implementation;
- Assessment of resources (financial and personnel for training), detailing out the process of implementation in terms of phases, number of people considered for each phase and other details and make the annual plans of implementation and a larger plan of implementation for a period of 5 years;
- Creation and update of a master database with complete information of each family along with micro plan;
- Identification of NGOs/ Government bodies to partner with, for the implementation of the LALRP;
- Coordinating with the District departments on trainings, schemes and other possible linkages for supporting the livelihood of the PAFs;
- Formulating and implementing detailed plans for implementation of each entitlement identified.

*GoN Project Monitoring Unit*

The Government of Nepal may delegate the management and administration of the PDA to a Project Monitoring Unit. This PMU may be responsible for monitoring the implementation of the LALRP, in keeping with the PDA requirements. The PMU shall not have rights that are in addition to the rights of GoN or a GoN instrumentality as contained in the PDA.

### *8.1.4 Training of Implementation Team*

Training of the LALRP implementation team and the external agencies identified for the implementation of the LALRP will be a crucial component of the process. Prior to the initiation of the LALRP implementation, a workshop shall be conducted of all parties involved. The purpose of this training shall be to provide all the agencies an understanding of the purpose of the LALRP, the principles governing it and the key components of the same.

The Project will also from time to time assess the adequacy and capacity of the LALRP implementation team members in terms of their understanding of the LALRP purposes, policies and principles as well as the implementation process, including the other Plans put in place for the Project as part of the SIMF. If required, refresher trainings will be provided on specific topics.

### *8.1.5 Coordination with EPC and Sub-Contractors*

Furthermore, due to the fact that a number of contractors will be involved in the Project at various stages of its development, it will be critical to ensure that the contractors abide by the principles established as part of the LALRP. Wherever possible, the contract agreements with contractors should be revised to insert conditions for employment of PAFs for suitable employment opportunities, and ensuring the health and safety of the workers. This includes the right of the ESMC to investigate reported incidents and levy penalties for non-compliance. Also it will be ensured that vetted and agreed Codes of Conduct are developed and shared with the relevant contractor employees.

## 8.2 IMPLEMENTATION SCHEDULE

### Table 8.1 Tentative Implementation Schedule

| Task | 2017-18 | 2018-19 | | | | 2019-20 | | | | 2020-21 | | | | 2021-22 | | | | 2022-23 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 |
| Disclosure and Finalization of LALRP | | | | | | | | | | | | | | | | | | | |
| Disclosure of LALRP | | | | | | | | | | | | | | | | | | | |
| Establishing Cut-off Date for LALRP | | | | | | | | | | | | | | | | | | | |
| Preliminary Consultations with Local Community | | | | | | | | | | | | | | | | | | | |
| FPIC Community Consultations | | | | | | | | | | | | | | | | | | | |
| Agreement on LALRP | | | | | | | | | | | | | | | | | | | |
| Finalization of LALRP | | | | | | | | | | | | | | | | | | | |
| Development of Detailed Implementation Plan and Mobilization of Resources | | | | | | | | | | | | | | | | | | | |
| Recruitment of Female Mobilization Officer | | | | | | | | | | | | | | | | | | | |
| Identification of Implementation Partner | | | | | | | | | | | | | | | | | | | |
| Identification of Partner NGOs | | | | | | | | | | | | | | | | | | | |
| Training of Implementation Team | | | | | | | | | | | | | | | | | | | |
| Detailed Need Assessment | | | | | | | | | | | | | | | | | | | |
| Development of Micro Plan | | | | | | | | | | | | | | | | | | | |
| Consent and Agreement of Micro Plan by PAFs | | | | | | | | | | | | | | | | | | | |
| Finalization of Micro Plans | | | | | | | | | | | | | | | | | | | |
| Development of Detailed Implementation Plan | | | | | | | | | | | | | | | | | | | |
| Disclosure of detailed implementation Plan | | | | | | | | | | | | | | | | | | | |
| Finalization of detailed Implementation Plan | | | | | | | | | | | | | | | | | | | |
| Implementation of Mitigation Measures | | | | | | | | | | | | | | | | | | | |
| Payment of pending compensation for structures | | | | | | | | | | | | | | | | | | | |
| Resource Mapping for employment opportunities within Project | | | | | | | | | | | | | | | | | | | |
| Payment of Compensation for Tree Loss | | | | | | | | | | | | | | | | | | | |
| Provision of Employment (direct and contractual) in Project | | | | | | | | | | | | | | | | | | | |
| Payment of Transition Allowance | | | | | | | | | | | | | | | | | | | |
| Transition Allowance for Vulnerable groups | | | | | | | | | | | | | | | | | | | |
| Livelihood and Skill Training | | | | | | | | | | | | | | | | | | | |
| Training and Capacity Building of CFUGs | | | | | | | | | | | | | | | | | | | |
| Reporting and Monitoring | | | | | | | | | | | | | | | | | | | |

| Task | 2017-18 | 2018-19 | | | 2019-20 | | | | 2020-21 | | | | 2021-22 | | | | 2022-23 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Regular reporting by CLOs to Social Manager | | | | | | | | | | | | | | | | | | |
| Regular reporting by Social Manager by Environmental and Social Manager | | | | | | | | | | | | | | | | | | |
| Regular reporting by Implementation Partners to Liaison Team Head | | | | | | | | | | | | | | | | | | |
| Internal Monitoring by Social Manager | | | | | | | | | | | | | | | | | | |
| External Monitoring by Independent Agency | | | | | | | | | | | | | | | | | | |
| LALRP Completion Audit | | | | | | | | | | | | | | | | | | |

### *8.3 TENTATIVE BUDGET*

***Table 8.2 Tentative Budget***

| S.No | Expenditure Head | Expenditure Details (along with remarks) | Unit Cost (NR) | Number of Units | Total (NR) |
|---|---|---|---|---|---|
| 1 | FPIC and Disclosure Process | | | | |
| | | Disclosure of LALRP | 50,000 | 2 | 1,00,000 |
| | | Consultations with local community | 50,000 | 4 | 2.00,000 |
| | Sub Total | | | | 3,00,000 |
| 2 | General Implementation Costs | | | | |
| | Mobilization of Implementation Team | Female Mobilization Officer (yearly basis) | 6,00,000 | 2 | 12,00,000 |
| | | Implementation Partner | 10,00,000 | 1 | 10,00,000 |
| | | Partner NGOs | 10,00,000 | 1 | 10,00,000 |
| | | Training and Capacity Building of Implementation Team Members | 50,000 | 4 | 2,00,000 |
| | Need Assessment | Need Assessment for PAFs | | | 1,50,000 |
| | | Resource Mapping for Employment Opportunities | | | 1,50,000 |
| | Micro Plan | Formulation of Micro Plan | | | 3,00,000 |
| | | Consultations with PAFs on Micro Plans | | | 2,00,000 |
| | Implementation Plan | Formulation of Implementation Plan | | | 1,00,000 |
| | | Disclosure of Implementation Plan | | | 2,00,000 |
| | Training and Capacity Building of CFUG members | Training and Capacity Building of CFUG members | 10,000 | 288 | 28,80,000 |
| | Sub Total | | | | 73,80,000 |

| S.No | Expenditure Head | Expenditure Details (along with remarks) | Unit Cost (NR) | Number of Units | Total (NR) |
|---|---|---|---|---|---|
| 3 | Allowances and Compensation Payment | | | | |
| | Payment of Compensation | Pending Compensation for Structures | | | 11,50,00,000 |
| | | Payment of Compensation for Trees | | | 2,00,000 |
| | Allowances | Transition Allowance | 8000 per month (6 months) | 137 | 65,76,000 |
| | | Transition Allowance for Vulnerable groups | 8000 | 12 | 2,30,4000 |
| | | Seed Capital | 50,000 | 7 | 3,50,000 |
| | Sub Total | | | | 12,44,30,000 |
| 4 | Livelihood and Skill Enhancement | | | | |
| | Livelihood and Skill Training | Technical Training | 31,250 | 160 | 50,00,000 |
| | | Vocational Training | 31,250 | 160 | 50,00,000 |
| | | Training on Livestock, Poultry and Boar Farming | 10,000 | 150 | 15,00,000 |
| | | Seed Capital for Livestock holding | 25,000 | 150 | 37,50,000 |
| | | Training on Business Enterprise and Financial Literacy | 5,000 | 75 | 3,75,000 |
| | | Seed Capital for Starting Business | 65,000 | 75 | 48,75,000 |
| | Monitoring and Reporting | Internal Monitoring | | | 5,00,000 |
| | | External Monitoring | | | 10,00,000 |
| | | Reporting Cost | | | 5,00,000 |
| | Sub Total | | | | 2,25,00,000 |
| | Total (1+2+3+4) | | | | 15,46,10,000 |
| | 5% Contingency of the above | | | | 77,30,500 |
| | Grand Total (Total +Contingency) | | | | 16,23,40,500 |

This section provides an understanding of the reporting and monitoring process to be set in place for the LALRP implementation of the UT-1 Project. The purpose of this will be to:

- document and track the implementation process;
- assess the compliance to the principles and policies identified previously;
- assessment against the key performance indicators (KPIs) identified previously; and
- Identify any challenges during the implementation of the LALRP as well as the potential corrective measures for the same.

## 9.1 REPORTING

The documentation and reporting will be important for assessing the progress of implementation of LALRP against pre-defined objectives and timelines and ensure effective and timely execution of the plan. The reporting for the LALRP implementation, shall be undertaken on a weekly, monthly, quarterly, half-yearly and annual basis, detailed implementation plans shall formulated for each entitlement, to allow for regular monitoring and reporting to be undertaken.

A format for the various types of reports shall be developed in keeping with the detailed implementation Plans formulated. This shall guide the implementation team on the type of information to be captured in the reports and ensure coherence in the type of information recorded and collated. The following table covers the details on frequency, type and content of reporting to be followed for the Project.

*Table 9.1 Reporting types, frequency and details*

| Type of Reporting | Reporting Frequency | Reporting Levels | Content |
|---|---|---|---|
| Internal Reporting | Weekly Reporting | • CLOs to the Social Manager. | • Compilation of the weekly activities undertaken along with a section to indicate any qualitative commentary on challenges and feedback received; |
| Internal Reporting | Monthly Reporting | • CLOs to the Social Manager;<br>• Social Manager to Environmental and Social Manager; | • Details on numbers of people engaged with for training and employment, with outcomes;<br>• Details on Government Departments/ NGOs liaised with and the outcome of the activity;<br>• Activities undertaken at various ongoing trainings; |

| Type of Reporting | Reporting Frequency | Reporting Levels | Content |
|---|---|---|---|
| | | | • Challenges faced due to community mobilization/ Implementation Agency / Resource Personnel, etc. |
| Internal Reporting | Quarterly Reporting | • CLOs to the Social Manager;<br>• Social Manager to Environmental and Social Manager; | • Assessment of activities against the KPIs identified;<br>• Progress of work at various fronts: Trainings, Employment of PAFs, Status of Market Linkages to be established for vocational skills, etc.;<br>• Challenges and outcomes in the activities undertaken |
| External Reporting | Half Yearly and Annually | • Implementation Partners to Social Manager;<br>• Social Manager to Environmental and Social Manager; | • Progress on KPIs;<br>• Progress on Detailed Implementation Plan;<br>• Details on activities undertaken;<br>• Challenges faced;<br>• Discussion on modifications in the Plan, if necessary;<br>• Way Forward. |

## 9.2 MONITORING AND REVIEW

### 9.2.1 Internal Monitoring and Review

The internal monitoring will be undertaken by the Social Manager in coordination with the CLOs and will involve both the process and output monitoring. Some of the typical KPIs to be monitored include the following.

*Table 9.2 KPIs to be monitored*

| Category | Quantitative KPIs | Qualitative KPIs |
|---|---|---|
| Cash Compensation | • New Bank accounts opened;<br>• Money management trainings conducted;<br>• Number of PAFs provided complete cash compensation within agreed time frame<br>• Number of PAFs left to be compensated. | • The ease of transfer in payment of compensation<br>• The use of the compensation amount by the PAFs |
| Employment Opportunities | • number of PAFs employed in the Project on permanent and contractual basis;<br>• Number of days of wage labour provided through Project.<br>• Change in household income; in comparison to pre-Project scenario | • Increase in secondary and tertiary employment levels in the Project area |
| Training & Capacity Building and linkage to Project employment | • Number of People trained;<br>• Number of training days per year<br>• Number of trainings successfully completed<br>• Change in the skill levels of the PAFs | • Change in employability & enterprise initiatives amongst women in the area |

| Category | Quantitative KPIs | Qualitative KPIs |
|---|---|---|
| or other avenues | • Change in household income; in comparison to pre-Project and post- land purchase (for those who find<br>• Change in number of families running businesses<br>• Number of people trained and employed by the Project<br>• Number of people trained and employed in the area<br>• Number of people trained and finding suitable employed outside the Project area | |
| Training on Livestock, poultry and boar farming followed by monetary and technical assistance for Livestock Rearing by the PAFs | • Number of people opting for livestock<br>• PAFs trained on improved practices;<br>• Increase in livestock holdings (% of what was before);<br>• Increase in income from milk and meat production;<br>• Number of PAFs provided financial linkage, etc.<br>• Increase in the household income; in comparison to pre-Project and post- land purchase. | • Increase of awareness in community about latest livestock rearing techniques;<br>• Process followed for conducting training, location and duration of training etc. |
| Training on Business enterprise and seed capital for starting business | • Number of training conducted;<br>• People trained on business enterprise;<br>• Number of PAFs provided financial linkage, etc.;<br>• Number of women supported;<br>• Number of PAFs who have pursued businesses post training | • Process followed for conducting training, location and duration of training etc. |
| Transition Allowance | • People identified for the transition allowance<br>• Bank accounts opened/ aligned with the allowance distribution activity;<br>• Number of money management trainings conducted.<br>• Increase in the household income in order to support families' expenses. | • Improvement in the social standing and societal engagement of the PAPs identified;<br>• Improvement in confidence levels of the PAPs identified |
| General | | • Increase in awareness in community about available opportunities not only locally but outside the village as well<br>• Increase in skill levels<br>• Increase in trust in the community towards the Project and the Project proponents<br>• Number of women and people with enhanced vulnerability trained; |

This monitoring will be undertaken on a weekly and monthly basis. The findings of the internal monitoring will inform the strengthening of the

LALRP implementation and the corrective action identified in the internal monitoring will be included in the LALRP process.

The internal monitoring process will ensure the participation of the relevant stakeholder groups, comprising of PAFs, vulnerable groups, *Jan Sarokar Samiti* and the District authorities, to obtain their perceptions on the progress, process and impacts of the LALRP implementation.

### *9.2.2 External Review and Completion Audit*

In addition to the internal monitoring process, the Project will also engage an independent agency to undertake external monitoring activities to provide an independent review of the LALRP implementation and to identify required corrective actions. The external monitoring is to include the following:

*Half Yearly Monitoring*

Half yearly Monitoring will be conducted for the LALRP. This report will describe the conformance of the LALRP implementation process to the international standards. The report will also identify any outstanding actions that are required to be taken to achieve compliance to the policies and principles of the LALRP and describe further measures for the same.

Each report will comprise of the following (but will not be limited to):

- LRP objectives and their status
- Verification of qualitative and quantitative indicators for LALRP;
- Impacts on vulnerable groups;
- Linkages with other Project initiatives on employment, community development and social impact mitigation;
- Action required and timelines along with responsibilities.

This will be undertaken for the first two years on a regular basis. The requirements of such report will then be further shifted to an annual basis. However, this decision will be taken based on the progress made on the LALRP implementation in the first two years.

*LRP Completion Audit*

An LALRP Completion Audit will allow the external agency to verify the Project's compliance to the applicable reference framework and the policies and principles committed to as part of the LALRP. It will assess the implementation of the plan.

The completion audit will have the following specific objectives:

- Verify the implementation of the Project's LALRP policy and principles;

- Evaluation of the impact of the compensation and R&R program measured through incomes and standards of living, with an emphasis on "status quo if not improvement" requirement;
- Assessment of the socio-economic status of the affected population;
- Identification of potential corrective actions necessary to mitigate any residual negative impacts of the program, if any, and to enhance its positive impacts.

Annex A

# Detailed Project Description

# 1 MAJOR FACILITIES

This Annexure provides a detailed discussion of the major project components for the UT-1 project. The Project concept is classic, with structures including temporary upstream and downstream cofferdams, diversion tunnels in the right bank, a gravity type concrete weir with three spillway gates, an intake, three underground de-sanding galleries, a long low-pressure tunnel to a surge tank, a vertical shaft to the short high pressure tunnel, a valve chamber, a 216 MW, underground powerhouse containing three vertical axis Francis generating units operating under a gross head of 350-m and associated equipment, a tailrace surge chamber-draft tube gallery and finally a short pressurized tailrace tunnel. Access to the powerhouse is by tunnel, with the control building and substation next to powerhouse. The total water conduit length is just over 10km. The project layout plan is depicted in ***Figure 1.1.***

The intake site is located near the confluence of Bhotekoshi river at Dhunche and Haku VDC on the right bank of Trishuli river, about 70km directly north of Kathmandu. The Project consists of a 77 metre-wide diversion dam in a narrow gorge located 275 metres downstream of the confluence of the Trishuli with the Bhotekosi River. The direction of the valley is mostly south-west. The dam site can be viewed on Google Earth at 28-07-36.61N and 85-17-52.42E. Apart from the dam and spillway, all structures are located underground on the right bank of the river. The Pasang-Lhamu highway passes on the left bank of the river, and is the primary access route for the development.

## 1.1 DIVERSION WORK

River diversion works are required to safely divert the river flow during the construction period so that it will not cause any damage to the construction. The diversion works are divided into upstream and downstream cofferdams to cut off the river flow and direct it to a two line diversion tunnel to bypass construction activities. This design was selected taking into consideration the narrow river width, hydrologic conditions, cost, and worker safety. Overall cofferdam and diversion tunnel have been selected for Upper Trishuli-1 hydroelectric project considering narrow river width, hydrologic conditions, economy, and safety of workers.

***Table 1.1 Feature of Diversion work***

| Classification | Description |
|---|---|
| Diversion work type | Overall cofferdam + diversion tunnel(2 line) |
| Design flood | 2 years frequency flood, 1,012.7 m3/s |
| Maximum water level | El. 1258.8 m |

## 1.2 *WEIR*

The weir is located in Trishuli River about 275 m downstream from the confluence of Trishuli and Bhotekosi River. The catchment area is 4,350.9 km2. The generation type of UT-1 HEP is a Run-of- River (RoR) type. The function of weir is to divert water to the powerhouse for 24 hours full time generation of power. The weir structure is planned as a concrete gravity dam type.

The weir has been designed for 5,000 frequency years and 2,000 frequency years with one gate out of operation. So the height becomes 32.0 m and length becomes 100.9 m so that water level does not exceed the crest level.

The spillway overflow is determined to safely release 200 years frequency flood of 2,554.8 m3/s. The spillway gate discharge has been designed to sustain for 5,000 frequency years to maintain El.1,255.0 m, and also it will not exceed El.1,259.0m for 2,000 frequency years with one gate out of operation. The spillway is determined as W 11.0 m × 3 nos. with radial gates (W 11.0 × H 16.5 × 3 nos.).

Also, overflows at the both side walls of the chute are not allowed during the maximum discharge. Stilling basin type dissipater is selected for the present study.

## 1.3 *INTAKE*

The intake is the structure that connects water in the reservoir flows to headrace tunnel. The location of intake is right side from the main axis of weir, and in order to minimize the amount of sediment flow, it is located near the spillway. The type is selected as horizontal bell-mouth type since the drainage works well due to narrow gorge and it is easy for maintenance.

*Table 1.2 Main Features of Intake*

| Classification | Description |
|---|---|
| Type | Horizontal Bell-mouth type |
| Sill elevation | El.1,247.0 m |
| Size | W 6.5 m × H 6.5 m × 2 Nos. |
| Length | 39.1 m |
| Gate | Roller gate |

## 1.4 *DESANDER*

Because of the limited construction area and construction method due to slope, the desander is planned to be installed below the ground as a horizontal flushing type.

The particle size has been decided as 0.2 mm, and 3 chambers with 115.0 m of length, 10.0 m of width, and 24.03 m of height will be installed. The sediment

deposit in flushing channel will be flushed out while the desander operation is stopped by adding additional flushing water flow (6.0 $m^3/s \times 3$ flushing channel). It will take 3 hours each time and 7.75 days within a year.
3 flushing channels will be merged in flushing culvert and 18.0 $m^3/s$ of discharge amount will be caused. It will go toward the downstream of Trishuli river and the size is decided as 3.4 m of width and 1.7 m of height.

### *1.5 HEADRACE TUNNEL*

The headrace tunnel connects the intake, surge tank and vertical pressure tunnel, and is comparatively under low pressure. The tunnel alignment was designed straight or as a curve with a large radius considering its function, topography & geologic conditions, workability, structure locations, etc. The gradient of the waterway has been set below 2 % considering drainages, equipment movements and topographic conditions during excavation of the headrace.

The diameter derived is 6.5 m, and its excavation diameter is 7.21 m. Overall length is 9,714.901 m. Shotcrete lining was planned for rock type I, II, IIIa grades with favourable rock conditions to reduce construction cost, and concrete lining was planned for rock type IIIb, IV, V grades.

### *1.6 SURGE TANK*

The headrace tunnel is a pressure type and as its length becomes longer, abnormal pressure rise or reject happens by surging and water hammer by the sudden start or stop during the turbine operation. A water tank called surge tank is installed in the headrace tunnel for fluent flow & absorption taking control of the load increment to ensure structural stability of headrace tunnel against the water hammer according to the pressure variations. The surge tank for this project is the restricted orifice with upper chamber type that has the same axis with vertical shaft and chamber locates in upper side.

### *1.7 PRESSURE TUNNEL*

The pressure tunnel starting at the end of the headrace tunnel connects to the steel penstock tunnel. The diameter of the pressure tunnel is 6.5 m, and concrete lining was applied considering the inner & outer water pressure. The thickness of concrete lining is 500 mm. The vertical pressure tunnel's excavation & inner sections are all circular, and its length is 292.122 m.

The penstock is a high pressure tunnel installed near the powerhouse. It is double Y-branched type with the diameter transition section (4.8 ~ 2.8 m), and its length is 110.7 m.

## 1.8 POWERHOUSE

The underground powerhouse of the Project is situated approximately 348.0m below the ground. Power is generated from the potential energy created by the high head between the upstream and the downstream with the run of river scheme. The generator facilities are composed of 216 MW (72 MW × 3 units), and the size of the powerhouse was planned considering topography, geology, size of generator facilities, and space for maintenance.

## 1.9 TAILRACE TUNNEL & OUTLET

The tailrace tunnel design has been changed from the FS to minimize possible disturbance of the downstream flow and damages to the opposite slope as well as friction loss by changing the cross section of the tunnel. The construction can be carried out without building a cofferdam at the downstream by raising up the outlet elevation. The salient features are as follows.

*Table 1.3 **Salient Features of Tailrace Tunnel and Outlet***

| | Parameter | Description |
|---|---|---|
| Tailrace tunnel | Form : | Concrete lining tunnel |
| | Diameter : | 6.5 m (circular) |
| | Length | 3 lines (L = 62.84 m), 1 line (L = 178.28 m) |
| Tailrace outlet | Type | Circular |
| | Sill elevation | EL. 910.0 m |
| | Size | D 6.5 m |
| | Length | 29.0 m (Channel : 13.1 m) |

## 1.10 QUARRY SITES

The Project will require approximately 120,000 cubic metres of aggregate material, for impervious core material, coarse and fine aggregates, riprap stone, and boulders, and approximately 60,000 cubic metres of sand. These materials will primarily be obtained from four quarry sites located in the Project area, although some of the material will be sourced from Project tunnelling and excavation. These quarry sites have been selected based on test pits, laboratory analysis, and an assessment of the volume and quality of aggregate available to meet overall Project demand. Refer to ESIA of this project for further details.

## 1.11 EXCAVATION AND DISPOSAL SITES

The Project will require the excavation of approximately 2.7 million cubic meters of material, the reuse and/or replacement of approximately 0.3 million cubic meters, and ultimately the disposal of approximately 2.4 million cubic meters. NWEDC has proposed 14 spoil disposal areas, as summarised below.

*Table 1.4 **Summary of Project Spoil Disposal Areas***

| Spoil Disposal Areas | Location | Storage Volume ($m^3$) | Size (ha) |
|---|---|---|---|
| 1 | Mailung | 17,532 | 5,185 |
| 2 | Mailung | 17,575 | 5,986 |
| 3 | Mailung | 41,463 | 6,650 |
| 4 | Entry to Gogane | 28,430 | 4,280 |
| 5 | Entry to Gogane | 3,297 | 1,327 |
| 6 | Mungtabar | 141,500 | 14,632 |
| 7 | Mungtabar | 13,104 | 3,453 |
| 8 | Dharnatar | 441,202 | 28,380 |
| 9 | Tungabagar | 158,373 | 18,815 |
| 10 | Bugetphat | 61,151 | 9,751 |
| 11 | Tundidanda | 58,800 | 7,898 |
| 12 | Thangu | 849,412 | 43,713 |
| 13 | Fulbari | 80,417 | 9,485 |
| Batching and Cement Plant Site | Mailung Dovan | 490,002 | 20,784 |
| Total | | 2,402,259 | |

*Source:* NWEDC

## 1.12 *ACCESS ROAD (ONGOING CONSTRUCTION AFTER COMPLETION OF DESIGN)*

The Project will construct two access roads for the project. Currently, there is no motor vehicle access road to the Dam Site. Repair works in access road is going on since last October, 2016. As of now, excavation works in 5.3 km has been completed with construction of gabion and masonry walls under construction to stabilize the landslide, triggered by the earthquake. Since the access road will be used after construction of weir structure and powerhouse, selecting right entry and exit is important to approach easily.

***Table 1.5 Routes of access roads***

| Classification | Section | Length (km) | Width (m) | Remarks |
|---|---|---|---|---|
| Section-1 | Mailung river ~ weir | 11.84 | 5.5 | Access road to dam |
| Section-2 | UT-3A Site ~ Mailung river | 1.01 | 5.5 | Access road of the project area from UT 3A hydropower project |
| **Total** | **3 types of route** | **15.6** | | |

*Source:* UT-1 HEP Detail Design Report, DKJV, 2017

Owing to huge landslide on the alignment between access road and surge tank during the earthquake, 1.7 km underground tunnel is planned to connect surge tank from access road.

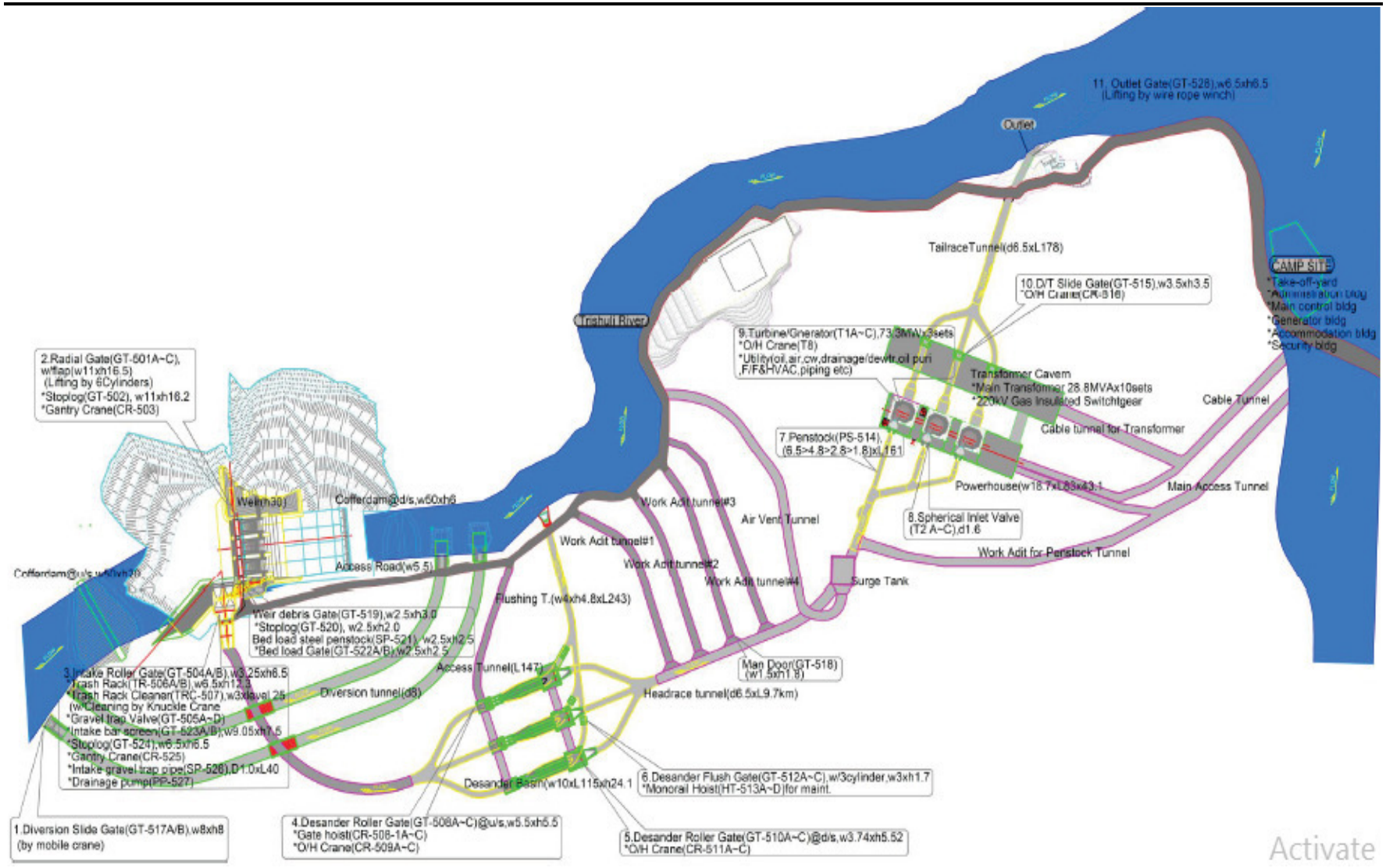
## 1.13 *PUBLIC ACCESS ROAD UPTO MAILUNG RIVER*

The 11 km road from Betrawati to Mailung River experienced heavy damage owing to landslide triggered by Gorkha Earthquake. Seeing the poor road condition, Government of Nepal has right now entrusted Nepali army to carry out maintenance work, among others, to stabilise landslides near Trishuli 3A'powerhouse, and headworks.

In addition to this, the Nepal-China road project is being developed in the district. In the AoI the Nepal-China road project is being developed along the Langtang National Park. This project is also expected to improve the access and connectivity of the AoI.

***Figure 1.1 Project Layout Plan***

*Source:* NWEDC



## *1.14 TRANSMISSION LINE*

UT-1 will need to construct only 689 m transmission line, within a 30 metre wide Right of Way from its switchyard to nearest tower of Chilime -Trisuli 3 'B' 220 kv double circuit Transmission Line of NEA. This transmission line will be located on government land. The NEA is constructing this 27 km 220kv double circuit T/L with support from KfW and EIB. Other projects expected to evacuate the power from this transmission line are Upper Sanjen (14.8 MW), Sanjen (42.5 MW) and Rasuwagadhi (111 MW) which already had connection agreement with NEA at Chilime hub substation.

The transmission line will require the construction of three new towers (i.e. AP-00, AP-01, and AP-02) from its switchyard to the nearest tower of Nepal Electricity Authority's (NEA) proposed Chilime-Trisuli 220 kilovolt double circuit transmission line.

In accordance with Nepalese regulations, NWEDC will permanently acquire the land for the three towers (approximately 400 square metres) and will lease the remaining right-of-way land from the government. From the information available, it is understood that the land required for the transmission line towers, is included in the 99.79 ha already procured for the project.

Annexure B

# Applicable Reference Framework for LRP Update, Upper Trishuli-1

# 1 APPLICABLE REFERENCE FRAMEWORK

This section provides an understanding of the regulatory requirements pertaining to the project, in terms of the national rules and regulations as well as the applicable requirements of the international standards applicable for the project.

This understanding of the local administrative structure and local laws and regulations is requirement for the context of the project, the impacts and the process associated with land procurement. While some of the laws and regulations, have direct relevance in the context of the project, others shape the complete administrative process surrounding the management of land including private, Guthi and community forest land etc.

## 1.1 NEPAL ADMINISTRATIVE STRUCTURE

Nepal Administrative structure has evolved over a period of time, and there are multiple changes that have taken place, especially since the middle of the last century. Some changes may still happen as and when the new constitution is in place. For the purpose of this assessment, current understanding of the system is important.

The executive branch of government includes the President, the Prime Minister, the Council of Ministers or Cabinet, constitutional and statutory bodies, and the bureaucracy, comprising various personnel services, formed to carry out executive functions. The President, as head of state, does not perform day-to-day executive functions, but is a part of the executive branch. In practical terms, the Cabinet is the highest executive body with authority to issue directives to guide, control, and govern. Under Article 43 of the Interim Constitution, the Cabinet can make its own rules on the allocation and transaction of business, allowing it to set up and run the central secretariat. The Constitution also requires the Cabinet to perform executive functions in accordance with laws enacted by parliament. The Interim Constitution provides for a political system with an "impartial, efficient and fair" bureaucracy.

### 1.1.1 Ministry

*Office of the Prime Minister and Council of Ministers*

There is an Office of the Prime Minister and Council of Ministers (OPMCM) headed by the Chief Secretary, of special class rank. The Chief Secretary serves as secretary to the Cabinet, head of the OPMCM, and coordinator of other secretaries. Primary responsibilities include providing leadership to the civil service, directing and supervising its performance, making the bureaucracy active, efficient and leading governance reforms.

*Minister*

Ministers are political appointees who manage the responsibilities of their respective ministries. As custodian of the executive power flowing down from the Cabinet, a minister communicates policy directions, administrative orders and decisions to the bureaucracy. The bureaucracy formulates policies and plans to implement decisions and directives of the government or the minister through various central and field level administrative mechanisms. The bureaucracy also monitors and evaluates program implementation, and recommends policy to the minister.

*The Secretary*

The secretary is a special class officer. Under the minister's direction, the secretary prepares and submits policy proposals for consideration by the Cabinet. The secretary is the administrative head of the ministry, its line agencies and field offices, and also supervises and monitors policy and program implementation. The secretary has both administrative and substantive (policy) responsibilities. The Good Governance (Management and Operation) Act 2007 (GGMOA) specifies administrative responsibilities, which broadly encompass day-to-day duties and functions. The substantive responsibilities include the technical and policy functions of the ministry as assigned by law or delegated by the minister.

### *1.1.2 Departments*

Departments are the second layer in the government hierarchy and serve as line agencies. Unlike ministries, departments have specialized human resources and technical equipment. They develop detailed plans and programs and implement them (also through field offices) after approval. They assist the ministries in policy matters, bringing in their operational knowledge and implementation experience. Departments are generally headed by a director general — usually a first class officer — whose responsibilities include implementing approved programs and policies, supervising and coordinating field offices, developing technical skills, providing advice to the ministry and ensuring effective service delivery.
In 2011, the government had 51 departments of three broad types:

- departments that use discrete skills and technology and maintain a host of specialties in human resources and equipment, such as the Department of Physical Planning under the Ministry of Physical Planning and Works, and the Survey Department under the Ministry of Land Reform and Management;
- (ii) departments engaged in technical operations, such as the Department of Food Technology and Quality Control under the Ministry of Agriculture and Cooperatives, and
- (iii) departments that exist primarily to coordinate field offices for implementing central level programs.

### *1.1.3 Central offices*

Central offices are created for specific purposes and are placed directly under either the ministry or the department. They focus on specific central level functions or coordinate field offices. In 2011 there were 136 central level offices. The Office of the Financial Controller is an example.

### *1.1.4 Field level organizations*

The GGMOA has organized the administrative system into central and field level units.

The field units focus on service delivery and are present in all five development regions, 14 zones and 75 districts and sub-districts. Further reorganization is likely, as there have been demands that the districts be redrawn, because the existing boundaries laid down five decades ago no longer match local realities. Changes will also be needed to conform to the new federal structure. Regional offices, directorates of ministries, and agencies were established to implement a regional approach to public administration and development. The chief of the Regional Administration Office (RAO) is a central government representative of the rank of secretary. There are regional offices in each of all five regions. The RAO's duties range from administrative leadership during calamities like epidemics, famine, and natural disasters, to coordinating district level offices, maintaining law and order, supervising the district administration offices, combating delays and corruption, promoting efficient service delivery, and settling inter-district disputes. In practice, the Regional Administrator's coordination with regional offices of sectoral ministries is largely ineffective because of unclear urisdictions, accountability structures and lines of authority. For this reason, secretaries do not like being posted as permanent regional administrators, and most of these units end up being run by 'acting' officials of lower rank defeating the purpose of the role they are expected to play.
Some ministries and departments also have regional offices, though not necessarily in all regions. The army, the police, central intelligence, health, drinking water, higher secondary education, the Public Service Commission (PSC), Radio Nepal, irrigation, forests, postal system, agriculture, livestock, veterinary, telecommunications, electricity, revenue investigation, and food and quality control have regional presence, many at the regional headquarters.

*Zonal offices*

Zonal offices function as intermediaries between the regional and district offices. During the Panchayat period, these offices were important politically, but most of them were dismantled after 1990, when multi-party democracy was established. Only a few zonal units remain. These include zonal offices of the PSC, police, hospitals, post offices, etc., and they provide sectoral services and also supervise district offices.

*District offices*

District offices are the key administrative field units. The chief district officer (CDO) heads the District Administration Office (DAO) as representative of the central government. The DAO's roles and functions are specified by the Local Administration Act 1971 (amended 2002) and it functions under the Ministry of Home Affairs (MoHA). The Regional Administrator is the immediate supervisor of the CDO. The main tasks of the DAO are to provide security to government offices and the public, maintain law and order, and also provide some general services

- Issue of citizenship certificates;
- Issue of passports;
- Registration of associations;
- Registration of newspapers and journals;
- Child adoption;
- Certification of orphans; and
- Certification of kinship.

The CDO is also responsible for coordinating all district level offices. Almost all public service agencies and some regulatory agencies have offices in all 75 districts. In 2011, Nepal had 1,622 district level offices.

- Each district has a local development officer (LDO) — the district level officer of the Ministry of Local Development (MoLD) — as the secretary to the elected DDC. The LDO is responsible for local development programs supported by the central government as well as those funded and managed by the DDC. The DDC's functions are mandated by the Local Self-Governance Act 1999 (LSGA) and Rules.
- All 75 districts include the 240 electoral constituencies (for national election), 927 Ilakas (areas created for the DDC election), 3,915 village development units and 58 municipalities.
- A staff member from regular civil service functions as the government representative, and as secretary of the different local bodies:
    - village development secretary (normally of assistant level) at the VDC;
    - executive officer at the municipality; and
    - LDO at the DDC.
- There are nine wards in each VDC. Wards are demarcated on the basis of population.
- A municipality can have more than nine wards. The municipal wards provide 11 types of services, such as agriculture, drinking water, irrigation, healthcare, law and order, and certification. Besides permanent offices, the government can create offices for specific projects and functions. Such offices are often set up for pursuing specific goals, or when existing administrative arrangements are unsuitable for a task at hand.

## *1.2 LAND: ADMINISTRATIVE STRUCTURE*

The Ministry of Land Reform and Management has the following functions as mentioned in the work division regulation, B.S 2064 of the Government of Nepal:

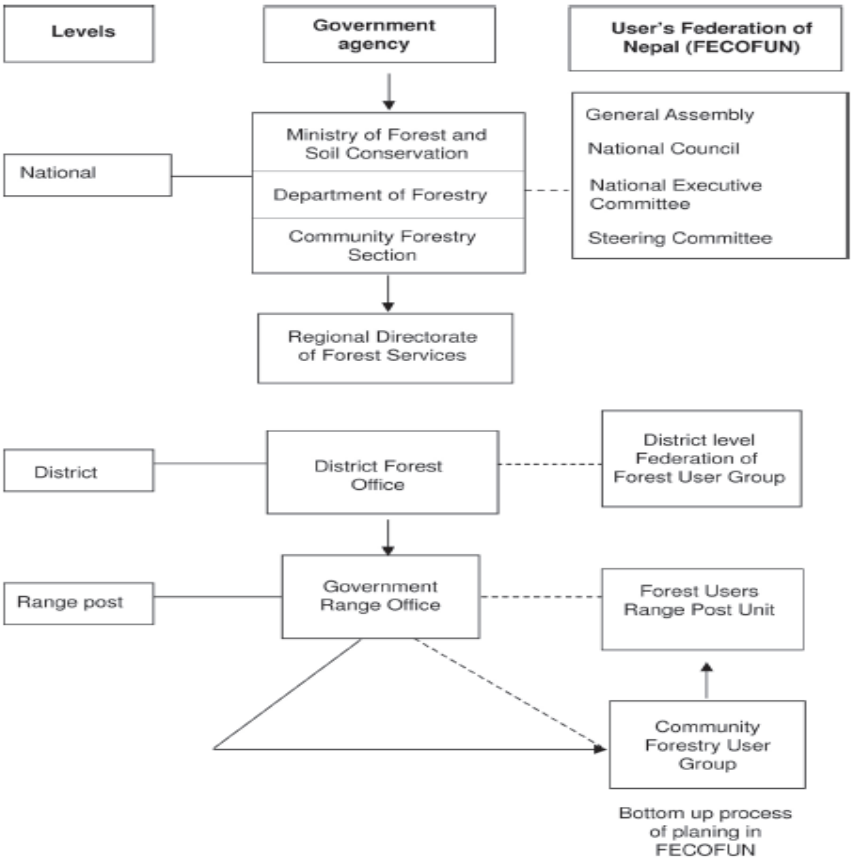
- Management of Guthi Corporation and Trust land;
- Implementing Land reform programmes;
- Implementation, monitoring and evaluation of the policies, plans and programmes;
- Land administration and Revenue collection;
- National and International issues related to land;
- Establish and maintenance of Geodetic control networks, production of topographic maps, aerial survey and Geo-informations;
- Human resource development through professional trainings in land survey and mapping and land management; and
- Administration and management of human resources within the ministry.

The Land Revenue Office (LRO) at District level is responsible for land administration and registration of all types land in Nepal. The Survey Office prepares land records through cadastral mapping. The three major types of formal and informal land ownership in practice are i) registered private land, ii) public land and iii) unregistered (but cadastral mapped) government land (ailani).

## *1.3 COMMUNITY FOREST: ADMINISTRATIVE STRUCTURE*

Primary actors in the implementation of community forestry are the national, regional, district and range-post levels of the Department of Forests and community groups (forest user groups). These groups have established their own network, the Federation of Community Forestry Users of Nepal (FECOFUN) at national, regional, district and range-post levels

*Figure 1.1 Organizational structure of Ministry of Forestry and FECOFUN*




Source:http://www.cifor.org/publications/pdf_files/events/documentations/yogyakarta/papers/chapter%205%20dahal.pdf

The Department of Forests was established in 1942 with the primary role of protection and management of the national forests. At present, there are 5 Regional Forest Directorates (responsible for coordinating, planning and monitoring district forestry programmes), 74 district forest offices (responsible for planning implementation at the district level), 92 Ilakas (subdistricts) forest offices and 698 range posts.

After the adoption of the community forestry concept, the government forestry personnel gradually shifted their role from policing and control to extension work and facilitating.

## *1.4 NATIONAL REGULATIONS*

### *1.4.1 The Constitution of Nepal, 2072 BS (2015)*

The present Constitution of Nepal came into effect on 20th September 2015. This Constitution replaced the interim Constitution of 2007. The key relevant provisions of the Constitution are:

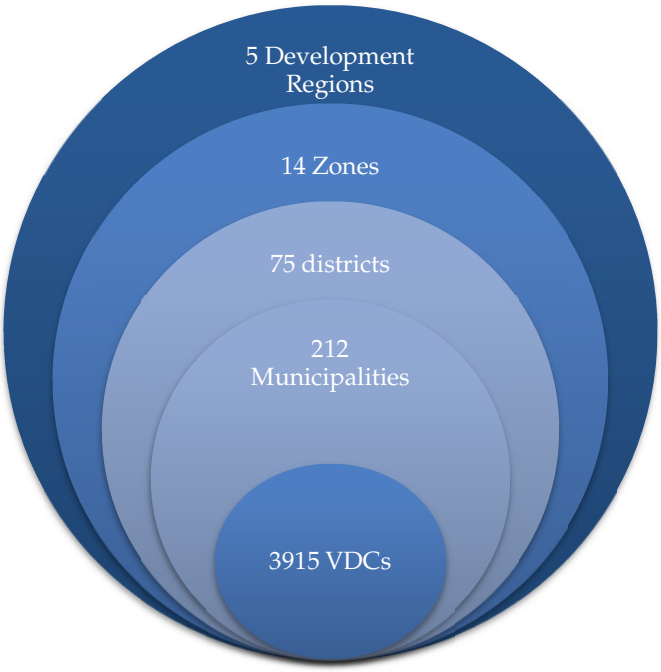
- Grants every citizen the right to acquire, own, sell and otherwise dispose of property;
- State shall make arrangements for the protection of sustainable use of and the equitable distribution of benefits derived from the flora and fauna and biological diversity

- Calls for the elimination of feudalism and prohibits forced labour and the exploitation of people on the basis of custom, tradition, or usage;
- Article 25(1) establishes the right to property for every citizen of Nepal, whereby every citizen is entitled to earn, use, sell and exercise their right to property under existing laws.
- Article 25(2) states that except for public interest, the state will not requisition, acquire or otherwise create any encumbrances on property of a person.
- Article 25(3) states that when the state acquires or establishes its right over private property, the state will compensate for loss of property and the basis and procedure for such compensation will be specified under relevant laws

*The Changed Administrative Structure*

A new local level administrative structure is being formed in Nepal, which has been decided by the cabinet, in line with the 2015 constitution. This new structure was adopted on 10th March, 2017[1], and elections were underway in the month of May for the *Gaon Palikas.* The old and new administrative structures are depicted in ***Figure 1.2*** and ***Figure 1.3*** respectively.

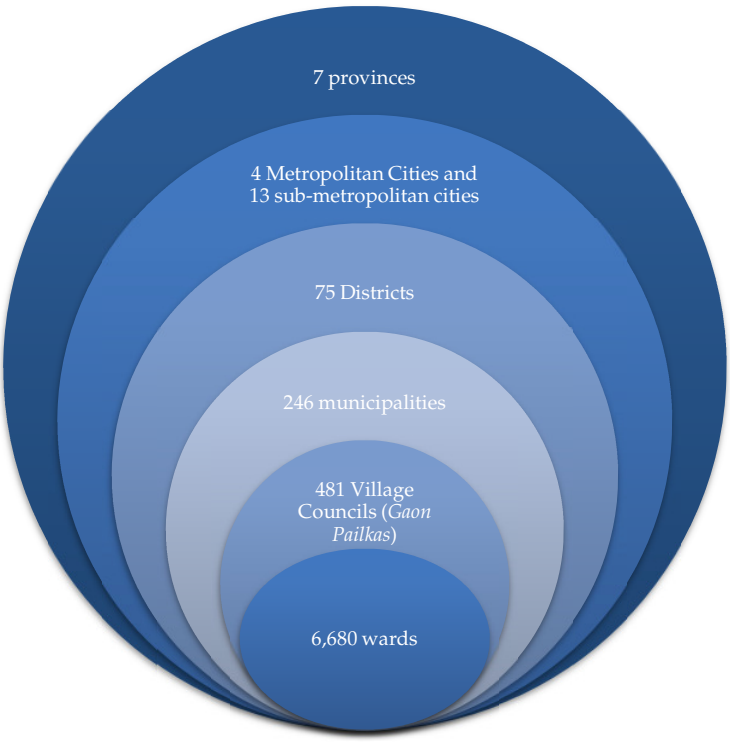
***Figure 1.2*** ***Old Administrative Structure of Nepal***




*Source:* http://www.mofald.gov.np/en/organizational-structure

***Figure 1.3*** ***New Administrative Structure of Nepal***

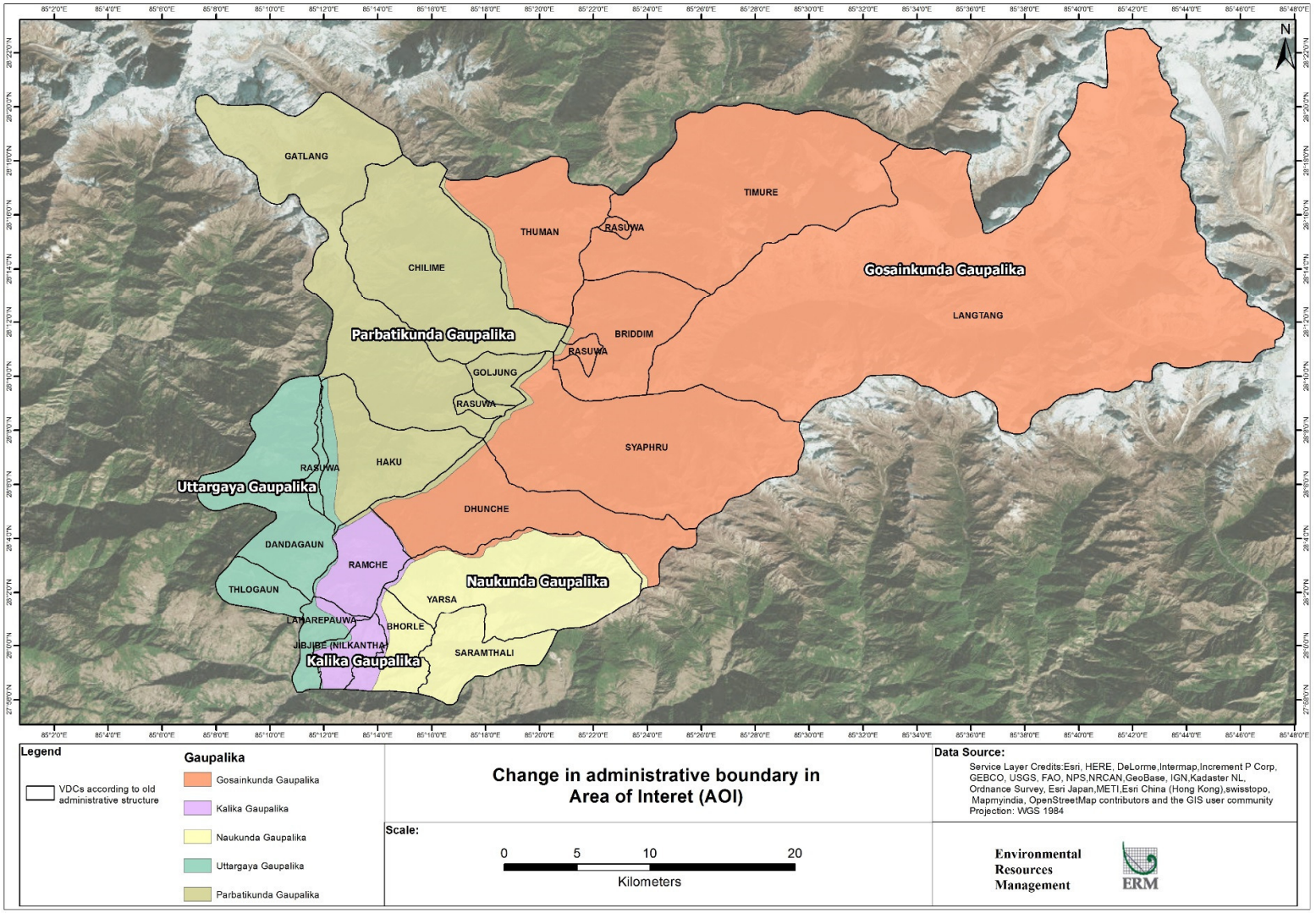
(1) https://thehimalayantimes.com/nepal/new-local-level-structure-comes-effect-today/




*Source:* http://kathmandupost.ekantipur.com/news/2017-03-11/new-local-level-units-come-into-existence.html

In keeping with this, the following figure provides an understanding of the manner in which the administrative structure of Rasuwa District has changed.

*Figure 1.4* *Changed Administrative Structure in Rasuwa District*



The key changes from the new administrative structure, which are relevant for the livelihood restoration and benefit sharing process, are as follows:

- This new structuring is primarily aimed at moving Nepal toward a federal structure. In keeping with this, rural and urban municipalities have been defined as local governments. These local governments, at the province and local level will exercise legislative powers, as sub-national governments;
- For this, many of the existing laws shall have to be repealed or aligned and amended while more than one hundred new laws shall have to be legislated by the federal government to meet the constitutional requirements. These laws will pertain to
  - provision for coordination mechanisms across different tiers of government,
  - changes in size, purpose and composition of public organizations
  - Provision for additional constitutional bodies and their purpose;
  - Provisions for exclusive and concurrent revenue assignments at all three tiers of government

  Though the exact scope of the changes in the laws and legal provisions is presently not known;
- The main purpose of the Gaonpalikas resembles the erstwhile Village Development Commitees (VDCs), but they have more rights on collection of royalty and taxes;. This will in turn have an impact on the provisions of benefit sharing and community based initiatives of the project;
- The Gaonpalikas will also have a larger annual budget in comparison to the VDCs. This will thus impact the level of projects or interventions undertaken by the government at the Gaonpalika level and their interface with the provisions identified as part of the SIMF for the project;
- Though the constitution does not recognize "District" as a different tier of sub-national government, its existence is allowed to continue. It remains to be decided and seen whether the existing organizational arrangements at district level would be completely eliminated or remain in new forms as extension of provincial government or a kind of federation or integrator or supervisory agency of local government units at district level;
- There is also an apprehension of competing interests in sharing many of the powers and resources from the federal government to sub-national governments simultaneously. This may also result in a lack of clarity in terms of the agencies and levels of government to be involved in the implementation of the SIMF for the project This will also require re-orientation in spirit of the constitutional provisions, with coordinating mechanism, so that the efforts towards creating institutional arrangements through administrative restructuring would not be affected.

### *1.4.2 Land Acquisition Act, 2034 BS (1977 AD)*

Land Acquisition Act, 2034 BS[1] (1977 AD) is the core legal provision to guide the land acquisition and resettlement activities in Nepal. The Act empowers the Government to acquire land for development purposes, by paying compensation to the landowner. Some of the key features of the Act are as follows:

- The Act empowers the government to acquire any land required for public purpose or for operation of any government institution initiated development project by giving compensation pursuant to the Act (Section 3 and 4). As per the prevailing government rules, the compensation to be provided for land acquisition should generally be in cash as per current market value. However, there is also a provision under Clause 14 of the Land Acquisition Act 2034 BS (1977 AD) to compensate land by land provided government land is available in the area.
- After the initial decision of the government to acquire land, the process of acquisition and compensation includes (a) initial procedures, (b) a preliminary investigation process, (c) acquisition notification, (d) compensation notification, and (e) appeal procedures.
- The public notification process is undertaken by the Executing Agency (EA) and includes the dissemination of information about purpose of acquisition, the land plots and area of land to be affected by the project.
- For the purpose of identifying the compensation amount, a Compensation Fixation Committee (CFC) is formed under the chairmanship of the Chief District Officer (CDO) of the district. The CFC is formed to undertake the actual verification of land to be acquired, review and fix compensation rate, identify the rightful owner(s), disburse the compensation, and provide necessary administrative support for addressing associated issues. However, formally the implementation process of CFC begins once GON grants formal approval for the land acquisition. This approval is based on the establishment of the public purpose of the land acquisition. Public purpose has been defined as the activity undertaken in the interest of or for the benefit or use of the general public, or functions to be undertaken by Government of Nepal and the term also included the following:
  - Project approved by Government of Nepal.
  - Project undertaken by local bodies in different levels.
- The Act also envisages the possibility of two separate rates of compensation, distinguishing between families who lose all their land and those who lose only some part of their landholdings. In determining the compensation, the Committee must consider the loss incurred by persons due to acquisition of land, shifting of residence or place of business to another place. If the land has to be acquired for institutions other than the VDCs and institutions fully owned by the government, the Committee has to consider the following while fixing the compensation amount:

[1] The years given outside of the bracket represent the year in keeping with the Hindu calendar followed in Nepal. This calendar is known as the Bikram Sambat Calendar. Throughout this report, the BS year will be given along with the accompanying year in keeping with the English Calendar in bracket.

- Price of land prevailing at the time of notification of land acquisition;
- Price of standing crops and structures, and
- Damage incurred by being compelled to shift the Affected Population residence or place of business in consequence of the acquisition of land.
    - Compensation to be paid for (a) damages caused as a result of investigations during the preliminary process, (b) land and property permanently acquired (including standing crops, trees and houses); and
    - Compensation to be paid in cash (lump sum), although landowners who have lost the entire landholdings may require for land replacement.

- However, under the Section 14 of the Act it is stated that, the Government may allot land to land losers from the land it possess such as *ailani*[1] *land*, or Government-owned any other land, in case land for land is decided as a part of the entitlements

Though the land was mostly bought through private purchase, some of the provisions of the act were partially used by the District administration in the interest of the Project.

### *1.4.3 Land Acquisition, Resettlement and Rehabilitation Policy for Infrastructure Development Projects, 2071 BS (2015 AD)*

The key objective of this policy is to avoid or at least minimize displacement and where not possible to provide adequate compensation and rehabilitation assistance to affected persons.

- The policy puts in place provisions for undertaking early screenings and assessment of potential impacts from the project activities and the formulation of adequate mitigation plans for the same;
- The policy requires for adequate engagement and information disclosure to be undertaken as part of the project, including an appropriate grievance redressal mechanism;
- The policy puts in place a process for land acquisition project classification, based on the region of the project and the number of families displaced (economically and physically). As part of this, land acquisition through use of eminent domain is the least preferred approach;
- This policy puts in place processes for land valuation and identifying provisions for relocation and social inclusion

Key features of the policy (relevant to the LALRP) are as follows:

- Social mobilization income restoration and life skill program: Project affected persons should be given necessary training for development of life skills, income generating schemes, savings and credit schemes so that

[1] Barren unregistered land

PAFs can take up self-employment projects at the resettlement zone. Preference should be given to women;

- Vulnerable groups such as Janajati/Adivasi, Dalits, landless, women, especially women-headed households, differently-abled, poverty groups and senior citizens are entitled to special benefit and assistance packages in addition to compensation and resettlement;

According to the project classification criteria, the UT-1 project is categorised as a High Risk Project. This policy shall guide the identification of mitigation measures for the project and formulation of management plans for the implementation of the same.

### *1.4.4 The Land Revenue or Malpot Aien (Land Administration and Revenue) Act 2034 BS (1977)*

This is the main Act to carry out land administration including maintenance and updating records, collection of land revenue and settlement of the disputes after completion of survey and handing over of the records to Land Revenue Office by the Survey Parties. It authorizes the Land Revenue Offices to registration, ownership transfer and deed transfer of land. This Act also authorizes the Land Revenue Offices to transfer ownership and deeds of individual land, if any person applied for the ownership transfer of his/or land with mutual understanding for public use with recommendation of relevant committee.

### *1.4.5 The Land (Measurement and Inspection) Act, 2020 BS (1962, as amended)*

This act sets out the classification of land and requirements for land survey and registration. The aim of the Land Measurement Act, 1962, was to measure and classify land resources to improve the land use system. This act therefore did not focus on protection of tenancy rights, but accepted that long term possession of land – 15 years without dispute – would ensure ownership right (This Act classified lands in four types in terms of quality – Abal, Doyam, Sim and Char, respectively. Many landowners had transferred the excess lands to industries, farms and businesses to prevent losing the surplus as per the provisions in the Act. Most of these lands are left fallow since several years.

### *1.4.6 The Land Administration Act 2020 BS (1963)*

The Land Administration act establishes district-level land administration offices and sets procedures for maintaining land registration records.

### *1.4.7 The Agriculture (New Arrangements) Act, 2020 BS (1963)*

This act restates earlier legislation abolishing intermediaries and landlord systems of tenure.

### *1.4.8 The Land Act 2021 BS (1964) and Amended till date*

The 1964 Land Act, as amended, requires the state to recognize the rights of registered tenants on land. The state must compensate the landowner and registered tenant for any land expropriation, dividing the compensation equally between them. This act serves the following purposes:

- abolishes the system of intermediaries collecting taxes from tenants by transferring control over taxation to District Land Revenue Offices and Village Development Committees (VDCs);
- transfers land managed by the state into private land (raikar);
- imposes ceilings on agricultural land;
- limits rent to a maximum of 50% of gross annual production of main crop;
- requires tenant certification, i.e., registration;
- institutes a compulsory savings program; and
- establishes a Commission on Land Use Regulation to address consolidation and fragmentation of land and incentivize farm cooperatives.

### *1.4.9 The Guthi Corporation Act, 2033 BS (1976 AD) Second Amendment in 1993 AD*

Guthi lands refer to the land and property donated by the government or the state and individuals for social and religious benefits. The term Guthi indicates an 'organization based on caste or kinship, or occasionally on geographical proximity, which insures the continued observance of social and religious customs and ceremonies of the community'. Guthi lands were exempt from tax and not to be reclaimed for private use by the donors. Generally, only the income derived from the property should be used; while the property including land remains intact, i.e. cannot be sold.

***Box 1.1 Understanding of Guthi Land***

Guthi word was derived from Sanskrit term Gosthi – meaning a society or association. The system was there before unification of Kathmandu to Nepal. Its origin and development can be traced to Newari customs in Kathmandu. For them, the system is an organic part of their social and cultural life.Guthi land covers about 2 % of the cultivated land of the country. For example, there is Sanaguthi, which is composed of members of the same caste or patrilineal group, which is responsible for conducting the funeral ceremonies involving its members. These may have some property including land for generating income, and this is certainly the Guthi. In general, Guthi is a system of keeping property to finance religious and charitable institutions.

The Guthi Sansthan Act 1976 has some provisions to convert Guthi (Rajguthi) land to Raikar by selling it. Changes were made to this effect in 1989 and 1993 enabling even the private Guthi to sell the land and keep its sales proceeding in the bank for interest income. But a court case in January 24, 2008 gave a verdict that no Guthi can be sold or transferred in any form. As the Guthi land cannot be sold or transferred now, its continuity will be maintained. However, exact modality of how this will be implemented is not clear. The district administrations allowed for the transfer of tenancy rights on Guthi land.

The act primarily deals with the management of the Sansthan, powers, duties etc. The applicability of this act for the project stems from the provision of the rent and tenancy rights associated with the Guthi land. Section 30 of the act mentions that, "Notwithstanding anything contained in Lands Act, 1964 and

other prevailing Nepal law, the tenancy right in a land cultivated on tenancy according to this Act may be sold and purchased." Chapter 6 of the act mentions in detail the provisions relating to Tenants. Section 35 of the Act, mentions Registration of tenants on payments of fees.

There are 15.53 ha of Guthi land affected by the project for which these provisions have to be considered.

### *1.4.10 Community Forest*

*Community Forest User Groups:*

The Decentralization Act 2039 BS (1982 AD) introduced the concept of community forest user groups (CFUGs). The **Master Plan for the Forestry Sector of 1988 and the Forest Act of 1993** formalized the concept and gave a legal basis for the groups to function as autonomous institutions in the management of forest resources. The following are some of the legal provisions that enabled forest user groups to build a strong institutional basis:

- The user group shall be an autonomous and corporate body having perpetual succession (Section 43(1)). It shall have a separate seal of its own (Section 43(2)). The user group shall have a separate fund of its own (Section 45(1)). The user group as a legal person may acquire, possess or transfer or otherwise manage movable and immovable property (Section 43(3)).
- The user group shall have to prepare a work plan for the community forest (Rule 28(1)).
- The user group shall collect, sell and distribute the forest products which are available pursuant to the work plan (Rule 32(1)).

After the enactment of the Forest Act of 1993, the formation of forest user groups began throughout the country. Under the Forest Act of 1993 and the Forest Regulation of 1995, forest user groups are allowed to find ways to achieve financial sustainability. This act requires that forest user groups spend a quarter of their income on forest management. However, many forest user groups spend most of their income on construction of local trails, school buildings, culverts and irrigation canals. Others are supporting livelihoods options for the rural poor and marginalized groups in their communities. All the forest user groups are voluntarily united under the umbrella of the Federation of Community Forestry Users of Nepal (FECOFUN) to ensure their rights are protected and not curtailed by the government.

The above mentioned Acts are important for the project as 76.67 ha (51.54 ha on permanent basis and 25.13 ha on temporary basis) of Community Forest and Government land is being diverted for the project. For this, the land take process is guided by these Acts and provisions.

### *1.4.11 Forest Product Collection and Sales Distribution Guidelines, 2000 (2057 BS)*

The guidelines clauses 3 to 10 have specified various procedure and formats for getting approval for vegetation clearance, delineation of lands for vegetation clearance, evaluation of wood volume etc. and government offices and officials responsible for the approval, delineation and evaluation. These provisions have a direct relevance to the development of the project and need compliance to these provisions.

### *1.4.12 Forest Act, 2049 and Guidelines of Use of Forestland for Other Purposes – 2063*

The use of forestland for project is subject to forest law and regulation and Guidelines of Use of Forestland for Other Purposes – 2063. As project infrastructure lies in different patches of forests and/or privately owned trees the Forest Act and the Forest Rules also become applicable. These projects need to comply with the provisions of forest law when it requires the use of forestland for construction. In case of government owned forestland to be acquired by any project for the purpose of public interest the process as outlined below will follow through the District Forest Office (DFO). In this case, the area to be acquired by the project will be in the ownership of the GoN, whereby GoN will grant permission for the utilization of the land for any specific purpose during the project timeline with agreed lease rates.

The principal steps in Govt./Forest land verification, decision and handover to the project proponent shall follow three broad steps.

- Preliminary Action on Land Verification and Approval from Cabinet
- Post Approval Discussions and Agreement
- Handover and Tree Cutting
  - Receipt of Tree Cutting Direction
  - Initiation of tree cutting, logging, stockpiling and transportation

***Table 1.1 Principle Steps for Preliminary Action on Land Verification and Approval from Cabinet***

| Step | Action | Responsibility | Time Required - Tentative | Remarks |
|---|---|---|---|---|
| 1 | Identifies the areas of Govt. land to be acquired and requests authorization from the concerned Ministry or Department to proceed with Govt. land possession "Bhogadhikar" | Project Proponent – representative of the proponent | Determined during feasibility study/ EIA | |
| 2 | Ministry/Department officially requests MoFSC to initiate preliminary action for land verification | MoFSC | 0.5 month | |
| 3 | MoFSC officially requests DoF to initiate preliminary action for land verification | DoF | 0.5 month | |

| Step | Action | Responsibility | Time Required - Tentative | Remarks |
|---|---|---|---|---|
| 4 | DoF officially request the respective District Forest Offices to initiate preliminary action for land verification and reporting | District Forest Office | 0.5 months | |
| 5 | District Forest Office initiates process for land verification – Field visits for identification, demarcation and assessment of forest resources to be felled | District Forest Office, CFUGs and Project Proponent | 2 months | Depends on the nature of land area to be verified |
| 6 | Documentation of forest resources, mapping and reporting | District Forest Office | 1 month | |
| 7 | District Forest Office officially intimates DoF regarding the assessment of land resources<br>• Total land area of project components<br>• Trees to be felled for required clearance to the project proponent | District Forest Office | 0.5 month | |
| 8 | DoF assessment of the file forwarded from DFO, decision and forwards to MoFSC | DoF | 0.5 months | |
| 9 | MoFSC initiate preliminary action on the file, decision and forwards to Cabinet for final decision | MoFSC | 1 month | |
| 10 | Required decision for land possession and removal of trees for the project – Intimates MoFSC of the decision | Cabinet of Ministers | 1 month | |

*Table 1.2 Principle Steps for Post Approval Discussions and Agreement*

| Step | Action | Responsibility | Time Required - Tentative | Remarks |
|---|---|---|---|---|
| 1 | MoFSC intimates DoF regarding the decision and instructs to initiate action | MoFSC | 0.5 month | |
| 2 | DoF receives the decision and initiates preliminary action | DoF | 0.5 month | |
| 3 | DoF intimates the project regarding the decision and forwards the preliminary draft of Agreement for further discussions | DoF | 0.5 month | |
| 4 | Discussions on the draft of Agreement with DoF - several rounds of discussion to clarify the land related data | DoF, Project Proponent | 2 month | |
| 5 | DoF invites for formal Agreement signing and finalization | DFO | 0.5 month | |
| 6 | DoF notifies District Forest Office, Regional Forest Directorate regarding the Agreement on Possession of Land and removal of trees | DFO | 0.5 month | |

*Table 1.3 Principle Steps for Handover and Tree Cutting*

| Step | Action | Responsibility | Time Required - Tentative | Remarks |
|---|---|---|---|---|
| 1 | Application to take preliminary action on land possession and tree cutting based on Forest Agreement | Project Proponent | 0.5 months | |
| 2 | Assessment of proposal and action on land demarcation at site | DFO, Project Proponent | 1.5 months | |
| 3 | Intimates project proponent on land demarcation | DFO | 0.5 month | |
| 4 | Apply for receipt of tree cutting direction | Project Proponent | 0.5 month | |
| 5 | Initiation of tree marking, tagging and inventory of forest resources<br>• Tree tagging and inventory within the boundary of demarcated land in S.N. 2 and 3 | DFO, CFUGs, Project Proponent | 2 months | Depending on the area of demarcated land |
| 6 | DFO requests Regional Forest Directorate (RFD) for final verification | DFO | 0.5 month | |
| 7 | RFD team visit to site for final verification | RFD, DFO | 0.5 month | |
| 8 | RFD intimates DFO for issuance of tree cutting direction | RFD, DFO | 0.5 month | |
| 9 | Issuance of "Tree Cutting Direction" to Project Proponent | DFO | 0.5 month | |
| 10 | Initiation of Tree Cutting and Land Clearance – As per agreement can be taken up by:<br>• Project Proponent through finalization of contractor – Steps 11 – 14<br>• Entrusted to DFO for tree cutting and clearance – Steps 15 – 20 | Project Proponent | | |
| 11 | Selection of appropriate contractor for tree felling, logging, stockpiling, transportation etc | Project Proponent | 0.5 month | **Initiated through Project Proponent** |
| 12 | Formalization of contract with selective contractor for tree felling | Project Proponent, Contractor | 0.5 month | |
| 13 | Initiation of tree felling, stockpiling, transportation etc | Contractor, CFUGs | 2 months | |
| 14 | Monitoring of activities undertaken by Project Proponent | DFO | Within the activity in S.N. 12 and 13 | |
| 15 | Application to initiate tree cutting by DFO | Project Proponent | 0.5 month | **Initiated by District Forest Office in coordination with CFUGs** |
| 16 | Discussions with DFO for required fund deposition as per Forest land Possession and Removal of Trees agreement | Project Proponent, DFO | 0.5 month | |
| 17 | Deposit the fund for tree felling in DFO account | Project Proponent | 0.5 month | |
| 18 | Tender notice issuance | DFO | 1 month | |
| 19 | Selection of contractor for tree cutting, stockpiling and transportation | DFO | 0.5 month | |
| 20 | Initiation of tree cutting, stockpiling and transportation | DFO, Contractor, CFUG | 2 months | |

| Step | Action | Responsibility | Time Required - Tentative | Remarks |
|---|---|---|---|---|
| 21 | Final Land Clearance and Use | Project Proponent | | |

### *1.4.13 Hydropower Development Policy, 2058 BS (2001 AD)*

Based on the experiences gained in the course of implementing the principles followed by the Hydropower Development Policy of 1992, emerging new concepts in the international market and their impacts, technological development, possibility of exporting electricity, and foreign investment and commitment on the environmental protection, the Hydropower Development Policy, 2001 was introduced with a view to make clear, transparent and investment –friendly hydropower development in Nepal. On the basis of this policy, a model Project Development Agreement was formulated by the Ministry of Energy, Government of Nepal in 2010. On the basis of this policy and PDA, a basket of benefits/provisions were identified for the purpose of benefit sharing with the local community in the project area. Some of the key provisions are as follows:

- Depending upon the capacity of the project, a maximum of 10% equity share of the project shall be allotted to the local community residing in the VDCs of the project site at the time of the initiation of the construction activities and the resettled and rehabilitated people;
- Rural electrification shall be encouraged in rural areas affected directly from the electricity generation project. According to the PDA, the company shall carry out electrification of households within a periphery of 500 meters from the power house site and dam site and shall provide 20 kWh of electricity per month for each family residing in the area. Royalty on electric energy consumed in such an area shall be exempted. Such exemption shall be given till the first 15 years of the commencement of commercial generation;
- Rural electrification fund shall be established for the development of micro-hydropower and rural electrification by pooling a certain percentage of the amount received as royalty;
- Provisions will be made for providing grant through Alternative Energy Promotion Centre(AEPC) to domestic private sector to generate and distribute electricity by building hydropower project of up to 100 kw at the rural level;
- Provision shall be made such that the local people can also be directly benefited from the operation of the hydropower generation project. Such provisions shall be included in the agreement to be made with the licensee;
- Downstream release shall be maintained, either 10% of the minimum mean monthly discharge or the quantity identified in the EIA study whichever is higher;
- Private sector shall be encourages to acquire the houses or land on its own;
- Rehabilitation and Resettlement shall be made for displaced families as specified by the government; and

- Royalty shall be shared as prescribed with the District Development Committee (DDCs) and will be spent in development and construction works

This policy is applicable for the project, as it is a Run of the River project. However, this policy will have to be amended in keeping with the changed administrative structure. Presently clarity is required on the manner in which the existing provisions for benefit sharing at VDC and district level will be interpreted at the Gaonpalika and District level.

### *1.4.14 Indigenous people: International Convention Ratified by Nepal*

*Convention (No. 169) Concerning Indigenous and Tribal Peoples in Independent Countries*

International Labour Organization (ILO) Convention 169 is directed at Government, and its implications for private sector are indirect. However, the convention is referred as a reference point by Indigenous People (IPs) and Civil Society Organizations. The Article 7 of the convention provides the right to indigenous people to decide their own priorities for the process of development. However, for the national development plans and programs, it mandates consultation with them in the formulation of the plans and programs. Article 12, 13, 14 and 15 safeguards rights of the indigenous people in the land and natural resources in territories traditionally occupied by them. In the event that the state retains the right of the natural resources in their territories, it mandates formulation of special provisions under the state legislation for participation in the decision making process and resettlement process with full compensation of the resulting loss or injury (Article 16). The Forest Act of 1993 and Forest Rules 1995 follow these principles enshrined in ILO C-169 through constituting Community Forest Users Groups and involving them in the decision making process of movable and immovable forest assets which may have implications on their way of life or livelihood practices.

This Convention has been ratified by Nepal in 1989. This Convention's provisions need to be kept in mind as more than 63.75% of the district's population and 93.6% of the Project AoI's population is comprised of the Indigenous group of Tamang. Furthermore, of the 38 Landowners impacted by the project, 37 are Tamang.

## *1.5 APPLICABLE STANDARDS OF INTERNATIONAL DEVELOPMENT FINANCE INSTITUTIONS*

The proposed Project, financing sources and financial support for the Project will be available from the multi-lateral financial, such as the World Bank (WB), The International Finance Corporation (IFC), the Asian Development Bank (ADB) and European Investment Bank's Principles and Standards as well as from the export credit agencies of the countries where major pieces of

equipment for the Project will be sourced. This support from the multi-lateral financial institutions/ export credit agencies also linked with the adherence of international best practices and environmental and social safeguard requirements of the lenders. The following subsections outline the key environmental and social requirements of the ADB,EIB and the IFC, applicable to the Project.

### *1.5.1 ADB's Safeguard Policy Statement, 2009*

In July 2009, ADB's Board of Directors approved the new Safeguard Policy Statement (SPS) governing the environmental and social safeguards of ADB's operations. The SPS builds upon ADB's previous safeguard policies on the Environment, Involuntary Resettlement, and Indigenous Peoples, and brings them into one consolidated policy framework with enhanced consistency and coherence, and more comprehensively addresses environmental and social impacts and risks. The SPS also provides a platform for participation by affected people and other stakeholders in the project design and implementation.

The SPS applies to all ADB-financed and/or ADB-administered projects and their components, regardless of the source of financing, including investment projects funded by a loan; and/or a grant; and/or other means, such as equity and/or guarantees. ADB works with borrowers and clients to put into practice the requirements of SPS.

The SPS supersedes ADB's Involuntary Resettlement Policy (1995), Policy on Indigenous Peoples (1998), and Environment Policy (2002). In accordance with the SPS, these previous policies apply to all projects and tranches of multi-tranche financing facility projects that were reviewed by ADB's management before 20 January 2010.
The objectives of ADB's safeguards are to:

- avoid adverse impacts of projects on the environment and affected people, where possible;
- minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
- assist borrowers and clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

ADB's SPS sets out the policy objectives, scope and triggers, and principles for three key safeguard areas:

- Environmental safeguards;
- Involuntary Resettlement safeguards; and
- Indigenous Peoples safeguards.

To help borrowers and clients and their projects achieve the desired outcomes,

ADB adopts a set of specific safeguard requirements that borrowers and clients are required to meet in addressing environmental and social impacts and risks. These safeguard requirements are as follows:

- Safeguard Requirements 1: Environment (Appendix 1 of SPS);
- Safeguard Requirements 2: Involuntary Resettlement (Appendix 2 of SPS);
- Safeguard Requirements 3: Indigenous Peoples (Appendix 3 of SPS); and
- Safeguard Requirements 4: Special Requirements for Different Finance Modalities (Appendix 4 of SPS).

In addition, ADB does not finance activities on the prohibited investment activities list (Appendix 5 of SPS).Furthermore, ADB does not finance projects that do not comply with its safeguard policy statement, nor does it finance projects that do not comply with the host country's social and environmental laws and regulations, including those laws implementing host country obligations under international law.

### *1.5.2 ADB Public Communications Policy (2011)*

ADB's *Public Communications Policy (2011)* sets out disclosure requirements for various ADB activities, including safeguard requirement. Safeguard Requirements 2: Involuntary Resettlement (Appendix 2 of SPS); and Safeguard Requirements 3: Indigenous Peoples (Appendix 3 of SPS) sets out the need for meaningful consultation and information disclosure during project preparation and operation to the affected population and other key stakeholders. Key requirements include:

- Information Disclosure: The borrower/client will submit the following documents to ADB for disclosure on ADB's website as per the applicability with respect to the Project:
  - Draft EIA including draft EMP;
  - Final EIA/IEE;
  - Updated EIA/IEE and corrective active plan;
  - Environmental Monitoring Reports;
  - Resettlement Plan (RP); and
  - Indigenous Peoples Plan (IPP).
- Information disclosure to affected people or stakeholders: The borrower/client will provide relevant environmental information in a timely manner, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. For uneducated people, other suitable communication methods will be used.
- Consultation and Participation: The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation.

- Timing and Frequency for consultation and participation: Meaningful consultation begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle,

### *1.5.3 ADB Social Protection Strategy 2001*

Social protection is a key step in ADB's battle to have Asia and the Pacific region "free of poverty." The Social Protection Strategy (SPS) spells out the scope of social protection and commitment of the ADB to develop priority interventions in five major elements including:

- Labour market policies and programs designed to generate employment, improve working conditions and promote the efficient operations;
- Social insurance programs to cushion the risks associated with unemployment, ill health, disability, work-related injury and old age;
- Social assistance and welfare service programs for the vulnerable groups with inadequate means of support, including single mothers, the homeless, or physically or mentally challenged people;
- Micro and area-based schemes to address vulnerability at the community level, including microinsurance, agricultural insurance, social funds and programs to manage natural disasters; and
- Child protection to ensure the healthy and productive development of children.

### *1.5.4 ADB Operations Manual (OM) C3 Sector and Thematic Policies on Incorporation of Social Dimensions 2011*

All ADB operations have social dimensions that need to be taken into account from the country strategy formulation, programming, and project processing phases onward. The key social dimensions, supported by specific ADB policies or strategies, include:

- Participation;
- Gender and development;
- Social safeguards; and
- Management of social risks, especially among vulnerable groups.

As per the policy, ADB operations incorporate social dimensions to ensure the following social development outcomes, especially for the poor, vulnerable, and excluded groups:

- Policies and institutions that recognize and promote greater inclusiveness and equity in access to services, resources, and opportunities;
- Greater empowerment to participate in social, economic, and political life; and
- Greater sense of security and ability to manage risks.

In pursuing these social development outcomes, ADB

- Encourages consultation with and participation by stakeholders (including the government, executing and implementing agencies, clients and/or beneficiaries, people affected by ADB-supported projects); provides them with opportunities to engage in key stages of the country strategy formulation, programming, and project cycles; and actively seeks, where appropriate, the cooperation of nongovernment organizations and other civil society groups in formulating, designing, implementing, monitoring, and evaluating projects;
- Addresses gender considerations in relevant aspects of ADB operations, including macroeconomic, sector strategy, country strategy formulation, and programming work, and in key stages of the project cycle; and proposes strategies to promote social inclusion and gender equality and to empower women;
- Integrates social analysis in preparing country partnership strategies and regional strategies and programs; identifies potential social issues during project preparation to ensure that the project design maximizes social benefits and avoids or minimizes social risks, particularly for vulnerable and marginalized groups; and
- Ensures that project design and implementation arrangements include actions to enhance benefits and to monitor and evaluate the distribution of the benefits of the project, with performance targets and indicators for monitoring and evaluating benefits included in the design and monitoring framework of the project performance management system.

### *1.5.5 ADB Gender Mainstreaming Guidelines 2012*

The projects of the Asian Development Bank (ADB) have four gender mainstreaming categories:

- Category I: gender equity as a theme (GEN);
- Category II: effective gender mainstreaming (EGM);
- Category III: some gender elements (SGE); and
- Category IV: no gender elements (NGE).

The Gender Mainstreaming Guidelines 2012 provides a detailed overview on the definition, requirements and application of the above gender mainstreaming categories.

### *1.5.6 World Bank Group Performance Standard*

The Performance Standards (PS) (January 2012) established by WBG stipulates that the Project shall meet certain requirements throughout the life cycle of an investment by WBG or other relevant financial institution such as other DFIs (eg DEG, FMO) or commercial banks, which are signatory to the *Equator Principles, 2006.*

***Table 1.4 WBG Performance Standards***

| Performance Standards | Specific Areas |
|---|---|
| Performance Standard 1: | Assessment and Management of Environmental and Social Risks and Impacts |
| Performance Standard 2 | Labour and Working Conditions |
| Performance Standard 3 | Resource Efficiency and Pollution Prevention |
| Performance Standard 4 | Community Health, Safety and Security |
| Performance Standard 5 | Land Acquisition and Involuntary Resettlement |
| Performance Standard 6 | Biodiversity Conservation and Sustainable Management of Living Natural Resources |
| Performance Standard 7 | Indigenous Peoples |
| Performance Standard 8 | Cultural Heritage |

*IFC Performance Standards, January 2012*

These PS and guidelines provide ways and means to identify impacts and affected stakeholders and lay down processes for management and mitigation of adverse impacts. A brief on the requirements as laid down in the performance standards is described in the following subsections.

Following sub-sections tries to provide the requirements of the specific PS, so as to set up the context for matching the requirements of these PS during the various stages of the life cycle of the Project.

*PS 1: Assessment and Management of Environmental and Social Risks and Impacts*

The PS 1 requires Social and Environmental Assessment and Management Systems for managing social and environmental performance throughout the life cycle of this Project and runs through all subsequent PSs. The main elements of PS 1 include:

- A Social and Environmental Assessment to understand the social and environmental impacts and risks;
- A Management Program for mitigating the impacts and minimizing the risks identified in the assessment;
- Establishing and ensuring organizational capacity and requisite trainings to the staff to implement the Management Programme;
- Engagement with the community to ensure free prior informed consultation (FPIC), community grievance redress constructive relationship all through the project life cycle; and
- Adequate monitoring and reporting systems to measure and report the effectiveness of the Management Programs.

The social and environmental performance is a continuous process to be initiated by the management and would involve communication between the organisation, its workers and local communities directly affected by the Project. The PS requires that Project proponent initiate regular assessment of the potential social and environmental risks and impacts and consistently tries to mitigate and manage strategy on an ongoing basis.

*PS 2: Labour and Working Conditions*

The economic growth through employment creation and income generation is recognised and balanced protecting the basic rights of workers. PS 2 is guided by the various conventions of International Labour Organization (ILO) and outlines the minimum requirements of working conditions, protection to the workforce (including issues of child and forced labour) and ensuring occupational health and safety of both its 'employees' as well as 'non employees' working through contractors. The PS requires:

- Establishment of a sound worker-management relationship;
- Encouraging equal opportunity and fair treatment of workers;
- Promoting compliance with national labour and employment laws; and
- Promoting healthy and safe working conditions for workers.

PS 2 requires project proponents to conduct its activities in a manner consistent with the four core labour standards (child labour, forced labour, non-discrimination, and freedom of association and collective bargaining). In addition, PS 2 also addresses other areas such as working conditions and terms of employment, retrenchment, and occupational health and safety issues.

Some of these requirements refer to the applicable national law. Whereas national law establishes standards that are less stringent than those in PS 2, or are silent, the project proponent is expected to meet the requirements of PS 2.

*PS 3: Resource Efficiency and Pollution Prevention*

PS 3 outlines the approach to pollution prevention and abatement in line with internationally disseminated technologies and practices with objectives to:

a) avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from activities; and
b) promote the reduction of emissions that contribute to climate change.
c) PS 3 requires a project to avoid, minimize, or reduce adverse impacts on human health and environment by adopting pollution preventive and control technologies throughout the Project life cycle.

PS 3 outlines a project approach to Pollution Prevention and Abatement (PPA) in line with internationally disseminated technologies and practices. It describes the measures to take into account the potential impact of emissions on the ambient conditions (such as ambient air quality) and seek to avoid or minimise these impacts within the context of the nature and significance of pollutants emitted.

*PS 4: Community, Health, Safety and Security*

PS 4 concentrates on the responsibility that must be undertaken by the client to avoid or minimize the risks and impacts to the community's health, safety

and security that may arise from project activities. PS 4 requires a project to evaluate risks and impacts to the health and safety of the affected community during the Project life cycle and establish measures to avoid minimize and reduce risks and impacts from the Project.

PS 4 recognises that project activities, equipment, and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development. However, projects can also increase the potential for community exposure to risks and impacts arising from equipment accidents, structural failures, and releases of hazardous materials. The performance standard details out project proponents responsibility to avoid or minimise the possible risks and impacts to community health, safety and security that may arise from project activities.

*PS 5: Land Acquisition and Involuntary Resettlement*

The objectives of this PS are to:

- Avoid or at least minimize the involuntary resettlement wherever feasible by exploring alternative project designs;
- Mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of land by:
    - Providing compensation for loss of assets at replacement cost; and
    - Ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.
- Improve or at least restore the livelihoods and standards of living of displaced persons; and
- Improve living conditions among displaced persons through provision of adequate housing with security of tenure at resettlement sites.

PS 5 require a project to consider various processes and systems to avoid /minimise social and economic impacts related to land acquisition and resettlement.

This PS applies to physical or economic displacement resulting from the following types of land transactions:

- Type I: Land rights for a private sector project acquired through expropriation or other compulsory procedures;
- Type II: Land rights for a private sector project acquired through negotiated settlements with property owners or those with legal rights to land, including customary or traditional rights recognised or recognisable under the laws of the country, if expropriation or other compulsory process would have resulted upon the failure of negotiation; and
- This PS does not apply to resettlement resulting from voluntary land transactions (ie market transactions in which the seller is not obliged to sell and the buyer cannot resort to expropriation or other compulsory procedures if negotiations fail). The impacts arising from such

transactions shall be dealt with as under PS1, though sometimes, when risks are identified, the project proponent may decide to adhere to PS 5 requirements even in willing buyer-seller cases.

PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

PS 6 aims at protecting and conserving biodiversity, the variety of life in all its forms, including genetic, species and ecosystem diversity and its ability to change and evolve, is fundamental to sustainable development. The components of biodiversity, as defined in the Convention on Biological Diversity, include ecosystems and habitats, species and communities, and genes and genomes, all of which have social, economic, cultural and scientific importance. This PS addresses how clients can avoid or mitigate threats to biodiversity arising from their operations as well as incorporate sustainable management of renewable natural resources.

PS 6 recognises that protecting and conserving biodiversity—the variety of life in all its forms, including genetic, species and ecosystem diversity—and its ability to change and evolve, is fundamental to sustainable development. It reflects the objectives of the Convention on Biological Diversity to conserve biological diversity and promote use of renewable natural resources in a sustainable manner.

*PS 7: Indigenous Peoples*

PS 7 acknowledges the possibility of vulnerability of indigenous people owing to their culture, beliefs, institutions and living standards, and that it may further get compromised by one or other project activity throughout the life cycle of the project. The PS underlines the requirement of avoiding / minimizing adverse impacts on indigenous people in a project area, respecting the local culture and customs, fostering good relationship and ensuring that development benefits are provided to improve their standard of living and livelihoods.

PS 7 recognises that Indigenous Peoples, as social groups with identities that are distinct from dominant groups in national societies, are often among the most marginalised and vulnerable segments of the population. The term "indigenous people" is more clearly defined in the IFC Guidance Note for PS 7.

Objectives of PS 7 underscore the need to avoid adverse project impacts on Indigenous Peoples' communities living in the project's area of influence, or where avoidance is not feasible, to minimise, mitigate or compensate for such impacts through mechanisms that are tailored to their specific cultural characteristics and expressed needs of the Indigenous Peoples, in a manner commensurate with the scale of project risks and impacts.

*PS 8: Cultural Heritage*

PS 8 aims to protect the irreplaceable cultural heritage and to guide clients on protecting cultural heritage in the course of their business operations. In addition, the requirements of this PS on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.

PS 8 recognises the importance of cultural heritage with an objective to:

- Protect cultural heritage from the adverse impacts of project activities;
- Support its preservation; and
- Promote the equitable sharing of benefits from the use of cultural heritage in business activities.

The PS requires the project proponent to comply with relevant national law on the protection of cultural heritage, including national law implementing the host country's obligations under the Convention Concerning the Protection of the World Cultural and Natural Heritage and other relevant international law.

### *1.5.7 Asian Infrastructure Investment Bank's Environmental and Social Standards*

The AIIB's Environmental and Social Framework aims to achieve environmentally and socially sustainable project outcomes by integrating good international practice in to all phases of a project, from the decision making to the preparation and implementation. Included in its framework[1] are:

- An Environmental and Social Policy, which sets forth mandatory environmental and social requirements for each Project.
- Environmental and Social Standards (ESSs), which set out more detailed mandatory environmental and social requirements relating to the following:

ESS 1: Environmental and Social Assessment and Management;

ESS 2: Involuntary Resettlement; and

ESS 3: Indigenous Peoples.

- An Environmental and Social Exclusion List (as an appendix to the Environmental and Social Policy) that provides an exclusion list of activities or items that will not be funded by the AIIB.

Together, the AIIB's Policy and Standards comprise an environmental and social management approach that is designed to:

- Support decision-making by AIIB;
- Provide a robust structure for managing operational and reputational risks of AIIB and its shareholders in relation to environmental and social risks and impacts in Projects;

[1] AIIB's Environmental and Social Framework: https://www.aiib.org/en/policies-strategies/framework-agreements/environmental-social-framework.html

- Provide for environmental and social screening and categorization of Projects;
- Analyse potential environmental and social risks and impacts of projects;
- Identify actions to avoid, minimise, mitigate, offset, or compensate for environmental and social impacts of projects;
- Support integration of environmental and social management measures into projects;
- Specify environmental and social management provisions to be included in agreements governing projects;
- Provide a mechanism for public consultation and disclosure of information on environmental and social risks and impacts of projects;
- Provide for monitoring and supervision of environmental and social management measures under projects; and
- Facilitate development and dissemination of lessons learned from projects to improve environmental and social management practices.

### *1.6 PROJECT DEVELOPMENT AGREEMENT WITH MINISTRY OF ENERGY*

On 29th December 2016, the Project Development Agreement (PDA) for the Project was signed between the Ministry of Energy, Government of Nepal and NWEDC. Some of the key clauses of the agreement, pertaining to environmental and social aspects, are as follows (this is not an exhaustive list):

- The following Plans shall be prepared as part of the Project:
    - The Local Benefit Sharing Plan,
    - Employment and Skill Training Plan and
    - Industrial Benefits Plan
    - Land Acquisition and Livelihood Restoration Plan (LALRP);
- The Company shall ensure that its Nepal Employment and Skills Training Plan provides for appropriate training of suitable citizens of Nepal for Project-related opportunities;
- The Company shall comply with the Nepal Employment and Skills Training Plan, Nepal Industrial Benefits Plan and Local Benefit Sharing Plan and ensure that appropriate programmes are designed to assist suitable Nepali citizens, entities, and firms to meet the Project's requirements for goods and services;
- The Company shall conduct employee training programmes from time to time, including training in each of the skills used in the Project, including management training;
- **Prior to Commercial Operation Date**, the Company shall build the distribution network to supply such Local Free Power to each Eligible Household within the Free Electrification Area;
    - GON shall be responsible for the operation and maintenance of such distribution network at its sole cost.
    - GON and the Company shall jointly prepare a plan (the "Rural Electrification Plan"), based on a pre-feasibility study to be carried

out by GON and the Company (at the Company's sole cost) to assess the costs and scope of rural electrification.
    - The Company shall implement the Rural Electrification Plan.
- **From and after commercial operation date**, the company shall supply at its own cost- 20 KWH of free power each month to each household within the free electrification area to up to 200% of the number of original Households;
- The company shall not impair the use of the river for drinking and cultural uses, existing irrigation, industrial and recreational uses. Where impaired, it should be mitigated

The Company shall (to the extent applicable) submit reports every six (6) months to GON for the first three (3) years of the Construction Period and every twelve (12) months thereafter, describing in detail:

- its employee training programmes,
- the implementation of such training programmes,
- The progress made towards meeting the objectives of using Nepali resources, training and development, the Nepal Employment and Skills Training Plan, Nepal Industrial Benefits Plan and Local Benefit Sharing Plan.

***Box 1.2 Benefit Sharing in Hydro Electric Projects in Nepal***

Nepal has over the years institutionalised certain mechanisms to ensure that the benefits of dams and hydropower projects with the concerned districts and local authorities. One of the important mechanisms in this has been the disbursement of a share of royalties from the hydroelectric plants to the local governments. According to a ministerial decision in 2003, the amount of royalties to be shared was fixed on 12% for the local areas and 28% to all the districts in the district development committee which housed the project. The 2001 policy also specifies that 1% of the royalty shall be provided to the VDCs that are directly affected by the hydropower project, with the sole purpose of expanding the village electrification of these VDCs. Through this mechanism, the target beneficiaries are allowed to share a portion of the revenue from bulk electricity sales on an annual basis. The disbursement of the royalties is usually done through community development programs or through a community development fund.

One of the key examples of benefit sharing by allowing the local community to purchase shares in the project is the Bhotekoshi project in Sindhupalchowk district. The 45 MW project, started operations in 2001. After a number of protests, meetings and discussions with the local community, the project agreed to make available 6% of their shares to a company formed by the local community. In addition to this the project has also agreed to pay NR 2.25 million annually to the Tatopani and Phulpingkatti VDCs, which are directly affected by the project and a lump sum amount of NR 2.25 million to seven other VDCs who are indirectly impacted by the project.

An example of benefit sharing, through royalty sharing is the 60 MW run-of the river Khimti-I Hydropower Project, located in Dolakha and Ramechhap district. The project as part of its royalty sharing mechanism provides scholarships for 50 female students from the community schools, to enable them to continue their education. This scholarship is provided through an endowment fund, established by the project company, in collaboration with the Rotary Club of Kantipur. As part of this program, the company provides NR I million as a contribution, and a matching amount is provided by the Rotary Club. The fund provides scholarships, of approx. NR 1500 and 2000 per year to the 50 students. Apart from this, the project has invested in the provisioning of health services in the area. For this purpose, the project provided a project clinic

within the premises of the project office in Kirne and runs a dispensary at the intake site. The clinic is headed by a health assistant and seven health workers. The entire operating cost for the clinic and dispensary are borne by the company.

Similarly, the Kali Gandaki Hydroelectric Project, located in the Western Development Region of Nepal, in the Syangja District and its surrounding districts. The royalty for the project is divided proportionally across the four districts of Syangja, Gulmi, Palpa and Parbat. This amount is to be used for local development works in the regions. It is reported that 3000 households in 11 VDCs across the project area have benefited from a rural electrification program.

Another example is the 20 MW Chilime Hydropower Project, built on Chilime River in 2003. this project, increased the local community's equity ownership to 10%, from 5% after a court judgement. A basket fund of NR 2.5 million each year has been allotted for community development works through Clilime Jalabiddhut Upabhokta Sarokar Samiti in affected VDCs – Chilime, Syafrubensi and Goljung. The project has also contributed to health, education, infrastructure, drinking water and irrigation as well as construction of toilets and bathrooms at public gatherings and schools at Chilime village. The project has provided financial aid to Higher Secondary Schools and Primary Schools in the neighbouring villages for infrastructure development including provision of computers in these schools. The project is providing and promoting entrepreneurship development programs among the rural youth for taking up self-employment. It is providing trainings to the local people with an aim to develop skilled local manpower and give them employment opportunity. The project has been providing a platform for internship programs for internship programs for students from different colleges. The project has facilitated new street lights for market areas in affected VDCs like Chilime, Goljung, Komin, Syafrubesi

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*Source*: IUCN and GTZ: Recognizing entitlements and sharing benefits: emerging trends in Nepal's Hydropower Terrain; United Nations Environment Programme, Dams and Development Project; Compendium on Relevant Practices: 2nd Stage, World Bank, A Guide for Local Benefit Sharing in Hydropower Projects. http://www.myrepublica.com/portal/index.php?action=news _details &news _id =89255, Shrestha, P; Lord, A; Mukherji, A; Shrestha, RK; Yadav, L; Rai, N (2016) Benefit sharing and sustainable hydropower: Lessons from Nepal. ICIMOD Research Report 2016/2. Kathmandu: Nepal, URL: http://lib.icimod.org/record/32026/files/icimodResearchReport2016_2.pdf accessed on 12th June 2017.

Annexure C

# Detailed Approach and Methodology for LALRP Formulation

# 1 APPROACH & METHODOLOGY FOR LALRP

This section describes the approach and methodology adopted for the LALRP Development. The methodology was based on a phased participatory approach, dependent upon qualitative and quantitative data collection.

As stated in ***Section 5.1*** of the LALRP, a number of environmental and social assessments have been undertaken for the project till date. One of the most important of these studies was the E&S gap assessment for UT-1 undertaken in June 2016, post the earthquake of April, 2015. The E&S gap assessment had suggested that firstly, the timing for LRP implementation was not correct and secondly, owing to changes on ground (loss of land, damage to house, internal displacement of the people from some of the villages etc.) the LRP will need to be updated.

The E&S gap assessment and subsequently the inception site visit for LALRP shaped and validated the methodology for data collection. This LALRP has been built on the information previously collected as part of the complimentary socio-economic baseline for the ESIA, gap assessment and scoping exercise post-earthquake and the previous LRP formulated in 2015. As a part of the current LALRP in 2017, 100 percent census survey of the identified PAFs, detailed stakeholder consultations ( PAFs, local community, NGOs/ INGOs, Government agencies etc.) formed the core of the methodology.

The following sections provide an understanding of the methodology followed for the development of the LALRP in further detail.

## 1.1 *INCEPTION AND SCOPING*

The inception phase activities were undertaken to build on the understanding of the Project and the changed socio economic context in the Project AoI, post-earthquake (April 2015). These changes can be attributed to a lot of factors including Government schemes, NGOs intervention, some villages becoming unsuitable for residing etc.. These in turn have resulted in changes and dynamic situation, one leading to another.

### 1.1.1 *Desk Based Review*

A desk based review of documents provided by NWEDC was conducted by the ERM team in order to build and enhance the understanding of the project. The documents reviewed in this process comprise of the following documents:

- Cadastral mapping and Land Acquisition Survey, 2011, by Jade Consult Pvt. Ltd.
- Complementary ESIA, 2014, by Nepal Environmental and Scientific Services Pvt. Ltd.

- Detailed Design Report, 2013 by Daelim Kyeryong
- Environmental Impact Assessment, 2011 by Jade Consult Pvt. Ltd.
- Post-Earthquake E&S gap analysis and status report, 2016;
- Pre Earthquake Stakeholder Engagement Plan and GRM, 2015;
- Pre-Earthquake Livelihood Restoration Plan (LRP), 2015;
- Project Development Agreement (PDA) signed with the Ministry of Energy on 29th December 2016.
- Records of Stakeholder consultations undertaken during preparation of LRP, 2015;

### *1.1.2 Kick Off Meeting with NWEDC and IFC*

A kick off meeting was organized with NWEDC representatives in Kathmandu on 9th April 2017. The purpose of this meeting was to develop an understanding of the following:

- The present ground situation, in keeping with the relief activities being undertaken, community's adaptation to post earthquake setting, change in administrative organization, post the new Constitution being implemented in Nepal;
- The present information available on the Project Affected Families (PAFs), especially focused on their present residence;
- Adequacy of the proposed methodology for the assignment and the potential schedule for the same; and
- Understanding on how well the present situation and changing dynamics on the ground can all be assimilated to manage the livelihood impacts on the PAFs and also meet the Project development agreement (PDA) commitments in general.

In addition to this, the ERM team also had a discussion with an IFC representative on 10th April 2017. This discussion was primarily aimed at updating IFC on the understanding developed so far and the work plan going forward. IFC also provided a perception of their and other lender's expectations from this assignment.

### *1.1.3 Site Reconnaissance*

The ERM team, accompanied by representatives of NWEDC and NESS undertook a site reconnaissance visit to Dhunche from 11th-14th April 2017.

***Figure 1.1 Site Reconnaissance Visit***

*Source*: ERM site visit, 2017

This site reconnaissance was aimed at the following:

- Visit to the still existing IDP camps, including Farm Camp and Nuabesi;
- Visit to the location identified for resettlement of in Khalte;
- Discussions with the following stakeholders:
  - NGOs such as Manekor and Laccos;
  - The CDO;
  - Reconstruction Authority;
  - Local Leaders; and
  - Local Community in IDP camps and Mailung.

## *1.2 PRIMARY DATA COLLECTION*

### *1.2.1 Survey Tool Development*

On the basis of the understanding developed during the inception phase, the primary data collection was initiated. For this purpose, a PAF socio-economic survey tool was formulated (***Annex C***). This survey form was aimed at allowing for qualitative and quantitative data to be collected. The purpose of this survey was to allow for an understanding of the following:

- Present residential status of the PAFs;
- Impacts of the earthquake;
- Change in the lifestyle and expenditure, in comparison to the pre-earthquake scenario;
- Relief support received by the PAFs from various stakeholders;
- Asset ownership of the PAFs;
- Livelihood profile of the household members;
- Income levels of the PAFs;
- Present skill and training level of the PAFs;
- The contextual vulnerability of the PAFs,
- Key concerns of the PAFs in terms of their present living conditions; and
- Key expectations from the project.

In addition to this, the stakeholders to be covered as part of the Focus Group Discussions (FGDs) and Key Informant Interviews were identified. For each stakeholder group the key area of concern or focus was identified and the basic objectives of the discussion were put in place.

### *1.2.2 Workshop with NESS Social Experts and Assessors*

ERM and NESS deployed a team of 8 personnel over the duration of the field work from 26th April 2017 to 8th May 2017. Prior to mobilization, a one day workshop was organized in Kathmandu on 26th April 2017. The purpose of this workshop was to introduce and familiarise the team with each other and to have a discussion on the field work methodology and survey tools developed. As part of this workshop, feedback was taken on the survey tools prepared based on their understanding of the local conditions, and changes were made accordingly.

### *1.2.3 Field Testing*

The revised survey tools were then field tested in the Nuabesi IDP camp on 27th April 2017. The field test served as a critical activity that identified required modifications for the survey format and methodology for data collection. This was important primarily to capture the various existing livelihood strategies of the PAFs, challenges, livelihood options which have been successfully explored, options which have not given results. Based on the field test, the survey format was finalized. Once the survey tool was finalized, a data entry code was developed for enabling proper data entry.

### *1.2.4 PAF Survey*

The PAF socio-economic surveys were initiated from 28th April 2017. The PAFs were identified based on the LRP formulated in 2015. However, as part of the survey process, an attempt was made to establish if any member of the original PAF, had since 2015, established a separate household. In such cases, the new households were treated as separate PAFs and covered individually (refer to ***Section 4.3.1*** of the LALRP for further details).

For the PAFs of Gogone, Mailung and Tiru, presently residing in IDP Camps such as Satbise, Nuabise, Khalte, Bogetitar and Batar, the surveys were undertaken in the IDP camps itself. To the extent possible, the surveys were undertaken in the existing household of the PAFs. For the PAFs of Haku Besi, Phoolbari and Thanku, the surveys were undertaken in Dhunche; this was also because of the fact that most of the PAFs had temporary settlement in Dhunche and were engaged in some sort of livelihood opportunity in and around Dhunche.

*Figure 1.2 PAF Survey undertaken by ERM*

*Source:* ERM site visit, 2017

For the purpose of the surveys, representatives of the PAFs were provided with one week advanced information pertaining to the purpose and content of the survey through the CSR team of NWEDC. To the extent possible, an attempt was made to conduct the survey with the head of the household. In the absence of the head of the household (in case they were away either for long period of employment, farming, or for day long training, etc.) a responsible representative of the household was surveyed. In cases where no

representative of the PAF was available, an attempt was made to contact the head of the households and identify a suitable time and location for the survey. As a result of this, certain surveys were also conducted in Trishuli Bazaar, Betrawati and Shanti Bazaaar, in keeping with the convenience of the PAFs. In case of absentee PAFs, or those residing in Kathmandu and other countries, an attempt was made to establish contact with them through mobile phones. Where this was not possible, a brief profile of the PAFs was sought from there family members or knowledgeable community members.

*Figure 1.3* ***Sample Photo Documentation of Respondents***

*Source:* ERM site visit, 2017

For each PAF, the survey was concluded with a photo documentation of the respondent for record keeping purposes. The following table provides an understanding of the date of survey conclusion in each of the settlements covered.

*Table 1.1* ***Date of Survey Completion in Each Major Settlement***

| Settlement | Date of Completion |
|---|---|
| Shanti Bazaar | 30th April 2017 |
| Satbise | 1st May 2017 |
| Mailung | 2nd May 2017 |
| Khalte | 3rd May 2017 |
| Nuabesi | 3rd May 2017 |
| Battar | 3rd May 2017 |
| Dhunche | 6th May 2017 |

### *1.2.5 Focus Group Discussions and Key Informant Interviews*

In addition to household surveys, FGDs and key informant interviews were undertaken with certain key stakeholder groups. These discussions and interviews were aimed at supplementing and triangulating the information made available during the PAF survey and also for collecting additional qualitative data on certain key areas, such as NGO activity in the area,

livelihood restoration mechanisms etc. The following stakeholder groups were covered as part of the discussions and interviews.

*Table 1.2 Stakeholder Engagement as part of the LALRP Process*

| S. No | Stakeholder Group | Group Representatives | Date | Summary of Consultations Undertaken |
|---|---|---|---|---|
| 1. | NGOs active in the project area | Manekor | 12th April 2017 | a discussion was undertaken on the activities of the organizations in the post-earthquake scenario, and the key learnings/ take aways from the same |
| 2. | | LaCCos | 12th April 2017 | |
| 3. | | Lumanti | 11th May 2017 | |
| 4. | Government Departments | National Reconstruction Authority (NRA) | 13th April 2017 | A discussion on the role and purpose of the NRA, its key objectives, way forward and challenges being faced |
| 5. | | Ministry of Federal Affairs and Local Development (MoFALD) | 5th May 2017 | A discussion on the process of grant disbursal for house reconstruction and the role of MoFALD in the same |
| 6. | | Department of Urban Development & Building Construction (DUDBC) | 5th May 2017 | A discussion on the overall reconstruction process and the designs approved by the government |
| 7. | | Land and Revenue Department | 5th May 2017 | A discussion on the role and key objectives of the agencies and the possibility of associating with them for the LALRP process |
| 8. | | Veterinary Department | 5th May 2017 | |
| 9. | | Chief District Officer (CDO) | 12th April 2017 | |
| 10. | | Cottage Industry Department | 5th May 2017 | |
| 11. | Local Community/ PAFs | Women group from Haku VDC | 5th May 2017 | A discussion with the various stakeholder groups on the following aspects:<br><br>The impacts from the earthquake<br>Present livelihood profile<br>Role of the project in earthquake relief<br>Present perception towards the project<br>Present expectations from the project in terms of LALRP activities |
| 12. | | Women Group from Haku VDC | 5th May 2017 | |
| 13. | | Tamang Women Group from Satbise | 1st May 2017 | |
| 14. | | Mixed group in Nuabise | 8th May 2017 | |
| 15. | | Mixed group in Bogetitar | 7th May 2017 | |
| 16. | | Mixed Youth Group | 29th April 2017 | |
| 17. | | Mixed Group from Farm Camp | 12th April 2017 | |
| 18. | | Women Shop Owner in Nuabise | 8th May 2017 | |
| 19. | | Women Shop Owner in Nuabise | 8th May 2017 | |
| 20. | | Mixed Group in Khalde | 13th April 2017 | |
| 21. | | Key Informant Interview, local Politician in Nuabise | 13th April 2017 | |

| S. No | Stakeholder Group | Group Representatives | Date | Summary of Consultations Undertaken |
|---|---|---|---|---|
| 22. | | Key Informant Interview, women returned after Foreign Employment | 2nd May 2017 | |
| 23. | | Men Group in Mailung | 14th April 2017 | |
| 24. | | Men Group from Haku VDC | 6th May 2017 | |

***Annex G***provides the Minutes of these discussions undertaken.

***Figure 1.4 Focus Group Discussions undertaken***

*Source:* ERM site visit, 2017

Most of the local community and PAFs discussions were undertaken with the available representatives in an opportunistic manner. Each group discussion comprised, on an average of 8-10 representatives.

For the discussions with the local NGOs and government agencies, appointments were sought in advance. Consultations with the Government agencies were undertaken both during the inception visit and in parallel with the HH surveys. This was crucial as a lot of information gaps were identified in consultation with the PAFs and the local community. Consultation with the Government departments especially DUBDC, NRA, CDO, Land & survey, and MOFALD helped get the correct status of the Government scheme particularly with respect to alternate housing, alternate land, and issues with respect to proposed resettlement sites, and especially Guthi land.

Status of Geological studies undertaken in District was also understood and preliminary observations from the geological report and expected outcomes from the final geological report (still under preparation) was also discussed. The entitlement of the housing grant and the existing delay or decision of non-distribution in case of erstwhile Haku VDC was also discussed.
Discussion with other Government departments were undertaken to understand the potential livelihood options which can be extended to the PAFs in wake of the April 2015 earthquake.

Consultations were undertaken with some of the prominent local NGOs like Manekor, Laccos and Lumanti to understand their engagement with the

earthquake affected families especially in the context of skill building, training, and capacity building in context to livelihood restoration. The purpose was to understand the following:

- How were the livelihood restoration related trainings selected?
- How was the beneficiary selection undertaken?
- Where was training undertaken and what was the duration for trainings?
- How were the resource persons for various trainings identified?
- How was the linkage established with government departments?
- Whether individual interventions preferred or group related interventions and what was the experience with these trainings?
- Whether seed capital was provided and how was that managed?

### *1.3 DATA ENTRY AND ANALYSIS*

Subsequent to the survey completion, the data was entered into an MS Excel format, based on the Data Entry Code. This data was then analysed, to formulate the socio-economic baseline of the PAFs (***Section 5***) and the identification of the livelihood restoration entitlements (***Section 9***). As part of this data analysis, any outliers or potentially inaccurate information was also identified and clarification was sought on the same, through telephonic conversations with the PAFs or key informants from the community.

#### *1.3.1 Data Quality Control*

At the end of each survey day, QA/QC of the survey formats was carried out along with a discussion with the surveyors. This QA/QC was aimed at not only identifying any missing information, but also to capture any anecdotal information made available by the PAFs, which may not necessarily get captured in the survey format.

### *1.4 DEVELOPMENT OF DRAFT LALRP*

Based on the quantitative and qualitative data thus collected, the LALRP for the project was formulated, as is presented in this report. This LALRP has been formulated as part of a larger Social Impact Management Framework (SIMF). The SIMF formulated is aimed at providing an understanding of the following:

- A descriptive narrative of the social context for the project, including the environmental and social assessments undertaken thus far, and the engagement with the community through the project lifecycle. As part of this, a narrative description shall also be provided of the Project's role in the earthquake relief and reconstruction efforts, to provide a context to the existing relationship with the local community and PAFs,
- Historic (pre-earthquake) and updated social baseline of the people directly affected by the project and those indirectly affected or in the general project influence area,

- Potential adverse impacts on the socio-economic status of the PAFs and local community due to project activities as discussed in the ESIA report (Task 1), including impacts on livelihood, community health and safety and impacts due to labour influx;
- Overall framework designed to manage project social impacts and risks.

The framework is comprised of the following:

- An **LALRP.** The LALRP is aimed at restoring the livelihoods of the PAFs and closing any gaps identified the monetary compensation paid, against the applicable reference framework. This LALRP is focused on the PAFs identified, but has also identified certain broad level mitigation measures/ interventions for the larger community, in keeping with the earthquake context. These mitigation measures/ interventions may be implemented by NWEDC as part of their CSR activities or the Benefit sharing plans identified in the PDA. The LALRP shall verify/re-assess the following:
  - Socio-economic profile/status and any vulnerabilities arising from the earthquake;
  - Utilization of land/asset compensation and the current status (impact) on the assets created using the compensation amount;
  - Change if any, in the livelihood profiles;
  - Change, if any in the options of resettlement and rehabilitations;
  - Reaffirm the livelihood restoration preferences/options suggested prior to the earthquake and update choices/preferences;
  - Demonstrate ICP and FPIC (as discussed in ***IPDP***) undertaken for the project;
  - Map (verify) skills/capacities to undertake/perform the suggested livelihood options/preferences;
  - Reassess/confirm the delivery models for the livelihood maintenance/restoration/improvement programs;
  - Update/reassess time and resource requirements for implementing the LALRP.
  - Provide detailed monitoring and review mechanism, which shall identify monitoring indicators and processes, aimed at:
    - allowing for regular tracking of the LRP and the early identification of changes (if any) in the situation on the ground or the socio-economic profile and setting of the PAFs;
    - continuously assess the effectiveness of entitlements and mitigation measures identified;
    - establishing with a degree of certainty that the livelihoods of the PAFs have been successfully restored
- An updated **Stakeholder Engagement Plan (SEP) and Grievance Redressal Mechanism (GRM)** (prepared by ERM in 2015). The SEP shall provide an understanding of the following:
  - All pre-earthquake disclosure and consultation undertaken;
  - initial IEE consultation and surveys;
  - complementary social baseline-related discussions;
  - the public hearing;
  - the CSR engagement activities undertaken by project Sponsors on a day-to-day basis;

- multiple lender consultations with villages/VDCs/NGOs;
- ESSA consultations;
- ERM engagement for the LALRP and Gap Assessment;
- post-earthquake engagement; and
- ongoing engagement by the two liaison officers;
- It will also spell out how ongoing engagement will occur for key stakeholder groupings in future.

In addition to these plans, the SIMF also includes **a brief description and an annotated outline** of the following plans required under the PDA, namely:

- Nepal Industrial Benefit Plan,
- Nepal Employment and Skill Training Plan, and
- Local Benefit Sharing Plan, including Local Shares, and
- Supply Local Free Power for Rural Electrification.

As part of the LALRP, an individual PAF profile was formulated (***Annex E & F***). This profile was also used, to identify the entitlements for each individual households, against the general entitlements identified (***Section 9***).

Annexure D

# Livelihood Entitlement Matrix for PAFs, Upper Trishuli -1

**Points to be considered for the the details in the matrix below:**

- The blue highlights mark separate PAFs;
- HH Code is designated based on the original village of the PAF, where

1. PHO - Phool Bari;
2. THA - Thanku;
3. HAK - Haku Besi;
4. GOG – Gogone;
5. MAI – Mailung.

- Tailoring is not a full time profession for women, who have reported it. The women undertake assignment for not more than 7 days in a month which provides some ancillary income;
- Support for Business Enterprises has been identified as a Livelihood Entitlement to be given for PAF; however, the kind of business enetrprise to be set up should be evaluated at the time of finalisation of Microplans with PAFs.
- The possible business enetrprises can be grocery stores, tea shops, homestays, restaurants, etc. as deemed necessary keeping in mind the commencement of construction phase of the project and influx of population.

*Table .1 Entitlement Matrix for PAFs*

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHO -01 | Dami Sangbo Tamang | Dami Sangbo Tamang | Self | Dami Sangbo Tamang | 50 | HOH | Dhunche | None | Labourer; supported by rent income | None | Yes | | | Yes | | | | | | | | | | | | | |
| | | | | Kaialmo Tamang | 55 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Kami Singh | 24 | Son | | | | | | | | | | Yes | | | | | | | | | | | |
| | | | | Chirring wangbo Tamang | 25 | Daughter in Law | | | | | | | | | | | | | | | | | | | | | |
| | | | | Nurbhu Tamang | 19 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Wife of Nurbhu | 19 | Daughter in Law | | | | | | | | | | | | | | | | | | | | | |
| | | | | Prem Tamang | 12 | Son | | | | | | | | | | | | | | | | | | | | | |
| PHO -02 | Kamisiya Tamang | Sonam Pincho | Son of Kamisiya | Sonam Pincho | 39 | Self | Shiva Mandir-Dhunche | None | Construction labourer | None | Yes | | | Yes | | | | | | | | | | | | | |
| | | | | Karchung Tamang | 35 | Wife | | | Construction labourer | Weaving training | | | | | | | | | | | | | | | | | |
| | | | | Kamisiya Tamang | 85 | Mother | | | | | | | | | | | | | | | | | | | | | |
| | | | | Bunima Tamang | 18 | Son | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Pasang | 21 | Daughter | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Reeta Tamang | 16 | Daughter | | | | | | | | | | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Lama Babu | 12 | Son | | | | | | | | | | | | | | | | | | | | | |
| PHO -03 | | Supa Singh | Son of Kamisiya | Supa Singh Tamang | 44 | HoH | Pradhikaran Camp | None | Construction labourer | None | | | | | | | | | | | | | | | | | |
| | | | | Nima Yange Tamang | 50 | First Wife | | Women Headed Household | Construction labourer | | | Yes | | | | | | | Yes | | | | | | | | |
| | | | | Ram Tamang | 16 | Son | | | | | | Yes | | | | | | | | Yes | | | | | | | |
| | | | | Jamuna Tamang | 16 | Daughter | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Phurba Kami Tamang | 14 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Lakpa Dolma Tamang | 9 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Chirring Sangmo Tamang | 39 | Second Wife | | Women Headed Household | Construction labourer | | | Yes | | | | | | | Yes | | | | | | | | |
| | | | | Aanjani Tamang | 8 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Aanjani Tamang | 5 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Kanchi Tamang | 2 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| PHO -04 | Kharpa Tamang | Kharpa Tamang | Self | Kharpa Tamang | 70[1] | HoH | Kebutol | Aged Couple | Supported by sons/ nephew | None | Yes | Yes | Yes | | | | Yes | | | | | | | | | | |
| | | | | Furpa Chagmo | 90 | Wife | | | | | | | Yes | | | | | | | | | | | | | | |
| PHO -05 | | Kaji Tamang | Son of Kharpa Tamang | Kaji Tamang | 56 | HoH | Kebutol | None | Construction labourer | None | | | | | | Yes | | | | | | | | | | | |
| | | | | Sonambuti Tamang | 35 | Wife | | | Construction labourer | | | Yes | | | | | | | Yes | | | | | | | | |
| | | | | Paras Tamang | 5 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Bibirani Tamang | 10 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sange Lama | 7 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ashisa Taman | 3 | Daughter | | | | | | | | | | | | | | | | | | | | | |

[1] Based on recall value of respondents. It is ERM's assessment that this age may be under reported.

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHO -06 | | Ram Tamang | Son of Yangchung Tamang, who is sister In Law of Kharpa Tamang (Brother's wife) | Ram Tamang | 44 | HoH | Farm Camp – Dhunche | None | Mason | None | | Yes | | Yes | | | | | | | | Yes | | | | | |
| | | | | Mendo Chemmo Tamang | 45 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Yachung Tamang | 70 | Mother | | | | | | | | | | | | | | | | | | | | | |
| | | | | Manju Tamang | 18 | Daughter | | | | | | Yes | | | | | | | | | | Yes | | | | | |
| | | | | Sonam Yongze Tamang | 14 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Dawa Yongze | 12 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Bhulakpa | 10 | Son | | | | | | | | | | | | | | | | | | | | | |
| PHO -07 | | Dawa Mingma Tamang | Son of Yachung Tamang | | | | Kathmandu | | | None | | | | | | | | | | | | | | | | | Not Surveyed |
| PHO -08 | | Furwa Dorje | Son of Yachung Tamang | Furwa Dorje | 55 | HoH | Thade | None | Agriculture | None | | | | | | Yes | | | | | | | | | | | |
| | | | | Rani Maya | 56 | Wife | | | Volunteer for Government | | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Subhash Tamang | 16 | Son | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| PHO -09 | | Pasang Tashi | Son of Yachung Tamang | Pasang Tashi | 37 | HoH | Pradhikaran Camp – Dhunche | None | Wage Labour | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Saraswati Tamang | 31 | Wife | | | Tea Shop | | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Sapna Tamang | 14 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Bishal Tamang | 13 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Dawa Tamang | 9 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Chirring Tamang | 6 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| PHO -10 | | Nurkhe Tamang | Son of Kharpa Tamang | Nurkhe tamang | 65 | HoH | Dhunche | Old Age | Construction labourer and agriculture | None | | | Yes | | | Yes | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Labang Tamang | 60 | Wife | | | Construction labourer | | | | | | | | | | | | | | | | | | |
| PHO -11 | | Pemba Tamang | Son of Nurkhe | Pemba Tamang | 30 | HoH | Kebutol | None | Petty Contractor | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Dikki Tamang | 25 | Wife | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Yubraj Tamang | 8 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Yugesh Tamang | 6 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Yuna Tmang | 2 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| PHO -12 | Mendo Dolmo Tamang | Mendo Dolmo Tamang | Self | | | | Kebutol | Old Age/ Single Woman supported by sons | Stone Breaking and selling alcohol; Supported by children | None | Yes | | Yes | | | | | | | | | | | | | | |
| PHO -13 | | Dorje Tamang | Son of Mendo Dolmo | Dorje Tamang | 43 | HoH | Kebutol | None | Construction labourer | None | | Yes | | | | | | | Yes | | | | | | | | |
| | | | | Mengmar Dolma Tamang | 43 | Wife | | | Construction labourer | | | | | | | | | | | | | | | | | | |
| | | | | Rosina Tamang | 10 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sajina Tamang | 9 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Putali Tamang | 5 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| PHO -14 | | Dupsingh Tamang | Son of Mendo Dolmo | Dupsingh Tamang | 34 | HoH | Kebutol | None | Construction labourer | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Chesang Sangmo Tamang | 34 | Wife | | | Sharecropping | | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Sharmila Tamang | 14 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Urmila Tamang | 12 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Bijaya | 9 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ajaya | 1 | Son | | | | | | | | | | | | | | | | | | | | | |
| PHO -15 | | Kami Bahadur Tamang | Son of Mendo Dolmo | Kami Bahadur Tamang | 30 | HoH | Kebutol | None | Trekking guide but not working due to illness | None | | | | Yes | | | | | | | | | | | | | HoH has worked security guard in Malaysia |
| | | | | Purna kumari tamang | 30 | Wife | | | | Mat Making | | Yes | | | | | | | | | | | | | | Yes | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Pasang Lama | 5 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Dawa Lama | 2.5 | Son | | | | | | | | | | | | | | | | | | | | | |
| PHO -16 | Chokta Tamang | Chokta Tamang | Brother of Mendo Dolmo's husband | Chokta tamang | 50 | HoH | Kebutol | None | Construction labourer | None | | | | | | | | | | | | | | | | | |
| | | | | Yapuri Tamang | 40 | Wife | | | | | | Yes | | | | | | Yes | | | | | | | | | |
| | | | | Ram Bahadur Tamang | 14 | Son | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| PHO -17 | | Lopsang Tamang | Son of Chokta | Lopsang Tamang | 33 | HoH | Karagar Toll – Dhunche | None | Security Guard | None | | | | Yes | | | | | | | | | | | | | Employment as security guard preferred |
| | | | | Dekki Tamang | 29 | Wife | | | | Tailoring training | | Yes | | | | | | | Yes | | | | | | | | |
| | | | | Karisma Tamang | 10 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Bikram Tamang | 6 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Tapita Tamang | 4 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| PHO -18 | Tarlama Tamang | Tarlama Tamang | Brother of Mendo Dolmo's husband | Tara Lama | 51 | HoH | Kebutol | None | Sharecropping; Animal Husbandry | None | | Yes | | | | | | Yes | | | | | | | | | |
| | | | | Risang Tamang | 38 | Wife | | | Sharecropping; Animal Husbandry | | | Yes | | | | | | | | | | | | | | Yes | |
| | | | | Buddhiman Tamang | 19 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sanu Maya Tamang | 17 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Salina Tamang | 15 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ranju Tamang | 13 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| PHO -19 | Rikita Tamang | Sukbahadur Tamang | Son of Rikita Tamang | Suk Bahadur Tamang | 28 | HoH | Dhunche | None | Security Guard | None | Yes | Yes | | | | | | | | Yes | | | | | | | |
| | | | | Chinmendo tamang | 20 | Wife | | | | | | Yes | | | | | Yes | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Sushamna Tamang | 2 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Rikita Tamang | 61 | Mother | | | | | | | | | | | | | | | | | | | | | |
| PHO -20 | | Gombo Tamang | Son | Gombo Tamang | 38 | HoH | Dhunche | None | Owns Welding workshop | None | | Yes | | | | | | | | Yes | | | | | | | |
| | | | | Kasangchomu Tamang | 27 | Wife | | | | | | Yes | | | | | | | | | | | | | | Yes | |
| | | | | Pramila Tamang | 13 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Anita Tamang | 9 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Amrita Tamang | 7 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Preeta Tamang | 1 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Inoush Tamang | 2 | Son | | | | | | | | | | | | | | | | | | | | | |
| PHO -21 | | Dawa Tamang | Son Rikita Tamang | Dawa Tamang | 31 | HoH | Kathmandu | None | Construction Labourer | None | | | | | | | | | | | | | | | | | Not surveyed |
| | | | | Kami Dolmo Tamang | 26 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Kabindra Tamang | 11 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Subendra Tamang | 5 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Monika Tamang | 2 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| PHO -22 | Kami Tamang | Chupsi Tamang | Son of Kami Tamang | Chupsi Tamang | 59 | HoH | Pradhikaran Camp | | Construction Labourer | None | Yes | | | Yes | | | | | | | | | | | | | |
| | | | | Sare Tamang | 51 | Wife | | | Construction Labourer | | | | | | | Yes | | | | | | | | | | | |
| | | | | Lakpa Chowang Tamang | 31 | Son | | | Construction Labourer | | | Yes | | | | | | | | | | Yes | | | | | |
| | | | | Buddhamaya Tamang | 28 | Daughter in Law | | | | | | | | | | | | | | | | | | | | | |
| | | | | Aman Tamang | 10 | Grand Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Oman Tamang | 8 | Grand Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Kami Tamang | 87 | Father | | Old Age | | | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Lata Tamang | 55 | Brother | | Disabled | | | | | | | | | | | | | | | | | | | |
| PHO -23 | | Pasangdi ndu Tamang | Son of Chupsi Tamang | Pasangdi ndu Tamang | 38 | HoH | Phool Bari | None | Construction Labourer | None | | Yes | | Yes | | | | | | | Yes | Yes | | | | | Masonry or Electrician Training |
| | | | | Chhomo Tamang | 31 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Dawa furpa | 11 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sunil Tamang | 7 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Tumba Tamang | 9 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Tanmay Tamang | 1 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| THA -01 | Sankhe Kami | Sankhe Kami | Self | Sanke kami | 83 | HoH | Thade | Old Age | None | None | Yes | | | | | | | | | | | | | | | | Tailoring Training for daughter in law also suggested by PAF |
| | | | | Santa Maya Kami | 80 | Wife | | Old Age | | | | | | | | | | | | | | | | | | | |
| | | | | Suk Bahadur Kami | 39 | Son | | | Blacksmith | | | Yes | | Yes | | | | | | Yes | | | | | | | |
| | | | | Kamala Kami | 30 | Daughter In Law | | | Agriculture | | | | | | | | | | | | | | | | | | |
| THA -02 | | Maite Kami | Son of Sankhe Kami | Maite B.K | 65 | HoH | Thade | Old Age | None | None | | | | | | | | | | | | | | | | | |
| | | | | Thakur B.K | 24 | Son | | | Driver | | | | | Yes | | | | | | | | | | | | | |
| | | | | Chanchal i B.K | 22 | Daughter In Law | | | Tailor | Tailoring | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Ridam B.K | 6 | Grand Son | | | | | | | | | | | | | | | | | | | | | |
| THA -03 | | Tilak B.K | Son of Maite Tamang | Tilak B.K | 27 | HoH | Thade | None | Driver | None | | | | | | | | | | | | | | | | | |
| | | | | Bimala B.K | 24 | Wife | | | | | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Bibash B.K | 5 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Biramsa B.K | 3 | Son | | | | | | | | | | | | | | | | | | | | | |
| THA -04 | | Kale Kami | Son of Sanke Kami | Kale Kami | 52 | HoH | Thade | None | Blacksmith | None | | Yes | | | | | | | | | Yes | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Sukmaya Kami | 50 | Wife | | | Agriculture | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Sarita Kami | 16 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Purna Bahadur | 17 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Kopila Kami | 13 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| THA -05 | | Som Bahadur | Son of Kale Kami | Som Bahadur | 28 | HoH | Thade | None | Driver | None | | | | Yes | | | | | | | | | | | | | Employment as Driver preferred |
| | | | | Tulsi Kami | 22 | Wife | | | Agriculture | | | Yes | | | | | | Yes | | | | | | | | | |
| | | | | Sangita B.K | 3 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Samiksha BK | 1 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| THA -06 | | Hiralal Kami | Son of Sanke Kami | Hira Lal Kami | 47 | HoH | Thade | None | Construction Labourer | Masonry | | | | | | Yes | | | | | | | | | | | |
| | | | | Maya Kumari kami | 36 | Wife | | | Tailoring | Vegetable garden | | | | | | | | | | | | | | | | | |
| | | | | Man Kumar BK | 22 | Son | | | Driver | | | | | Yes | | | | | | | | | | | | | Driving job preferred |
| | | | | Srijana BK | 24 | Daughter In Law | | | | | | | | | | | | | | | | | | | | | |
| | | | | Krisha BK | 5 | Grand Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Krishna BK | 3 | Grand Son | | | | | | | | | | | | | | | | | | | | | |
| THA -07 | | Gore Kami | Son of Sanke Kami | Gore Kami | 40 | HoH | Thade | None | Construction Labourer/ Welder | Masonry | | | | Yes | | | | | | | | | | | | | Security Guard job preferred by Gore and driver Job desired for son |
| | | | | Fulmaya Kami | 36 | Wife | | | Share Cropping | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Hari Bahadur Kami | 18 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ganesh B.K | 11 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Parbati B.K | 10 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Asim B.K | 3 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Aruna BK | 1 | Daughter | | | | | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HA K-01 | Dawa Singh Tamang | Buchring Tamang | Son of Dawa Singh Tamang | Mendub urjeth tamang | 56 | 1st Wife of Bhuchiring | Pradhikaran Camp | Women Headed Household; Bhuchiring Tamang is Dead | Construction Labourer (2nd Wife) | None | | Yes | | | | | Yes | | | | | | | | | | Entitlements need to be verified with the first wife as she was not surveyed |
| | | | | Kippu Ghalmo Ghale | 47 | 2nd Wife of Bhuchiring | | Women Headed Household; Bhuchiring Tamang is Dead | | | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Sirmaya Tamang | 18 | Daughter | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Tenbahadur Tamang | 15 | Son | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Rani Mendo Tamang | 13 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Santu Tamang | 8 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| HA K-02 | | Sunawangi Tamang | Son of Dawa Singh Tamang | Sunwangi Tamang | 56 | HoH | Dhunche and Haku Besi | None | Agriculture | None | | Yes | | | | | | | Yes | | | | | | | | |
| | | | | Mandobuti Tamang | 59 | Wife | | | Agriculture | | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Man Bahadur Tamang | 25 | Son | | | Driver | | | | | | | | | | | | | | | | | | |
| | | | | maya Tamang | 22 | Daughter In Law | | | | | | | | | | | | | | | | | | | | | |
| | | | | Niru Tamang | 4 | Grand Daughter | | | | | | | | | | | | | | | | | | | | | |
| HA K-03 | | Sanja Ram Tamang | Son of Sunawangi Tamang | Sanja Ram | 33 | HoH | Ghumti – Dhunche | None | Truck Owner | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Roshni | 28 | Wife | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Anju tamang | 13 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Baby Daughter | 0.5 | Daughter | | | | | | | | | | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HA K-04 | | Nimadar ke Tamang | Son of Dawa Singh Tamang | Nima Darke Tamang | 50 | HoH | Dhunche and Haku Besi | None | Petty Contractor and Politician | None | | | | | | | | | | | | | | | | | |
| | | | | Namin Tamang | 48 | Wife | | | Agriculture | | | | | | | Yes | | | | | | | | | | | Job as cook preferred |
| | | | | Sarita Tamang | 18 | Daughter | | | | | | | | Yes | | | | | | | | | | | | | |
| | | | | Govinda | 15 | Son | | | | | | | | | | | | | | | | | | | | | |
| HA K-05 | | Buddima n Tamang | Son of Nimadar ke Tamang | Buddima n Tamang | 25 | HoH | Dhunche | None | Stone Breaking and Tea Shop | None | | Yes | | | | | | | | | | | | | | Yes | |
| | | | | Bimala Tamang | 24 | Wife | | | | Tailoring training | | | | | | | | | | | | | | | | | |
| HA K-06 | Falam Tamang | Falam Tamang | Self | Falam Tamang | 55 | HoH | Dhunche | None | Construction Labourer and Agriculture | None | Yes | | | | | Yes | | | | | | | | | | | |
| | | | | Mirchir Tamang | 55 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Lakpala ma | 40 | Son in Law | | | | | | | | | | | | | | | | | | | | | |
| | | | | Samjaha na Tamang | 28 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | 3 kids | | | | | | | | | | | | | | | | | | | | | | | |
| HA K-07 | Furpa Tamang | Furpa Tamang | Self | Furpa Tamang | 60 | HoH | Haku Besi | None | No occupation. Dependent on sons and daughters | None | Yes | | | | | Yes | | | | | | | | | | | |
| | | | | Shersang Tamang | 59 | Wife | | | | | | Yes | | | | | Yes | | | | | | | | | | |
| HA K-08 | | Nima Dindup Tamang | Son of Furpa Tamang | Neema dindup tamang | 39 | HoH | Dhunche | None | Sale of Poultry and Political Leader | None | | | | | | | | | | | | | | | | | |
| | | | | Maitajom tamang | 38 | Wife | | | | Tailoring | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Buddhal axmi tamang | 20 | Daughter | | | | | | | | Yes | | | | | | | | | | | | | |
| | | | | Prem maya tamang | 16 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ashok tamang | 14 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sanjeev tamang | 1 | Son | | | | | | | | | | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HA K-09 | | Timbril Tamang | Son of Furpa Tamang | Timbril Tamang | 33 | HOH | Kathmandu | None | Real Estate Agent | None | | | | | | | | | | | | | | | | | Not Surveyed |
| | | | | Budhdhi Maya Tamang | 34 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Praneeta Tamang | 12 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Inam | 11 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Baby | 0.5 | Son | | | | | | | | | | | | | | | | | | | | | |
| HA K-10 | Furpa Tamang Waiba | Chawang Tamang | Son of Furpa Tamang Waiba | Chhawang tamang | 39 | HoH | Dhunche | Partial Disability of HoH, Aged members in the family and single person earning | Meat Shop | None | Yes | | | | | | | | | | | | | | | | |
| | | | | Mendo Lachi Tamang waiba | 41 | Wife | | | | | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Phool Mendo Tamang Waiba | 14 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sanchu Maya Tamang | 12 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Jit badhur Tamang Waiba | 16 | Son | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Shyam Badhur Tamang | 9 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Furpa Tamang Waiba | 76 | Father | | Old Age | | | | | | | | | | | | | | | | | | | |
| | | | | Pashang Tamang Waiba | 75 | Uncle | | Old Age | | | | | | | | | | | | | | | | | | | |
| HA K-11 | | Lachin Tamang | Son of Furpa Tamang Waiba | Lachin Tamang | 36 | HoH | Kebutol | None | Wage Labour | None | | | | | Yes | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Monji Tamang | 31 | Wife | | | | | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Akash Tamang | 12 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Archana Tamang | 9 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| HA K-12 | | Layun Tamang | Son of Furpa Tamang Waiba | Layun Tamang | 27 | HoH | Kathmandu | None | Driver | NA | | | | | | | | | | | | | | | | | Not Surveyed |
| | | | | Kabita Tamang | 25 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Annu Tamang | 8 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| HA K-13 | Kami Tamang Waiba | Kami Tamang Waiba | Self | Kami Tamang Waiba | 63 | HoH | Dhunche | None | Stone breaking and agriculture in sharecropping | None | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Chhebi Tamang | 50 | Wife | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Nursang | 17 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Buddha maya | 12 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| HA K-14 | | Lamadurj Tamang | Son of Kami Tamang Waiba | Lamadurj Tamang | 32 | HoH | Haku Besi | None | Construction Labourer and Agriculture | Driving | | Yes | | | | | | | | Yes | | | | | | | |
| | | | | Lari Mendo | 30 | Wife | | | Fancy Goods shop and restaurant | | | Yes | | | | | | | | | | | Yes | | | | Tailoring Traininga also desired |
| | | | | Vishal | 13 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Pradeep | 11 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Nirjala | 2 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Baby | 1 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| HA K-15 | | Kamitasi Tamang | Son of Kami Tamang Waiba | Kamitasi Tamang | 34 | HoH | Dhunche | None | Liaison Officer - UT-1 | None | | | | | | | | | | | | | | | | | |
| | | | | Tawa Mendo Tamang | 34 | Wife | | | | | | Yes | | | | | | | | | | | Yes | | | | |
| | | | | Saroja Tamang | 2 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Metina Tamang | 9 | Daughter | | | | | | | | | | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Soniya Tamang | 6 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Lalita Tamang | 3 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| HA K-16 | | Kale Tamang | Son of Kale Tamang Waiba | Kale Tamang | 45 | HoH | Dhunche | None | Employed in private company | None | | Yes | | | | | | | | | | Yes | | | | | |
| | | | | Garabi Tamang | 36 | Wife | | | Stone breaking and agriculture | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Sonam Tamnag | 14 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sushila Tamang | 12 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ravi Tamang | 8 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sajan Tamang | 6 | Son | | | | | | | | | | | | | | | | | | | | | |
| HA K-17 | Karsang Dawa Tamang | Karsang Dawa Tamang | Self | Karsang Dawa | 43 | HoH | Pradhikaran Camp | None | Construction Labourer | None | Yes | | | Yes | | | | | | | | | | | | | HoH has worked as a security guard in Dubai and Malaysia |
| | | | | Serbahadur Tamang | 12 | Son | | | | | | | | | | | | | | | | | | | | | |
| HA K-18 | Karsang Namgayal Tamang | Karsang Namgayal Tamang | Brother of Karsang Dawa Tamang | Karsang Namgayal Tamang | 51 | HoH | Haku Besi | None | Tour guide | None | Yes | | | Yes | | | | | | | | | | | | | Can speak Englis |
| | | | | Mendo Tamang | 50 | Wife | | | | | | | | | Yes | | | | | | | | | | | | Cook/ Housekeeping |
| | | | | Budhdhi Maya Tamang | 22 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sangmaya Tamang | 21 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Maya Devi | 19 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Krishna Bahadur | 17 | Son | | | | | | | | | | | | | | | | | | | | | Direct Employment Desired |
| | | | | Kamang Bbahadur | 14 | Son | | | | | | | | | | | | | | | | | | | | | |
| HA K-19 | Pemburi | Dawa Tamang Waiba | Son of Pemburi Tamang | Dawa Tamang waiba | 52 | HoH | Dhunche | None | Stone Breaking and | None | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tamangni | | | | | | | | Sharecropping | | | | | | | | | | | | | | | | | | |
| | | | | Daba sangabo waiba | 44 | Wife | | | | | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Pemburi Tamang | 85 | Mother | | | | | | | | | | | | | | | | | | | | | |
| | | | | kami sangbo waiba | 23 | Son | | | Stone Breaking | | | Yes | | | | | | | | | Yes | | | | | | |
| | | | | Suk badhur tamang | 19 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Laxmi tamang | 18 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sarmila tamang | 16 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| HAK-20 | | Bikas Waiba | Son of Ditha Tamang and grandson of Pemburi Tamang | Bikas Waiba | 22 | HoH | Kebutol | None | Driver | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Lachchi Sangmo Tamang | 37 | Mother | | | | Weaving training | | | | | | | | | | | | | | | | | |
| | | | | Prakash Tamang | 15 | Brother | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sangdevi Tamang | 17 | Sister | | | | | | | | | | | | | | | | | | | | | |
| | | | | Durga Maya | 18 | Sister | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| HAK-21 | | Sonam Tamang | Son of Dawa Tamang Waiba | Sonam tamang | 35 | HoH | Thade | None | Foreign Employment | None | | Yes | | | | | | | | | Yes | | | | | | Training suggested for HoH by PAF but he stays in Qatar. Confirm during implementation |
| | | | | Phool Maya Tamang | 32 | Wife | | | Stone breaking | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Suchan | 10 | Son | | | | | | | | | | | | | | | | | | | | | |
| HAK-22 | | Faisirin Tamang | Son of Pemburi Tamangni | Faisirin Tamang | 53 | HoH | Dhunche and Haku Besi | None | Wage Labour | None | | Yes | | | | Yes | | | | | Yes | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Manju Tamang | 40 | 2nd Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Chippu Tamang | Dead | 1st Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Rajan Tamang | 20 | Son | | | Truck owner and driver | | | | | | | | | | | | | | | | | | |
| | | | | Kushal Tamang | 0 | Son | | | | | | | | | | | | | | | | | | | | | |
| HA K-23 | | Kami Chhowang | Son of Faisiring Tamang | Kami Chhowang | 27 | HoH | Haku Besi | None | Wage Labour and Agriculture | None | | Yes | | | | | | | | Yes | | | | | | | Has 10 poultry already |
| | | | | Ser Mendo | 25 | Wife | | | | | | Yes | | | | | Yes | | | | | | | | | | |
| HA K-24 | Ujayali Tamang | Chirring Nurbu Tamang | Son of Ujayali Tamang | Chirring Nurbu Tamang | 41 | HoH | Kebutol | | Construction Labourer | None | Yes | | | Yes | | | | | | | | | | | | | |
| | | | | Chittto Tamang | 38 | Wife | | | Construction Labourer | | | | | | | Yes | | | | | | | | | | | |
| | | | | dil badhur tamang | 21 | Son | | | Construction Labourer | | | | | | | | | | | | | | | | | | |
| | | | | ramila tamang | 11 | Daughter | | Disabled | | | | | | | | | | | | | | | | | | | |
| | | | | Ujayali Tamang | 80 | Mother | | Old Age | | | | | | | | | | | | | | | | | | | |
| HA K-25 | | Kipa Tamang/ Chiring Darge | Son | | | | Kathmandu | | Not Known | NA | | | | | | | | | | | | | | | | | Not surveyed |
| HA K-26 | Suku Tamanag | Suku Tamanag | Self | Suku tamang | 60 | HoH | Dhunche | None | None | None | Yes | Yes | | | | | Yes | | | | | | | | | | HoH also suggested Masonry/ electrician training for son |
| | | | | Kanchi maya tamang | 50 | Wife | | | Stone Breaking | | | | | | | | | | | | | | | | | | |
| | | | | Santa Tamang | 18 | Son | | | Construction Labourer | | | | | Yes | | | | | | | | | | | | | |
| HA K-27 | | Upren Tamang | Son of Suku Tamang | Upreng tamang | 32 | HoH | Dhunche | None | Works in a metal workshop in Gosai Kunda; | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Sirju tamang | 28 | Wife | | | Makes and sells Alcohol | | | Yes | | | | | | | Yes | | | | | | | | |
| | | | | Rikta maya tamang | 12 | Daughter | | | | | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Risma tamang | 4 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Roshan | 2 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-01 | Kring Tamang | Chenom Tamang | Son of Kring Tamang | Chhenom Tamang | 53 | HoH | Nuabesi | None | Construction Labourer | None | Yes | | | Yes | | | | | | | | | | | | | Masonry Training for HoH also preferred |
| | | | | Cheji Tamang | 52 | Wife | | | Construction Labourer | | | | | | | | | | | | | | | | | | |
| | | | | Nita Tamang | 19 | Daughter | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Rani Maiya Tamang | 17 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ram Singh Tamang | 13 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Suman Tamang | 10 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Anita Tamang | 7 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| GO G-02 | | Lakchiya Man Tamang | Son of Chhenom, Grandson of Kring Tamang | Lakchiya Man Tamang | 25 | HoH | Nuabesi | None | Construction Labourer | Driving | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Chhechang Buti Tamang | 22 | Wife | | | | Poultry | | Yes | | | | | | | | | | | | | Yes | | |
| GO G-03 | | Bir Bahadur Tamang | Son of Kring Tamang | Bir Bahadur Tamang | 39 | HoH | Nuabesi | None | Wage Labour | Poultry (wife) | | Yes | | | | | | | | | Yes | | | | | | |
| | | | | Nangsaal Tamang | 36 | Wife | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Kurmari Tamang | 13 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Shanti Tamang | 10 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Arjun Tamang | 6 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sima Tamang | 3 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Risang Tamang | 1 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-04 | | Mengma Dorje | Son of Kring Tamang | Mengma Dorje | 45 | HoH | Khalde | None | Mason | Masonry | | Yes | | | | | | | | Yes | | | | | | | HoH expects support in obtaining Driving License |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Chhedi Tamang | 42 | Wife | | | Construction Labourer | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Pam Bahadur | 13 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Suta Singh | 7 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Suna Devi Tamang | 6 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| GO G-05 | | Dawa Chirring | Son of Sabi, grandson of Kring Tamang | Dawa Chiring | 37 | HoH | Batar | None | Foreign Employment | None | | | | | | | | | | | | | | | | | |
| | | | | Chejui Tamang | 31 | Wife | | | Wage labour | | | | | | | Yes | | | | | | | | | | | |
| | | | | Sabi Tamang | 73 | Father | | Old Age | | | | | | | | | | | | | | | | | | | |
| | | | | Moni Yalmo Tamang | 69 | Mother | | Old Age | | | | | | | | | | | | | | | | | | | |
| | | | | Jeevan Tamang | 6 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-06 | | Mohan Dorjee | Son of Sabi Tamang and Grandson of Kring Tamang | Mohan Dorje | 52 | HoH | Batar | None | Carpenter | Carpentry | | Yes | | | | | | | | | | Yes | | | | | |
| | | | | Ganga Tamang | 37 | Wife | | | Wage labour | | | Yes | | | | | | | | | Yes | | | | | | |
| | | | | Rupesh Tamang | 16 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Phool Maya Tamang | 20 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Tez Tamang | 8 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-07 | Kale Tamang | Risang Tamang | Son of Kale Tamang | Risang Tamang | 37 | HoH | Bogetitar | None | Mason | Masonry | Yes | | | Yes | | | | | | | | | | | | | |
| | | | | Urmila | 37 | Wife | | | Construction Labourer | | | Yes | | | | | | | | | | | Yes | | | | |
| | | | | Kale Tamang | 69 | Father | | Old Age | | | | | | | | | | | | | | | | | | | |
| | | | | Garabi Tamang | 68 | Mother | | Old Age | | | | | | | | | | | | | | | | | | | |
| | | | | Sunil Tamang | 11 | Son | | | | | | | | | | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Sushil Tamang | 4 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-08 | | Jainurbu Tamang | Son of Kale Tamang | Jainurbu Tamang | 47 | HoH | Bogetitar | None | Mason | Masonry | | Yes | | | | | | | | Yes | | | | | | | HoH expects support in obtaining Driving License |
| | | | | Layahamoo Tamanag | 45 | Wife | | | Grocery shop | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Rabin Tamang | 14 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-09 | | Sandesh Tamang | Son of Jainurbu. Grandson of Kale Tamang | Sandesh Tamang | 24 | HoH | Bogetitar | None | Mason | Masonry | | | | | | Yes | | | | | | | | | | | |
| | | | | Rom Maya Tamang | 19 | Wife | | | Construction Labourer | | | | | | | Yes | | | | | | | | | | | |
| GO G-10 | | Suresh Tamang | Son of Jainurbu. Grandson of Kale Tamang | Suresh Tamang | 18 | HoH | Bogetitar | None | Wage Labourer | Masonry | | Yes | | | | | | | | Yes | | | | | | | HoH expects support in obtaining Driving License |
| | | | | Sangeeta Tamang | 17 | Wife | | | Wage Labourer | Tailoring | | Yes | | | | | | | | | | | | | Yes | | |
| GO G-11 | | Gadorje Tamang | Son of Kale Tamang | Ga Dorjee Tamang | 42 | HoH | Nuabesi | None | Mason | None | | | | | | Yes | | | | | | | | | | | |
| | | | | Jeju Tamang | 40 | Wife | | | | | | | | | | | | | | | | | | | | | Tailoring training for wife also desired |
| | | | | Subhas Tamang | 15 | Son | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Dil Maya Tamang | 13 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Bam Maya Tamang | 11 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Kopila Tamang | 4 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Namila Tamang | 2 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-12 | | Singha Lama Tamang | Son of Kale Tamang | Singha Lama Tamang | 40 | HoH | Piplitar | None | Mason | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Risang Yalmo Tamang | 35 | Wife | | | Construction labour | Weaving Training | | Yes | | | | | | | | | | | | | Yes | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Rita Kumari Tamang | 14 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Suku Maya Tamang | 14 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Rajan Tamang | 7 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Anish Tamang | 5 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Soniya Tamang | 3 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| GO G-13 | Langde Ghale, Ladeu Ghale, Wande Ghale, Arjun Ghale, | Langde Ghale | Self | Langde Ghale | 35 | HoH | Tiru - Respondent in Khalde | None | Mason | None | Yes | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Dawa Ghale | 26 | Wife | | | Agriculture and handicrafts | Handicraft | | Yes | | | | | | | | | | | | | Yes | | |
| GO G-14 | | Ladeu Ghale | Son | Ladeu Ghale | 48 | HoH | Nuabesi | HoH is disabled | | None | | | | | | | | | | | | | | | | | |
| | | | | Mendo Galmo Ghale | 45 | Wife | | | Construction labour | | | | | Yes | | | | | | | | | | | | | Housekeeping job preferred |
| | | | | Noorsung Ghale | 28 | Son | | | Foreign Employment | | | | | | | | | | | | | | | | | | |
| | | | | Mengmar Chhomo Ghale | 22 | Daughter In Law | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ajay Ghale | 6 | Grandson | | | | | | | | | | | | | | | | | | | | | |
| | | | | Neeraj Ghale | 3 | Grandson | | | | | | | | | | | | | | | | | | | | | |
| GO G-15 | | Wande Ghale | Self | Wande Ghale | 27 | HoH | Khalde | None | Foreign Employment | None | | | | | | | | | | | | | | | | | |
| | | | | Dawamendo Ghale | 19 | Wife | | | Handicraft | Weaving Training | | Yes | | | | | | | | | | | | | Yes | | |
| GO G-16 | | Arjun Ghale | Self | NA | NA | NA | Migrated | Not known | Not known | None | | | | | | | | | | | | | | | | | Not surveyed |
| GO G-17 | Sonam Tamang | Sonam Tamang | Son of Talama Tamang | Sonam Tamang | 75 | HoH | Bogetitar | Old Age | Old Age Pension and supported by sons | None | Yes | | Yes | | | | | | | | | | | | | | |
| | | | | Chosang Tamang | 70 | Wife | | Old Age | | | | | Yes | | | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GO G-18 | | Chekula ma | Son of Sonam Tamang | Cheku Lama | 29 | HoH | Bogetitar | None | Electrician - Petty Contractor | Electricia n Training | | Yes | | | | | | | | | | Yes | | | | | |
| | | | | Dolma Tamang | 26 | Wife | | | Stone breaking | Tailoring Training | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Ashish Tamang | 7 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Alisha Tamang | 5 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| GO G-19 | | Dawa/K ancha Lama | Son of Sonam Tamang | Dawa Kancha Lama | 30 | HoH | Bogetitar | None | Wage Labour | | | Yes | | | | | | | | | | Yes | | | | | Employment with UT-1 is also desired after training by HoH |
| | | | | Laxmi Lama | 21 | Wife | | | | Poultry and Tailoring Training | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Nir Man Lama | 4 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-20 | | Mengma r Lama | Son of Sonam Tamang | Mengma r Lama | 31 | HoH | Bogetitar | None | Mason | Masonry | | Yes | | | | | | | | Yes | | | | | | | |
| | | | | Meera Lama | 24 | Wife | | | Wage labour and poultry | Poultry | | Yes | | | | | | | | | | | Yes | | | | |
| | | | | Deepika Maya Lama | 6 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| GO G-21 | | Nursinge Lama Tamang | Son of Sonam Tamang | Nursinge lama | 48 | HoH | Batar | None | Wage Labour (Semi skilled carpenter, welder and mason) | None | | Yes | | | | | | | | | Yes | | | | | | |
| | | | | Purnima ya Lama | 45 | Wife | | | Handicrafts | Weaving Training | | Yes | | | | | | | | | | | | | Yes | | Market Linkage essential |
| | | | | Nursang Maya Tamang | 25 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| GO G-22 | | Indra Man Tamang | Son of Nursinge Lama | Indra Man Tamang | 22 | HoH | Bogetitar | None | Construction labourer | Plumbin g | | Yes | | | | | | | | Yes | | | | | | | Seed capital for setting business enterprise is also desired by the PAF |
| | | | | Sanchis Lama Tamang | 16 | Brother | | | | | | | | | | | | | | | | | | | | | |
| | | | | Buddha Maya Tamang | 14 | Sister | | | | | | Yes | | | | | | | | | | | | Yes | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Pramila Tamang | 11 | Sister | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sirjanamaya Tamang | 7 | Sister | | | | | | | | | | | | | | | | | | | | | |
| GO G-23 | | Ursinge Lama | Son of Sonam Tamang | Ursinge Tamang | 58 | HoH | Bogetitar | None | Construction labourer | Masonry and Carpentry | | | | Yes | | | | | | | | | | | | | |
| | | | | Jejhum Tamang | 52 | Wife | | | Construction labourer | Sewing and Knitting | | | | | | | | | | | | | | | | | |
| | | | | Raju Tamang | 28 | Son | | | Construction labourer | | | | | Yes | | | | | | | | | | | | | |
| | | | | Samjhana Tamang | 25 | Daughter | | | | Sewing and Knitting | | | | | | | | | | | | | | | | | |
| | | | | Subina Tamang | 11 | Daughter | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Subindra Tamanag | 8 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-24 | | Tulo Tamang | Son of Ursinge Lama | Tulo Tamang | 37 | HoH | Bogetitar | None | Electrician | | | Yes | | | Yes | | | | | | | Yes | | | | |
| | | | | Mensdo Dalma Tamang | 34 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Badal | 2 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-25 | | Nurghu Tamang | Son of Talama Tamang | Nurghu Tamang | 60 | HoH | Tiru | Could not be surveyed | | None | | | | | | | | | | | | | | | | | Could not be surveyed |
| | | | | Wangchit | 50 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Gauri Tamang | 18 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Biswas Tamang | 13 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sonam Tamang | 12 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| GO G-26 | | Kabi Raj Tamang | Son of Nurghu Tamang | Kabi Raj Tamang | 30 | HoH | Batar | None | Construction labourer | None | | | | | | | | | | | | | | | | | |
| | | | | Budhdhi Maya Tamang | 22 | Wife | | | Construction labourer | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Yunisha | 3 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Yuvraj | 6 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-27 | | Wangel Tamang | Son of Nurghu Tamang | Wanghel Tamang | 30 | HoH | Tiru and Batar | None | Construction labourer and Agriculture | None | | | | Yes | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Gangamaya Tamang | 25 | Wife | | | Construction labourer | | | | | | | | | | | | | | | | | | |
| | | | | Mangal Tamang | 17 | Brother | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Suresh Tamang | 9 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Umesh Tamang | 6 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Som Maya Tamang | 3 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| GO G-28 | | Chirring Tamang | Son of Talama Tamang | Chirring Tamang | 57 | HoH | Tiru | e | None; Supported by sons | None | | Yes | | | | | Yes | | | | | | | | | | |
| | | | | Yangjen Tamang | 61 | Wife | | Disabled | | | | | | | | | | | | | | | | | | | |
| GO G-29 | | Lakpa Tamang | Son of Chirring Tamang | Lakpa Tamang | 40 | HoH | Kathmandu (HoH); Bogetitar (family) | None | Contractor | None | | | | | | | | | | | | | | | | | |
| | | | | Mingma Dolma Tamang | 40 | Wife | | | Construction labourer | Sewing training | | | | | | Yes | | | | | | | | | | | |
| | | | | Manmaya Tamang | 17 | Daughter | | | | Plumbing training | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Som Maya Tamang | 16 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Khesom Tamang | 13 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-30 | | Santosh Tamang | Son of Lakpa Tamang | Santosh Tamang | 21 | HoH | Dhunche | None | Wage Labour | None | | Yes | | | | | | | | | | | Yes | | | | |
| | | | | Man Maya Tamang | 19 | Wife | | | School Teacher | Plumbing | | | | Yes | | | | | | | | | | | | | |
| GO G-31 | | Ram Tamang | Son of Chirring Tamang | Ram Tamang | 40 | HoH | Bogetitar | None | Foreign Employment | None | | | | Yes | | | | | | | | | | | | | The HoH presently stays in Malaysia. Confirm location and preference at the time of implementation |
| | | | | Tenji Ghale | 38 | Wife | | | Wage Labour | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Bimala Tamang | 7 | Daughter | | | | | | | | | | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Arjun Tmang | 4 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-32 | | Sukman Tamang | Son of Chirring Tamang | Sukman Tamang | 19 | HoH | Battar | None | None; Supported by father/brothers | None | | Yes | | | | | | | | Yes | | Yes | | | | | |
| GO G-33 | | Dawa Wangde Tamang | Son of Chirring Tamang | Dawa Wangde Tamang | 30 | HoH | Satbesi | None | Construction labourer | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Dolma Tamang | 22 | Wife | | | School Teacher | | | | | Yes | | | | | | | | | | | | | |
| GO G-34 | Budhi Maya Tamangni | Mengmar Dorjee | Son of Budhi Maya Tamangni | Mengamar Dorje | 40 | HoH | Bogetitar | None | Mason | Masonry | Yes | Yes | | | | | | | | | | Yes | | | | | |
| | | | | Somani Tamang | 37 | Wife | | | Stone breaking | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Lama Tamang | 16 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Tenjing Tamang | 14 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Budhi Maya Tamangni | 78 | Mother | | Old Age | | | | | | | | | | | | | | | | | | | |
| | | | | Pasang Tamang | 12 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-35 | | Pentis Tamang | Son of Budhi Maya Tamangni | | | | Kathmandu | | Wage Labour | NA | | | | | | | | | | | | | | | | | Not surveyed |
| GO G-36 | | Dawa Lama | Son of Pentis Tamang (Minor) | | | | India | | Student | NA | | | | | | | | | | | | | | | | | Not surveyed |
| GO G-37 | | Tika Tamang | Son of Pentis Tamang | | | | Tiru | | Agriculture | NA | | | | | | | | | | | | | | | | | Not surveyed |
| GO G-38 | | Kippa Tamang | Son of Pentis Tamang | | | | Kathmandu | | Monk | NA | | | | | | | | | | | | | | | | | Not surveyed |
| GO G-39 | Wangla ma | Kami dorje Tamang | Son of Sonam Tamang and Brother of Wangla | Kami dorje Tamang | 61 | HoH | Bogetitar | Disabled member in family | Basket weaving and agriculture | Carpentry (son) | Yes | | Yes | | | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ma Tamang | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Langhale Tamang | 61 | Wife | | | | | | | Yes | | | | | | | | | | | | | | |
| | | | | Tarkhiyal Tamang | 16 | Nephew/ Son | | | Construction labourer | | | Yes | | Yes | | | | | | | Yes | | | | | | |
| | | | | Lemba Tamang | | Nephew/ Son | | Disabled | | | | | Yes | | | | | | | | | | | | | | |
| GO G-40 | | Dawa Finchow Tamang | Son of Kami Dorjee | Dawa Finchow | 33 | HoH | Bogetitar | None | Wage Labour | Poultry | | | | Yes | | | | | | | | | | | | | |
| | | | | Lakpa Thalmo Tamang | 30 | Wife | | | | | | | | | | | | | | | | | | | | | |
| GO G-41 | | Bhuchiring Tamang | Son of Sonam Tamang | Bhuchiring Tamang | 62 | HoH | Tiru and Nuabesi | None | Agriculture | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Chesang Ghale | 62 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Dibe Tamang | 12 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Karishma Tamang | 16 | Daughter | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| GO G-42 | | Karsang Lama | Son of Bhuchiring Tamang | Karsang Lama | 34 | HoH | Nuabesi | None | Mason | None | | Yes | | | | | | | | Yes | | | | | | | HoH expects support in obtaining Driving License |
| | | | | Budhdhi Maya Tamang | 35 | Wife | | | Construction labourer | Weaving Training | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Kabi Raj | 16 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sangeeta | 13 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Anjana Tamang | 11 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ram | 6 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Lakshman | 6 | Son | | | | | | | | | | | | | | | | | | | | | |
| GO G-43 | | Dawa Phurba Tamang | Son of Bhuchiring Tamang | Dawa Phurba Tamang | 20 | HoH | Nuabesi | None | Foreign Employment | None | | | | | | | | | | | | | | | | | |
| | | | | Kiran Kumari | 19 | Wife | | | Wage Labour | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Preeti Maya Tamang | 1 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| GO G-44 | | Taar Lama | Son of Bhuchiri | Taar Lama | 31 | HoH | Nuabesi | None | Wage Labour | None | | Yes | | Yes | | | | | | | | Yes | | | | | Tailoring Training also |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ng Tamang | | | | | | | | | | | | | | | | | | | | | | | | desired for Wife |
| | | | | Kumari Lama | 31 | Wife | | | Wage Labour | Knitting training | | | | | | | | | | | | | | | | | |
| | | | | Nurbhu | 5 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sushita Maya | 10 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| GOG-45 | | Wangalamba Tamang | Son of Sonam Tamang | Wanglamba Tamang | 49 | HoH | Nuabesi | None | Mason | Masonry training | | | | Yes | | | | | | | | | | | | | Tailoring / Weaving Training desired for wife and daughter |
| | | | | Som Maya Tamang | 48 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Geeta Tamang | 22 | daughter | | | | Computer training | | | | Yes | | | | | | | | | | | | | |
| | | | | Dawa Lama | 18 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Som Ras | 16 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Suneeta | 14 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| GOG-46 | | Failama Tamang | Son of Sonam Tamang | Failama Tamang | 34 | HoH | Kathmandu/Bogetitar | None | Wage Labour | None | | | | | | | | | | | | | | | | | Was in Kathmandu at the time of survey |
| | | | | Som Mayi Tamang | 28 | Wife | | | Vegetable Farming | Vegetable Cultivation | | | | | | | | | | | | | | | | | |
| | | | | Rohit | 5 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Roman | 3 | Son | | | | | | | | | | | | | | | | | | | | | |
| MAI-01 | | Ash Bir Tamang | Self | Ash Bir Tamang | 50 | HoH | Nuabesi | None | Petty Contractor and Politician | None | Yes | | | | Yes | | | | | | | | | | | | |
| | | | | Sushmita Tamang | 35 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Som Maya Tamang | 17 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Anjali Maya Tamang | 12 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Karan Tamang | 19 | Son | | | | | | | | | | | | | | | | | | | | | |
| MAI-02 | | Amrit Tamang | Son of Ash Bir Tamang | Amrit Tamang | 30 | HoH | Nuabesi | None | Petty Contractor and Politician | Masonry | | | | Yes | | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Saleman Tamang | 25 | Wife | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Asmita Tamang | 11 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| MAI -03 | | Birat Man Tamang | Son of Ash Bir Tamang | Birat Man Tamang | 29 | HoH | Mailung | Disability of wife | Wage labour, Piggery | None | | | | Yes | | | | | | | | | | | | | Employment as Security Guard desired |
| | | | | Sushma Tamang | 24 | Wife | | Disabled | | | | | | | | | | | | | | | | | | | |
| MAI -04 | | Masin Tamang | Son of Ash Bir Tamang | Masin Tamang | Dead | HoH | HoH Dead/ Wife in Kathmandu | Women Headed Household | House Maid | None | | | | Yes | | | | | | | | | | | | | Check at the time of implementation as wife is reported to be staying in Kathmandu |
| | | | | Bipana Tamang | 19 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Urmila Tammang | 11 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| MAI -05 | | Jaiman Tamang | Son of Ash Bir Tamang | Jaiman | 22 | HoH | Nuabesi | None | Security Guard | None | | | | | | | | | | | | | | | | | |
| | | | | Chirring Mendo Tamang | 22 | Wife | | | | Weaving training | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Jennifer Tamang | 5 | Daughter | | | Handicrafts | | | | | | | | | | | | | | | | | | |
| MAI -06 | Antare Tamang | Panche Tamang | Son of Antare Tamang | Pancha Bahadur Tamang | 51 | HoH | Mailung | None | Petty Contractor | None | Yes | | | | Yes | | | | | | | | | | | | |
| | | | | Kamani Tamang | 51 | Wife | | | Stone Breaking | | | Yes | | | | | | | Yes | | | | | | | | |
| | | | | Sher Bahadur Tamang | 22 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Phool Maya Tamang | 22 | Daughter In Law | | | | | | | | | | | | | | | | | | | | | |
| | | | | Amin Tamang | 0 | Grandson | | | | | | | | | | | | | | | | | | | | | |
| MAI -07 | | Junga Bahadur Tamang | Son of Panche Tamang | | | | Kathmandu | | Not Known | NA | | | | | | | | | | | | | | | | | |
| MAI -08 | | Dhan Bahdur Tamang | Son of Panche Tamang | Dhan Bahdur Tamang | 32 | HoH | Satbesi | | Stone breaking and selling alcohol | None | | | | | | | | | | | | | | | | | |
| | | | | Sirjana Tamang | 28 | Wife | | Women Headed | | | | Yes | | | | | | | | | | | | | Yes | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | (Husband in Jail) | | | | | | | | | | | | | | | | | | | |
| | | | | Shakti Tamang | 3 | Son | | | | | | | | | | | | | | | | | | | | | |
| MAI-09 | | Dirgha Tamang | Son of Antare Tamang | Drigha Tamang | 40 | HoH | Mailung | None | Mason | None | | | | | | | | | | | | | | | | | |
| | | | | Kikpa Sangbo Tamang | 40 | Wife | | | Wage Labour | | | | | | | | | | | | | | | | | | |
| | | | | Antare Tamang | 70 | Father | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ganga Maya Tamang | 70 | Mother | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ambare Tamang | 14 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Susmita Tamang | 20 | Daughter | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Kalpana Tamang | 17 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| MAI-10 | Semsung Ghaleni | Semsung Ghaleni | | Samsung Ghaleni | 72 | HoH | Shanti Bazaar and sometimes in Mailung near IDP Camp | Aged Lady supported by married daughter | Dependent on married daughter | None | Yes | | | | | | | | | | | | | | | | |
| | | | | Urjan Tamang | 47 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Phairom Tamang | 47 | Son in Law | | | | | | | | | | | | | | | | | | | | | |
| | | | | Bhim Bahadur Tamang | 21 | Grand Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Imang Tamang | 23 | Grand Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Madhav | 19 | Grand Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Biraj Tamang | 12 | Grand Son | | | | | | | | | | | | | | | | | | | | | |
| MAI-11 | Kami Singh Tamang | Gunda Tamang | Son of Kami Singh Tamang | Gunda Singh Tamang | 62 | HoH | Gogone | None | Agriculture and support from sons | NA | | | | | | | | | | | | | | | | | Not Surveyed |
| MAI-12 | | Thula Kancha Tamang | Son of Gunda Tamang | Thula Kancha Tamang | 49 | HoH | Nuabesi-Thimbure for work at the time of survey | None | Migrated to Kerong to work as Construction Labourers (HoH and wife) | NA | | | | | | | | | | | | | | | | | Not surveyed |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAI -13 | | Larke Tamang | Son of Gunda Tamang | Larke Tamang | 30 | HoH | Nuabesi | None | Wage Labour | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Kanchi Maya | 25 | Wife | | | Sharecropping | Handicraft | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Bhujan | 8 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Suni | 7 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sanjeeta | 3 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| MAI -14 | | Birman Tamang | Son of Kami Singh Tamang | Birman Tamang | 51 | HoH | Tiru | None | Cultivates land in Tiru | None | | | | | | | | | | | | | | | | | Not surveyed |
| | | | | Selmaya Tamang | 67 | Wife | | | | | | | | | | | | | | | | | | | | | |
| MAI -15 | | Kami Singhi Tamang | Son of Birman Tamang | Kami Singhi Tamang | 40 | HoH | Nuabesi | None | Mason | Masonry | | | | | | Yes | | | | | | | | | | | |
| | | | | Sapna Maya Ghale | 32 | Wife | | | Construction labourer | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Dhai Jani | 12 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ram Tamang | 10 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Rupesh Tamang | 7 | Son | | | | | | | | | | | | | | | | | | | | | |
| MAI -16 | | Sonam Sangbu Tamang | Son of Birman Tamang | Sonam Sangbu Tamang | 29 | HoH | Nuabesi | None | Construction labour | Masonry | | | | Yes | | | | | | | | | | | | | Employment as Security Guard preferred by HoH |
| | | | | Ritu Tamang | 21 | Wife | | | | | | Yes | | | | | Yes | | | | | | | | | | |
| MAI -17 | | Sildorje Tamang | Son of Kami Singh Tamang | Sildorje Tamang | 50 | HoH | Bogetitar | None | Wage Labourer | None | | | | | | | | | | | | | | | | | |
| | | | | Sell Jom Tamang | 48 | Wife | | | Wage Labourer | | | | | | | | | | | | | | | | | | |
| | | | | Manju Tamang | 20 | Daughter | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Anju Tamang | 19 | Daughter | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Devesh Tamang | 14 | Son | | | | | | | | | | | | | | | | | | | | | |
| MAI -18 | | Harka Man Tamang | Son of Sildorjee Tamang | | | | Trishuli Bazaar and Malaysia | None | Foreign employment | NA | | | | | | | | | | | | | | | | | Not surveyed |
| MAI -19 | | Umesh Tamang | Son of Sildorjee Tamang | Umesh Tamang | 21 | HoH | Shanti Bazaar and Malaysia | None | Foreign employment | None | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Shanti Tamang | 19 | Wife | | | | Vegetable Cultivation | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Sujan Tamang | 3 | Son | | | | | | | | | | | | | | | | | | | | | |
| MAI -20 | | Buddhi Tamang | Son of Kami Singh Tamang | Buddhi Tamang | 35 | HoH | Satbesi | None | Mason | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Nema Yangdi Tamang | 35 | Wife | | | Wage Labourer | | | Yes | | | | | | | | | | | | | | Yes | |
| | | | | Robin Tamang | 17 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Thanjen Tamang | 11 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Chopen Tamang | 14 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Dawasangmu Tamang | 9 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Kanchi Maya Tamang | 10 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Kami Singh Tamang | 72 | Father | | Old Age | | | | | | | | | | | | | | | | | | | |
| MAI -21 | Bir Bahadur Tamang | Bir Bahadur Tamang | Son of Mar Singh Tamang | Bir Bahadur | 28 | HoH | Shanti Bazaar | None | Petty Contractor | None | Yes | | | | Yes | | | | | | | | | | | | |
| | | | | Parbati | 29 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Mar Singh | 58 | Father | | | General Store | | | | | | | | | | | | | | | | | | |
| | | | | Phool Maya | 48 | Mother | | | | | | | | | | | | | | | | | | | | | |
| | | | | Not known | NA | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Not known | NA | Son | | | | | | | | | | | | | | | | | | | | | |
| MAI -22 | Nima Dolmo Tamang | Nima Dolmo Tamang | Self | Nema Dolmo Tamang | 50 | HoH | Khalde | Widow living separately but supported by son | Supported by sons | | Yes | | Yes | | | | | | | | | | | | | | |
| MAI -23 | | Sedar Tamang | Son of Nima Dolmo Tamang | Sedar Tamang | 31 | HoH | Khalde | Disabled HoH | | None | | | Yes | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Lemba Tamang | 32 | Wife | | | Construction Labourer | Weaving | | | | Yes | | | | | | | | | | | | | |
| | | | | Bhimal Tamang | 5 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Rikki Tamang | 2 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| MAI -24 | | Pemba Tamang | | Pemba Tamang | 28 | HoH | Khalde | None | Petty contractor | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Nita Tamang | 21 | Wife | | | | | | Yes | | | | | | | | | | | | Yes | | | |
| MAI -25 | Ajaya Tamang | Ajaya Tamang | Self | Ajaya Tamang | 28 | HoH | Bogetitar | None | Construction Labourer | Masonry | Yes | Yes | | | | | | | | | Yes | Yes | | | | | |
| | | | | Deji Tamang | 25 | Wife | | | Construction Labourer | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Binay Tamang | 4 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Samridhi Tamang | 2 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| MAI -26 | | Kami Tamang | Relative of Ajaya Tamang | Kami Tamang | 45 | HoH | Bogetitar | None | Mason | Masonry | | | | Yes | | | | | | | | | | | | | |
| | | | | Phool Maya Tamang | 36 | Wife | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Karishma Tamang | 11 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Bhim Bahadur Tamang | 9 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Amita Tamang | 7 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Manush Tamang | 4 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Madan Tamang | 1.5 | Son | | | | | | | | | | | | | | | | | | | | | |
| MAI -27 | | Lari Tamang | Relative of Ajaya Tamang | Lari Tamang | 31 | HoH | Bogetitar | None | Wage Labourer | Poultry and Carpentry Training | | Yes | | | | | | | | Yes | | | | | | | |
| | | | | Sajina Tamang | 30 | Wife | | | Wage Labourer | | | Yes | | | | | | | | | | | | | | Yes | |
| | | | | Urmila Tamang | 11 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Lina Tamang | 7 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Parmila Tamang | 6 | Daughter | | | | | | | | | | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAI -28 | | Amir Tamang | Relative of Ajaya Tamang | Amir Tamang | 30 | HoH | Bogetitar | None | Foreign employment | None | | | | | | | | | | | | | | | | | |
| | | | | Phool Kumari Tamang | 24 | Wife | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Neema Chhoigi | 70 | Mother | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sarang Tamang | 6 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Rita Tamang | 3 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| MAI -29 | Chandra Man Tamang | Chandra Man Tamang | Self | Chandra Man Tamang | 27 | HoH | Khalde | None | Foreign employment | None | Yes | | | | | | | | | | | | | | | | |
| | | | | Silyamo Tamang | 23 | Wife | | | | | | Yes | | | | | | | | | | | Yes | | | | |
| | | | | Bisan Tamang | 1 | Son | | | | | | | | | | | | | | | | | | | | | |
| MAI -30 | | Amidempa Tamang | Brother of Chandra Man Tamang | Amdempa Tamang | 24 | HoH | Khalde | None | Wage Labour | None | | Yes | | | | Yes | | | | | Yes | | | | | | |
| | | | | Samjhana Tamang | 24 | Wife | | | Foreign employment | | | | | | | | | | | | | | | | | | |
| | | | | Sari Tamang | 3 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| MAI -31 | | Aitaman Tamang | Nephew of Chandra Man Tamang. Stays in Malaysia . Unmarried | | | | Malaysia | | Foreign Employment | None | | | | | | | | | | | | | | | | | Not surveyed |
| MAI -32 | Lanurbu Tamang | Lanurbu Tamang | Son of Lanurbu Tamang | Lanurbu Tamang | 53 | HoH | Bogetitar | None | Construction Labourer | None | Yes | | | | | | | | | | | | | | | | |
| | | | | Brugyalamo Tamang | 50 | Wife | | | Construction Labourer | | | | | | | | | | | | | | | | | | |
| | | | | Sajan Tamang | 21 | Son | | | | Plumbing | | Yes | | | | | | | | | Yes | | | | | | |
| | | | | Sanden Tamang | 17 | Son | | | | | | | | | | | | | | | | | | | | | |
| MAI -33 | | Sidar Tamang | Son of Lanurbu Tamang | Sidar Tamang | 32 | HoH | Bogetitar | None | Mason | Masonry and | | Yes | | | | | | | | | Yes | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Carpentry | | | | | | | | | | | | | | | | | |
| | | | | Chesang Tamang | 25 | Wife | | | Construction Labourer | Vegetable farming | | Yes | | | | | | | | | | | | | | Yes | |
| | | | | Keshan Tamang | 13 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sagar | 9 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Baby | 0 | Son | | | | | | | | | | | | | | | | | | | | | |
| MAI -34 | | Reppa Tamang | Brother of Lanurbu Tamang | Reppa Tamang | 37 | HoH | Bogetitar | Disabled HoH | Supported by Nephew and daughter who is studying in class 8th (working once a week) | Carpentry Training | | | Yes | | | | | | | | | | | | | | |
| | | | | Sarki Tamang | Dead | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Manmaya Tamang | 14 | Daughter | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Anjana Tamang | 11 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| MAI -35 | | Nurwangdi Tamang | Brother of Lanurbu Tamang | Noorwangdi Tamang | 50 | HoH | Satbesi | None | Mason | None | | | | | | Yes | | | | | | | | | | | |
| | | | | Seryoul Tamang | 48 | Wife | | | Construction Labourer | | | Yes | | | | | | Yes | | | | | | | | | |
| | | | | Deji Tamang | 16 | Daughter In Law | | | | | | | | | | | | | | | | | | | | | |
| | | | | Karsang Tamang | 20 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Nurbu Tamang | 13 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Sidhartha Tamang | 4 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Samjhana Tamang | 10 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| MAI -36 | | Sangdeva Tamang | Son of Nurwangdi | Sangdeva Tamang | 23 | HoH | Satbesi | None | Works for ACF, as local supervisor | None | | | | Yes | | | | | | | | | | | | | |
| | | | | Faiyalmo Tamang | 23 | Wife | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Basanta Tamang | 1 | Son | | | | | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAI -37 | Chhowan Tamang | Chhowan Tamang | Self | Chhowan Tamang | 47 | HoH | Nuabesi and Tiru | None | Agriculture (family members) | None | Yes | | | | | | | | | | | | | | | | This is a big family; hence more entitlements should be given |
| | | | | Shree Maya Tamang | 44 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ruchen Tamang | 77 | Mother | | | | | | | | | | | | | | | | | | | | | |
| | | | | Birpal Tamang | 59 | Elder Brother | | | | | | | | | | | | | | | | | | | | | |
| | | | | Raju Tamang | 21 | Son | | | Construction Labour | Handicraft (Bamboo Stool Making) | | Yes | | | | | | | | | | | | Yes | | | |
| | | | | Harka Tamang | 13 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ajay Tamang | 10 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Jeevan Tamang | 8 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ashish Tamang | 3 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Dil Maya Tamang | 12 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Anita Tamang | 7 | Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Pemba darke | 30 | Younger Brother | | | | | | | | Yes | | | | | | | | | | | | | |
| | | | | Jai Mindo | 28 | Sister In Law | | | | | | Yes | | | | | | | | | | | | | Yes | | |
| MAI -38 | Birman Tamang | Birman Tamang | Self but lives with son Pemba | Birman Tamang | 58 | HoH | Nuabesi | None | Sharecropping | Masonry | Yes | Yes | | | | | | | | | | | | | | | |
| | | | | Maliyansa | 58 | Wife | | | | | | | | | | | | | | | | | | | | | |
| | | | | Pemba Tamang | 26 | Son | | | Mason | | | Yes | | | | | | | | | Yes | | | | | | |
| | | | | Budhi Maya Tamang | 26 | Daughter In Law | | | Wage Labour | | | Yes | | | | | | | | | | | | | Yes | | |
| | | | | Khusi Maya Tamang | 5 | Grand Daughter | | | | | | | | | | | | | | | | | | | | | |
| | | | | Basanta Tamang | 3 | Grand Son | | | | | | | | | | | | | | | | | | | | | |

| HH Code | Land Owner Name | Seperate Household | Relation to Land owner | Name of family member | Age | Relation to HoH | Present Location | Vulnerability | Present Occupation | Trainings Received | Additional Cash Compensation | Transition Support | Vulnerability Pension | Direct Employment | Contractual Opportunities | Wage Based Work | Poultry Training | Boar Farming | Goat Farming | Driver/Mechanic Training | Masonry Training | Electrician / Plumbing Training | Cooking Training | Computer Training | Tailoring / Sewing/Knitting Training | Seed Capital for Business Enterprise | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAI -39 | Nima Mengmar Tamang | Nima Mengmar Tamang | Self | Neema Miyar Tamang | 29 | HoH | Nuabesi | None | Construction Labourer | None | Yes | | | | | Yes | | | | | | | | | | | |
| | | | | Urchi Tamang | 31 | Wife | | | Construction Labourer | Vegetable Cultivation | | | | | | | | | | | | | | | | | |
| | | | | Sabindra Tamang | 11 | Son | | | | | | | | | | | | | | | | | | | | | |
| | | | | Ram Maya Tamang | 9 | Daughter | | | | | | | | | | | | | | | | | | | | | |

Annexure E

# Terms of Reference for Implementation Partner

# 1 OVERALL ASSIGNMENT CONTEXT

This Annexure provides a template for the Terms of Reference for the Implementation Partner to be appointed for the LALRP. This ToR shall be finalized after the finalization of the LALRP, based on the review of the lenders and the feedback of the external stakeholders in the disclosure process.

## 1.1 PROJECT UNDERSTANDING

The UT-1 Hydropower project is being developed by the Nepal Water and Energy Development Company (NWEDC) as a 216 Mega-watt (MW) green field run-of-the-river project located in the upper part of the Trishuli watershed, approximately 50 km north of Kathmandu. IFC Infra-Ventures has signed a Joint Development Agreement (JDA) with Korea South-East Power Co. Ltd, Daelim Industrial Co., Ltd, Kyeryong Construction Industrial Co. Ltd. and Jade Power Private Limited to develop the project in March 2012. The Project Development Agreement (PDA) with the Government of Nepal was signed on 29th December 2016.

A total of 99.79 ha of land are required for the project. Of this 96.16 ha, 26.15 ha is required on a temporary basis during the construction phase of the project. While the permanent land is primarily private land and *Swyambhuguthi*[1] land, the temporary land requirement for the project is mostly community forest and government land. The project has completed the land take process for the private land required for the project and its various associated facilities. Payment of compensation for privately held land and asset to the affected persons/ households was completed in 2015.

Once commissioned, the project will account for sizeable portion of Nepal's current installed capacity and will sell power under a long-term power purchase agreement (PPA) with Nepal Electricity Authority ("NEA"), the national utility company.

As stated earlier, a Livelihood Restoration Plan (LRP) was prepared by ERM in March 2015 for the project and was supposed to be implemented in to meet the requirements of the applicable national regulations, WBG Performance Standards (PS) 2012 and ADB Safeguard Policy Statement (SPS) 2009. The main objective of LRP was to enable restoration of livelihoods, and preferably

[1] Swayambhuguthi land or the Trust land is the land that belongs to a Monastery at Swayambhu in Kathmandu. Guthi Tainathi land (Guthi owned land)" means a land which is not registered in the name of any person and in which the Guthi Corporation has exclusive right. "Guthi" means and includes a Guthi (trust) endowed by any philanthropist through relinquishment of his or her title to a movable or immovable property or any other income-yielding property or fund for the operation of any shrine (matha) or festival, worship or feast of any God, Goddess or for the construction, operation or maintenance of any temple, shrine (devasthal), rest house (dharmashala), shelter (pati), inn (pauwa), well, tank, road, bridge, pasture, garden, forest, library, school, reading hall, dispensary, treatment facility, house, building or institution for any religious or philanthropic purpose. *Source:* The Guthi Corporation Act, 2033 (1976).

improvement of livelihoods of the project affected families from pre-project levels.

It should be noted that at the time of the LRP formulation between 2014-15, the entire compensation amount as assessed by the government and NWEDC, had already been disbursed the eligible PAFs. The PAFs reported that they had used this money to purchase alternative land, construct new houses, repair existing houses or invest in income generating activities/assets. The LRP was to compensate the loss of livelihoods of the PAFs through a number of livelihood programme options, in addition to what they had already received as compensation for their assets.

However, before the LRP could be implemented, the Project Area of Influence (Haku, Ramche and Dhunche VDC) suffered a major earthquake which resulted in significant impacts and internal displacement of a large number of people from local villages, including the PAFs from the villages falling in the project area of influence especially from Haku VDC. The 2015 earthquake also resulted in a change in the baseline of the project. This change has been in the form of the place of residence, asset ownership, livelihood profile, financial status of the project and expectations of the stakeholders from the project. Due to this, the need was identified of updating the impact assessments and management plans formulated for the project. In keeping with this a revised LALRP was formulated in keeping with the post-earthquake scenario. The Project is now looking to recruit an Independent Implementation Partner (IM) for assisting in the execution of the LALRP thus formulated.

### *1.2 OBJECTIVE AND PURPOSE OF ASSIGNMENT*

The objective of the assignment is to implement the specific entitlements identified in the LALRP, in keeping with the livelihood restoration principles identified and the applicable reference framework. This plan is aimed at mitigating the impacts of economic displacement and at a minimum, restoring the livelihoods and living standards of the affected population to the pre-land procurement state.

### *1.3 APPLICABLE REFERENCE FRAMEWORK*

The LALRP has to be implemented in keeping with the requirements of the following:

- Applicable National regulations;
- Applicable WBG Performance Standards;
- ADB Safeguard Policy Statement 2009; and
- European Investment Bank' Statement of Environmental and Social Principles and Standards, 2009

### *1.4 SCOPE OF ASSIGNMENT*

The scope of work for the assignment is to implement the contents of the LALRP formulated, in keeping with the implementation plan presented in the LALRP. The specific tasks to be undertaken include the following:

#### *1.4.1 Undertake a Need Assessment Update of Socio Economic Baseline*

It is understood that due to the impacts of the earthquake, the socio-economic profile and residential status of the PAFs is in a state of flux and dynamism. In keeping with this, prior to the implementation of the LALRP, the IM shall undertake a detailed need assessment for the PAFs. This need assessment shall be to develop a detailed understanding of the present skill set and livelihood status of each PAF. This need assessment shall be undertaken based on structured surveys and focused interviews with each PAF.

On the basis of this need assessment the IM shall update the socio-economic baseline where required. In addition to this, the Entitlement Matrix formulated for the LALRP shall be updated, to incorporate the specific entitlements identified for the family.

#### *1.4.2 Formulation and Finalization of Micro Plans*

Based on Entitlement Matrix formulated as part of the LALRP and the need assessment undertaken, the IM shall formulate micro plans for each PAF.

This micro plan should provide an understanding of the following:

- Identification number of PAF (in keeping with that provided in the LALRP)
- Residence (original and present) details;
- Household level details;
- Details of Impacted Assets (along with layout and pictures wherever possible);
- Entitlements identified; and
- Timeline for implementation of the entitlements identified.

This micro plan shall be developed in consultation with each affected household to ensure that there is an understanding and agreements in terms of the following (but not be limited to):

- Impacted assets;
- Entitlements due as part of LRP;
- Eligible individuals;
- Compensation calculation;
- Schedule for disbursal of entitlements;
- Process of disbursal; including:
    - Preference of trainings; and
    - Preference for mode of payment for cash compensation.

For the purpose of identifying the entitlements, the PAF shall be provided with multiple options. The entitlements and means of disbursement shall then be finalized in consultation with the PAF. The IM shall execute a written agreement (in an informed manner) with the PAF that they understand and agree with the entitlements identified and the schedule for their disbursement. This agreement should be signed in the presence of the VDC leaders and representatives of the local government, if possible.

### *1.4.3 Development and Maintenance of a Database*

These agreements shall be maintained in the LALRP database established for the project and the originals shall be submitted to NWEDC for record keeping. As part of this database, information for each PAF should be maintained in a separate file. This database shall be regularly updated and shall allow NWEDC to regularly monitor the progress of implementation of the entitlements.

### *1.4.4 Formulation of Detailed Implementation Plan*

Prior to initiating the implementation of the LALRP or micro plans, the IM shall formulate a detailed implementation schedule. This implementation schedule shall put in place a timeline for each step of the implementation process as identified in the LALRP and agreed upon in the micro plan, with the aim of meeting the overall timelines identified in the LALRP. This schedule shall provide an understanding of the timelines for the complete implementation of each entitlement and shall include a schedule for each settlement/village/ VDC and a detailed schedule for day-to-day implementation. This implementation schedule shall be formulated in keeping with the overall implementation plan put in place for the LALRP.

The implementation schedule shall allow NWEDC to track and monitor the progress of the implementation of the LALRP, in keeping with the overall timelines established. The schedule formulated shall be dynamic in nature and shall allow for variation, due to externalities, to be absorbed. However, the overall schedule shall be adhered to, as any significant delay in the implementation process could result in financial and reputational risks for the project.

### *1.4.5 Identification of Third Parties*

In addition to the implementation plan, the IM shall also identify other third party organizations/entities who may be involved in the implementation of the LALRP provisions. These third parties may include NGOs/INGOs/ Government organizations who are involved in skill development and livelihood restoration activities. These third parties organizations identified shall be those who have experience of undertaking work in the district, and preferably in the AoI and shall be those acceptable with the local community. The third parties shall be finalized and engaged by NWEDC.

### *1.4.6 Disclosure of Implementation Plans and Agreement with PAFs*

The implementation plan formulated shall be disclosed to the PAFs, in keeping with the provisions of the Stakeholder Engagement Plan for the project. As part of this implementation plan, the IM shall have a clear understanding of the requirement for manpower during the various phases of the LALRP implementation and the extent to which the same can be fulfilled locally in consultation with NWEDC. Consensus shall then be sought from the PAF on the overall implementation schedule and the same shall be finalized in keeping with the feedback received.

### *1.4.7 Implementation of the Livelihood Restoration Entitlements Identified*

In keeping with the detailed implementation plans and micro plans thus formulated, the IM shall implement the LALRP entitlements. The implementation of the entitlements shall be in keeping with the applicable reference framework, livelihood restoration principles and implementation process put in place as part of the LALRP.

While third party organizations may be involved in the implementation of specific entitlements, the IM shall be responsible for the overall implementation of the entitlements identified and the monitoring and coordination of the activities of the third party experts. The IM shall properly document each training and support provided and the engagement with the PAFs and submit the same on a regular basis to NWEDC in keeping with the reporting timelines identified in the LALRP.

### *1.4.8 Continued Engagement, Disclosure and Participation*

The IM shall be responsible for undertaking regular engagement with the PAFs and ensuring the implementation of the LALRP in a participatory manner. The engagement with the PAFs shall be undertaken in coordination with the Environmental and Social Management Cell (ESMC) in keeping with the requirements of the Stakeholder Engagement Plan for the project. In addition to this, the IM shall also be responsible for providing ongoing training and hand holding support to the PAFs. This support shall allow the PAFs to accrue maximum benefits from the projects.

## *1.5 REQUIRED MANPOWER AND QUALIFICATION OF EXPERTS*

The IM should have following eligibility to undertake the implementation of LALRP:

- Should have previous work experience in the project district and preferably AoI and should be familiar with socio-economic and cultural setting of the project AoI;
- Minimum 5 years' experience of implementation of livelihood/skill enhancement programmes

- Minimum 5 experience of organizing skills, business and awareness training and post training support including employment and market linkage and business counselling
- Proven capability on beneficiary mobilization, group sensitization, awareness raising of beneficiaries, technical and business curriculum development by mobilizing pool of technical and business trainers
- Financial solvency to adequate manpower to undertake the assignment

### *1.6 MONITORING AND REPORTING REQUIREMENTS*

The reporting and monitoring of the implementation of the LALRP shall be undertaken in keeping with the process identified in the LALRP.

### *1.7 TIMELINE*

The implementation of the LALRP is to be undertaken over a course of five years, till the second quarter of 2022-2023 AD. After the completion of this timeline, a completion audit shall be undertaken to assess any remaining gaps in the restoration of livelihoods. If a need for extending livelihood restoration support is identified, the contract for the IM may be extended as required.

Annexure F

# LRP Survey Tool - 2017, Upper Trishuli-1

NWEDC-Upper Trishuli-1

Socio-economic Survey Questionnaire 2017

**Introduction**

**Instructions to the Project Company Staff:** Greet the respondent and please introduce yourself briefly to the respondent.

*We are surveyors from {NWEDC}. We are conducting a survey of people falling under the Upper Trishuli project. In order to understand the impact of the 2015 earthquake, we are undertaking a survey of the household that may get affected as a result of this project.*

*Based on the results of this survey, Livelihood restoration plan will be updated for the project. We will also try to understand the various losses that you have suffered because of the earthquake, and the options for restoring the living standard. There are no right or wrong answers. We only seek your responses and opinions regarding some of the issues. We assure that your personal details will be kept confidential. The interview might take 40 to 45 minutes. We seek your cooperation in this regard.*

*May we proceed? ……..Thank you!!!*

**Part 1: Introduction**

| | | | |
|---|---|---|---|
| ***Respondent Details:*** | | | |
| *Name of the respondent* | | | |
| *Name of Head of Household* | | | |
| *Relationship of the respondent with the head of the household (in keeping with 2015 LRP)* | | *Date: (DD/MM/YY)* | |
| ***Enumerator Details:*** | | | |
| *Name:* | | *Signature:* | |
| *Date: (DD/MM/YY)* | | | |
| ***Quality check*** | | | |
| *Person doing quality check:* | | *Signature* | |
| *Date: (DD/MM/YY)* | | | |
| ***Location Details:*** | | | |
| Original Village and VDC (in keeping with 2015 :LRP) | | Present Residence | |
| Phone Number | | | |
| Census Department ID Number: | | | |
| Identification Number (by survey) team | ……/……/ | | |
| Household Code from 2015 LRP | | | |

**PART 2: IMPACT OF 2015 EARTHQUAKE AND RELIEF PROVIDED**

| Q. N. | QUESTIONS | PLEASE TICK AS APPROPRIATE |
|---|---|---|
| 1 | Vulnerability Status (please tick as appropriate) | 1. Disabled<br>2. old couple ( Above 60 years) without support<br>3. Landless or Lack of Productive Agricultural land<br>4. Lack of any potential source of income<br>5. Living in IDP camp<br>6. Single Women Headed Household |

| 2.What were the impacts on the HH due to the 2015 earthquake | | Yes | No | If yes, Details |
|---|---|---|---|---|
| a) | Complete Destruction of homestead | 1 | 2 | |
| b) | Partial destruction of homestead | 1 | 2 | |
| c) | Complete destruction of agricultural land | 1 | 2 | |
| d) | Partial destruction of agricultural land | 1 | 2 | |
| e) | Loss of livestock | 1 | 2 | |
| f) | Loss of other sources of income | 1 | 2 | |
| g) | Physical disability of family member | 1 | 2 | |
| h) | Death of a family member | 1 | 2 | |
| i) | Other (please specify) | 1 | 2 | |

| | | |
|---|---|---|
| 3 | Have a discussion on the impact of the earthquake on the household?<br>1. Loss of property or assets<br>2. Physical injuries to household members<br>3. Damage to land (fissures in land etc.) and assets | |
| 4 | Are you presently using the impacted structure? | 1. Yes (permanently)<br>2. Yes (temporarily)<br>3. No |
| 5 | Are you presently using the land impacted by earthquake? | 1. Yes<br>2. No |
| 6 | If yes or no, Provide Details | |
| 7 | Were you able to recover any salvageable material from the impacted structures? | 1. Yes<br>2. NO |

8. Please provide details in terms of the number of livestock impacted due to the earthquake

| | Livestock Type | Total Number before Earthquake | Total number lost |
|---|---|---|---|
| a) | Poultry | | |
| b) | Cattle | | |
| c) | Goat/ Sheep | | |
| d) | Boar/ Pig | | |

**PART 3: RESIDENCE AND FAMILY STRUCTURE**

| | | |
|---|---|---|
| 9 | What is the present residence | 1. Original village **(goto Q 11)**<br>2. IDP Camp<br>3. Other (please specify) **(goto Q 11)** |
| 10 | If the answer is IDP Camps, do the members of the household have any concern in residing in the camp | |
| SN | Family Members | Key Concerns |
| a) | Men (25-59 years) | |
| b) | Women (25-59 years) | |
| c) | Elderly (above 60 years) | |
| d) | Youth (18-25 years) | |
| 11 | In the last 2 years, has any member of the household returned to the original homestead? | 1. Yes (permanently)<br>2. Yes (only for agriculture)<br>3. No **(goto Q 13)** |

| | | |
|---|---|---|
| 12 | If the answer to the previous question is yes, then how many members of the family returned? | 1. Complete family<br>2. part of the family (provide numbers) |
| 13 | How long they are gone and how many times in both years? | Number of Trips_____<br>Number of Days per Trip---------- |
| 14 | Do you have the Lal Purza/ Tenancy Certificate (in case of guthi land) to claim the housing grant? | 1. Yes **(goto Q 16)**<br>2. No |
| 15 | Please provide details<br>( E.g Lal purza is lost/ cannot trace it/ destroyed) | |
| 16 | Do you aim to return to original village permanently? | 1. Yes<br>2. No **(goto Q 18)** |
| 17 | If yes, Have a discussion on what are the present hindrances in returning to village permanently | |
| 18 | Will all the family members go back, or only a few? | 1. All **(goto Q 20)**<br>2. Few |
| 19 | If only a few, Details | |
| 20 | Do any members of the household have any concerns in returning to the village permanently | |

| SN | Family Members | Key Concerns |
|---|---|---|
| a) | Men (25-59 years) | |
| b) | Women (25-59 years) | |
| c) | Elderly (above 60 years) | |
| d) | Youth (18-25 years) | |
| 21 | Do you have any other house/ residence in Nepal? | 1. Yes (goto Q22)<br>2. No **(goto Q 23)** |
| 22 | If Yes, provide details in terms of location, area, suitability for permanent habitation etc. | |
| 23 | Are you eligible for Housing grant<br>(3 lakhs NRP) to be provided by the government? | 1. Yes<br>2. No<br>3. Not Aware |
| 24 | Are you eligible for any resettlement housing to be provided by the Government? | 1. Yes<br>2. No<br>3. Not Aware |
| 25 | Has anybody separated from family to start a new household after the earthquake? | 1. Yes<br>2. No **(goto Q 27)** |
| 26 | If yes, What was the reason for the separation | 1. To get maximum benefit from relief activities<br>2. Due to need for livelihood<br>3. Other (please specify) |
| 27 | Have you purchased any additional land since the earthquake | 1 Yes<br>2. No **(goto Q 29)** |
| 28 | If yes, then please provide details | |

| SN | Additional land | Details |
|---|---|---|
| a) | Purpose of Land | 1. Residence |

| | | |
|---|---|---|
| | | 2. Agriculture |
| b) | Size (ropani) | …….Ropani |
| c) | Location | |
| d) | Quality from pre earthquake | 1. Same<br>2. Better<br>3. Worse |
| e) | Irrigation Status (for agricultural land) | 1. Irrigated<br>2. Unirrigated |

**PART 4: INCOME AND EXPENDITURE AND LIVELIHOOD PROFILE**

| 29 | What are your key sources of expenditure (Nepali Rupee) | | |
|---|---|---|---|
| SN | Expenditure Head | Prior to earthquake | Post earthquake |
| a) | LPG (in Rs or number of units) (monthly) | | |
| b) | Fire wood (Monthly) | | |
| c) | Education (Monthly) | | |
| d) | Diesel/petrol (Monthly) | | |
| e) | Transport (Monthly) | | |
| f) | Telephone/mobile phone (Monthly) | | |
| g) | Entertainment (Annually) | | |
| h) | Healthcare/ Medical Expenditure(Annually) | | |
| i) | Agriculture Input Investment (Seeds, Fertiliser, etc.)(Annually) | | |
| j) | Maintenance (Annually) | | |
| k) | Loan repayment(Annually) | | |
| l) | Cultural/religious expenses (festivals/marriages)(Annually) | | |
| m) | Ration (Monthly) | | |
| n) | Rent (Monthly) | | |
| o) | Other _____ | | |

| 30 | Please provide a livelihood profile of the household, against each member | | |
|---|---|---|---|
| SN | Name of individual | Sources of Livelihood | Average Annual Income |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Sources of Livelihood

1. Agriculture, 2.Fishing, 3.Electrician, 4.Carpenter, 5.Masonry, 6.Plumber, 7.Livestock Farming, 8.Private Employee, 9.Government Employee, 10. Remittance, 11.Driver, 12. Retired, 13. Student, 14. Stone Breaking, 15. Poultry Farming, 16. Boar Farming, 17. Unemployed, 18. Other

| | | |
|---|---|---|
| 31 | What is the total Household Income (including remittances etc.) in Nepali Rupee | |
| 32 | Are you facing any issues in finding a source of livelihood? | 1. Yes<br>2. No **(goto Q 33)** |
| 33 | If yes, provide details | |
| 34 | Do you have any savings which can be used in case of need? | 1. Yes<br>2. No **(goto Q 35)** |
| 35 | If yes, give an indicative value | |
| 36 | Of the total amount received for your family for UT-1 land procurement, what was your share? | …… Amount |
| 37 | What did you use your share for? | |

| SN | Usage | Yes | No | Remarks |
|---|---|---|---|---|
| a) | Money still remaining in account | 1 | 2 | |
| b) | Used for earthquake relief | 1 | 2 | |
| c) | Used for buying provisions and food for family | 1 | 2 | |
| d) | Used for buying new house/ constructing new house (ask If it was damaged in earthquake) | 1 | 2 | |
| e) | Used for buying new land | 1 | 2 | |
| f) | Medical Expenses | 1 | 2 | |
| g) | Buying utility for Families | 1 | 2 | |
| h) | Payment of Debts | 1 | 2 | |
| i) | Family expenses such as marriage, education etc. | 1 | 2 | |
| j) | Other | 1 | | |

38. What kind of support have you received from the following stakeholders?

| | Kind of Support | Government | UT-1 Project | NGOs | Other (please Specify) |
|---|---|---|---|---|---|
| a) | Land for temporary Housing | 1 | 2 | 3 | 4…… |
| b) | Temporary Housing in IDP Camp | 1 | 2 | 3 | 4…… |

| | | | | | |
|---|---|---|---|---|---|
| c) | Provisions for IDP Camp and Sustenance | 1 | 2 | 3 | 4…… |
| d) | Livelihood Training / Support | 1 | 2 | 3 | 4…… |
| e) | Support for House Reconstruction | 1 | 2 | 3 | 4…… |
| f) | Cash Compensation | 1 | 2 | 3 | 4…… |
| g) | Other (please Specify) | 1 | 2 | 3 | 4…… |

39. Please provide details of cash compensation/ support received in terms of the following

| SN | Aspects | Details |
|---|---|---|
| a) | Amount Received | |
| b) | Purpose of Compensation | |
| c) | Number of Installments paid | |
| d) | Amount yet to be received | |

40. Please provide details of livelihood training / received

| SN | Name of Individual received training | Name of Organization giving Training | Type of Training | Number of Days | Certification (yes/ No) | What did you like about the training | What did you dislike about the training | Was the training useful in terms of developing livelihood |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | 1 2 | | | 1 2 |
| 2 | | | | | 1 2 | | | 1 2 |
| 3 | | | | | 1 2 | | | 1 2 |
| 4 | | | | | 1 2 | | | 1 2 |
| 5 | | | | | 1 2 | | | 1 2 |

| | | | |
|---|---|---|---|
| 41 | In case of Agriculture, provide details of nature of cultivation? | 1. Cultivation on own land in original village<br>2. Cultivation own land in new purchassed residence/ land<br>3. Cultivation on rented land<br>4. Cultivation based on share cropping<br>5. Vegetable farming | |
| 42 | If cultivating on land in original village. Do you wish to rent/purchased land in present residence or purchase land in new location? | 1. Yes<br>2. No **(goto Q 44)** | |
| 43 | If yes, what are the key issues you are facing in renting land/ purchasing land? | | |
| 44 | What was the use of the produce from your land (private and guthi)? | 1. For self-consumption/ consumption by the family/ For storing food for the lean Season<br>2. For selling the produce in the local village ( among HH)<br>3. For selling the produce in the market<br>4. Other (please specify) | |
| | If engaged in Fishing | | |
| 45 | Fishing purpose | 1. Personal Consumption 2. Sale 3. Recreation | |
| 46 | Number of days/ months engaged in fishing per year | .....Days/.....Months | |
| 47 | Does any member of your household migrate out for work? | 1. Yes 2. No **(goto Q 50)** | |
| 48 | If yes, please provide details: | | |
| SN | Name of individual | Type of work | Location |
| 1 | | | |
| 3 | | | |
| 4 | | | |

| | | |
|---|---|---|
| 49 | Has the number of household members, migrating out for work, increased/ decreased since the earthquake | 1. Increased **(goto Q 52)**<br>2. Same<br>3. Decreased **(goto Q 52)** |
| 50 | Please provide reasons for the same | |
| 51 | Has anyone from the family who had earlier migrated out, come back post-earthquake? | 1. Yes<br>2. No |
| 52 | If yes, provide details | |
| 53 | What is the total number of livestock presently owned by the household | |
| SN | Type of livestock | Number of livestock |
| a) | Poultry | |
| b) | Cattle / Bovine | |
| c) | 3 Boar/ Pig | |
| 54 | Has this livestock holding increased or decreased since the earthquake. Please provide details | 1. Increased **(goto Q 57)**<br>2. Decreased |
| 55 | If decreased, then what is the reason for the same and what challenges are you facing | 1……..<br>2…….<br>3……. |

| | |
|---|---|
| 56 | If undertaking daily wage, then please answer the following questions |

| SN | Name of Individual | Type of activity | Location | Distance from residence | Daily Income | Remark |
|---|---|---|---|---|---|---|
| a) | | | | | | |
| b) | | | | | | |
| c) | | | | | | |
| d) | | | | | | |

| | | |
|---|---|---|
| 57 | What are the changes you have witnessed in your living standard, from pre-earthquake and why (compare native village with IDP camp) | 1……<br>2……<br>3…… |

58 What are your present expectations from the UT-1 project in terms of livelihood restoration

| | Present expectations | For Men | | For Women | | For Youth | |
|---|---|---|---|---|---|---|---|
| | | Yes | No | Yes | No | Yes | No |
| a) | Contract opportunity of business | 1 | 2 | 1 | 2 | 1 | 2 |
| b) | Direct employment | 1 | 2 | 1 | 2 | 1 | 2 |
| c) | Cash based support | 1 | 2 | 1 | 2 | 1 | 2 |
| d) | Training with market linkage | 1 | 2 | 1 | 2 | 1 | 2 |
| e) | Wage based work | 1 | 2 | 1 | 2 | 1 | 2 |
| f) | Support/ seed capital for starting some sort of business based on existing skills | 1 | 2 | 1 | 2 | 1 | 2 |
| g) | Other (please specify) | 1 | 2 | 1 | 2 | 1 | 2 |

59 If you have to consider skill/income generating training, then what type of training will you require?

| | Type of skill/income generating training | For Men | | For Women | | For Youth | |
|---|---|---|---|---|---|---|---|
| | | Yes | No | Yes | No | Yes | No |
| a) | Agriculture | 1 | 2 | 1 | 2 | 1 | 2 |
| b) | Dairy | 1 | 2 | 1 | 2 | 1 | 2 |

| | | | | |
|---|---|---|---|---|
| c) | Poultry | 1 2 | 1 2 | 1 2 |
| d) | Piggery/ Boar Farming | 1 2 | 1 2 | 1 2 |
| e) | Business/ Enterprise | 1 2 | 1 2 | 1 2 |
| f) | Driving/ Mechanic | 1 2 | 1 2 | 1 2 |
| g) | Masonry/ Electrician/ Plumbing | 1 2 | 1 2 | 1 2 |
| h) | Other (please specify) | 1 2 | 1 2 | 1 2 |
| 60 | For the livelihood support identified, would you prefer a group level intervention or individual household intervention | | | |
| 61 | According to you, what will be the ideal duration of each training | | | |
| 62 | According to you, what is the ideal location for each training. How far will you be able to travel for the training | | | |
| 63 | What kind of support you will need to undertake the training | | | |
| 64 | Do the women in the household have any specific concerns regarding the livelihood support activities | | | |
| 65 | Do the men in the household have any specific concerns regarding the livelihood support activities | | | |

Annexure G

# Consultations undertaken by ERM during LALRP Update, Upper Trishuli-1

*Meeting – I*

| *Basic details* | |
|---|---|
| **Location: Dhunche** |  |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 12th April 2017 | |
| **Purpose of the visit**: To develop an understanding of the NGOs activities in the area and the key learnings from the same | |

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*Key points Discussed* :

- The NGO undertook livelihood capacity building and training activities in 6 VDCs in the district in 2016. In total approx. 20 trainings have been conducted, some of the key activities undertaken include:
  - Baking and cookery training- aimed at promoting tourism
  - Sherpa training
  - Provision for machines for spice grinding
  - Development of foot trails, dumping pits etc.
  - Seed distribution for mushrooms, herbs
  - Training for ground apple cultivation
  - Provisioning of farming equipments such as sprinklers, pipes etc.
  - Coffee machines for community buildings
  - First aid vet trainings
  - Water mill repair and infrastructure support
  - Tailoring training and provision of sewing machines
  - Training on plumbing and electricity
- They established user committees for each training undertaken
- They tied up with organizations such as Save the Children, UNDP, DFiD, LWF
- However, most of the funding is nearing completion
- Each training was comprised of groups of 20 people each
- The duration of the trainings was kept short, as if the trainings were too long then the locals did not stay to complete the trainings
- The NGO provided accommodation for the duration of the training at the rate of NR 200
- The NGO also provided for travel expenses. If the community members had to walk 1 hour then NR 100 a day was provided. If the training required bus travel, then the same was refunded
- The some of the key learnings are as follows:
  - women groups were better to work with
  - provision of electricity will be essential for the local community carrying forward most of the trainings received
  - the community will also need seed capital (1-5 lakh NR) for kick starting any initiative
  - ideally the seed capital shall be disbursed in 3 instalments
  - user groups of 9-10 individuals should be formed for each activity
  - at least one female should be in an executive position for each user group and of the 9 members, at least 4 should be women

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Manish Singh, Akshita Misra |
| 2. | **NESS**: Madhav Bhatta |
| | **Stakeholder Group:** Manekor representative |
| 3. | **Stakeholder Representatives:** Tshering Dolma |

*Meeting – II*

| *Basic details* | |
|---|---|
| **Location: Dhunche** |  |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 12th April 2017 | |
| **Purpose of the visit**: To develop an understanding of the NGOs activities in the area and the key learnings from the same | |

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*Key points Discussed* :

- the key programs undertaken by the NGO include:
  - Livelihood Promotion Programme
  - Local Governance Community Development Programme
  - Sustainable Action for food security and resilience programme
- The NGO is primarily dependent upon USAID for funding
- Their main communities of interest were those residing in Nuabesi, Bogetitar and Kalikastan
- The NGO also distributed cheques worth 5,000 NR to the residents of the camps to allow them to purchase winter supplies
- In addition to this, the government also provided NR 10,000 as support
- The NGO also provided agricultural support. For Nuabesi and Bogetitar was put in banks and the interest from the same is being used for everyday purposes
- In addition to this, the NGO is supporting in terms of water supply to schools in Sanu Haku, Haku Besi and Thullu Haku
- The NGO also provided livelihood training for 15-20 years old, including tomato farming
- The NGO also provided for a market place for vegetables and producec
- Some of the trainings which should be considered include driving, electrician, mobile repair, mechanical training

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Manish Singh, Akshita Misra |
| 2. | **NESS**: Madhav Bhatta |
| | **Stakeholder Group:** LaCCoS |
| 3. | **Stakeholder Representatives:** Sunil, Shagun |

*Meeting – III*

| *Basic details* | |
|---|---|
| **Location: Kathmandu** | |
| **Project:** UT1- SIMF | |
| District: Kathmandu | |
| Date: 11th May 2017 | |
| **Purpose of the visit**: To develop an understanding of the role played by NGO-Lumanti in Rasuwa district post-earthquake. | |

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*Key point of Discussions*:

- Lumanti has been operating in Rasuwa district for nearly 2 years, with teir office in Laherepahua;
- The key area of work of Lumanti is in Recovery and Reconstruction;
- Lumanti has recently started working on the re-construction of Tamang trail in Rasuwa district and the areas also covers part of Haku VDC;
- Lumanti runs a "Cash for work" programme in the area, such that locals are engaged in the construction activities in lieu of wages;
- Lumanti has also worked in sanitation project in Bogetitar;
- Lumanti personnel reported that there is a high political activity in the project area which sometimes hinders/ interferes with the NGO programmes;
- The development project being carried out in the area have to approved by the Social Welfare Council/ Education Departments at the district level;
- Based on the proposal submitted, there is a District Project Advisory Committee (DPAC) meeting every month with an objective to track the progress of work done;
- In the Rasuwa district, more than 30 cooperatives have been formed, which comprise of nearly 30,000-40,000 women;
- Women focussed trainings on Mushroom Farming Beehive Farming, Cooking Trainings, etc. have been conducted in the district; however there is limited or no coverage of PAFs in these trainings;
- The tailoring trainings given to women did not translate into gainful engagement because of the lack of quality in the product;
- The area is quite widespread and has people staying in remote locations. The sporadic presence of skilled people and their working in isolation because of distance factor are the stumbling blocks for translation of these trainings into full time income generating activities;
- Women should be considered for poultry farming, goat farming trainings, as they want to stay close to their house and this activity helps them manage work and house well;
- Balaju Industrial Area in Kathmandu has various free of cost residential skill training programmes;
- Balaju has defined parameters for selection of candidates for training. The trainings include masonry, electrician, plumbing, drivers, etc.
- UN agencies have started recruiting women as drivers in Nepal.

| *Meeting Attended By* : | |
|---|---|
| 1. | **ERM**: Saumya Srivastava; Akshita Misra and Manish Singh |
| 2. | **NESS**: NA |
| 3. | **Key Informant:** Personnel from NGO Lumanti |

*Meeting – IV*

| *Basic details* | |
|---|---|
| **Location: Dhunche** | |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 13th April 2017 | |
| **Purpose of the visit**: to understand the mandate and role of the NRA and the activities undertaken thus far | |

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*Key points Discussed* :

- The role of the NRA primarily pertains to coordination between the NGOs, government authorities and people in regards to earthquake relief and reconstruction work
- The NRA has to approve the designs for the private and government houses being rebuild as part of the earthquake relief work through its urban development office. This office also provides sample designs. There are a total of 20 designs. Only if the designs are approved is the amount of reconstruction support released
- In the earthquake prone area, the designs are 1 floor while on planes, it is double storeyed
- The NRA undertakes regular meetings with NGOs and INGOs- at least three times in one year
- In addition to this, 3 meetings have been undertaken with the District Coordination Committee
- The NRA Rasuwa, is presently focused on 7 VDCs, namely, Saranthali, Ramche, Ratlam, Gonju, Vridhim, Dailung, Lahare Pahuwa
- The NRA has three implementation units in Dhunche, namely, technical officer, urban development and building construction, and Earthquake Housing and Reconstruction Project. these require daily coordination by the NRA
- Another role of the NRA is for grievance redressal
- The geology report was finished one month ago and first went to the CDO for approval and then has come to this office to NRA for approval
- There are 18 NGOs active in the area of which 6 will be involved in reconstruction, namely, Will Change, Lumanti, Nepal Red Cross, Batas Foundation, Dhurmus Santhali, and Manekor
- The organizations Manekor and LaCCoS are involved in livelihood restoration
- Each NGO has been given a specific area for intervention
- Individual land owners don't come here but come through NGOs or political leader recommendations
- Once the reconstruction is complete, each household has to get a certificate of completion from the government of Nepal
- In the Haku VDC, 803 out of 820 households have been identified for support
- The residents of gogone and tiru will also get replacement land
- Those on Guthi land will get support if they have tenancy certificates, however, there is an issue of payment of taxes
- The Ministry of Local Development prepared a report on the impact of the earthquake, 1-2 months after the earthquake
- A land has been identified in Lahare Pahuwa for resettlement, however it is only 82 ropani and may not be enough
- The NGOs Dhurmus Santhali and Kaduri foundation are undertaking the reconstruction activities.
- The land levelling activities are almost complete
- The households who will get houses in this area are not identified yet, however, vulnerable households will be given preference
- There is a target to build 500 households

| | |
|---|---|
| • Once these houses are ready they will be handed over to the NRA for allocation and handed over to people along with titles for the land and house<br>• This process will be led by the DDC office, and be supported by the NRA<br>• This whole process will take approx. 1.5 years to complete<br>• 35 days before the certificates are issued, the NRA will have to issue a public notice | |
| *Meeting Attended By* : | |
| 1. | **ERM**: Manish Singh, Akshita Misra |
| 2. | **NESS**: Madhav Bhatta<br>**Stakeholder Group:** National Reconstruction Authority |
| 3. | **Stakeholder Representatives:** Rajendra Pakherel (information and documentation officer) |

*Meeting – V*

| *Basic details* | |
|---|---|
| **Location: Dhunche** | |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 5th May 2017 | |
| **Purpose of the visit**: A discussion on the process of grant disbursal for house reconstruction and the role of MoFALD in the same | |

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*Key points Discussed* :

- The Land and revenue department or the Malpot department has a role to play in the process of housing grant allocation and getting the grant for land purchase for those whose present residence has been declared as unsafe
- For the purpose of availing the grant, the following documents are required:
  - Citizenship documentation
  - Bank account details
  - Lal purza
  - Photograph
  - Copy of agreement between gaonpalika and concerned person
- The gaonpalika will have to send the recommendation with the documents
- The grant will be released into the bank account provided, based on the documentation verification

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: |
| 2. | **NESS**: Madhav Bhatta |
| 3. | **Stakeholder Group: Ministry of Federal Affairs and Local Development (MoFALD)** |
| 4 | **Stakeholder Representatives:** NA |

*Meeting – VI*

| *Basic details* | |
|---|---|
| **Location: Dhunche** | |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 5th May 2017 | |
| **Purpose of the visit**: A discussion on the role and key objectives of the agencies and the possibility of associating with them for the LALRP process | |

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*Key points Discussed* :

- The total compensation amount to be paid for house reconstruction is 2.5 lakh NR
- Of this 50,000 is paid as the first instalment, 1.5 lakh as second instalment, 75,000 as third instalment and 25,000 if the family constructs a toilet as well;
- NRA had initially decided to pay the first instalment only to those whose land was identified as safe in the geological report
- This grant can be availed by anyone having at least 2 anna land
- For this, they need to approach the VDC representatives, or now the ward representatives in the gaonpalikas
- For those areas whose land has been declared as unsafe, the government will purchase replacement land for this 2 lakh NR has been identified
- This replacement land shall preferably be private land, depending upon the land owner being willing to sell.
- The problem with government land allocation is that the conversion of the land use will have to be undertaken which is a lengthy process. Furthermore, for the government land allocation the central NRA will have to take a decision. While for the private land either the NRA or the CDO can approve
- So either individuals can take 2 lakh and purchase land themselves, or the government will do it for them
- The land purchase by the government will be done in groups of 10 families. A pilot test of this was done in Khalte
- Extra land is being identified in Saubari, Pairibari and other locations as well
- This land plot identified will also have to accommodate roads, drainage, water supply, electricity supply and places of worship
- Once the final Geological report is out, compensation will paid to the eligible families from Gogone and tiru as well
- The same is the case with the Guthi land tenants, the compensation will be paid only once the geological report is released

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Manish Singh |
| 2. | **NESS**: Madhav Bhatta |
| 3. | **Stakeholder Group: Department of Urban Development & Building Construction (DUDBC)**<br>**Stakeholder Representatives: division chief** |

*Meeting – VII*

| *Basic details* | |
|---|---|
| **Location: Dhunche** | |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 5th May 2017 | |
| **Purpose of the visit**: A discussion on the role and key objectives of the agencies and the possibility of associating with them for the LALRP process | |

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*Key points Discussed* :

- The geological report is presently in draft stage. It identifies the villages of Gogone and Tiru as unfit for inhabitation
- The residents of these villages are thus not considered as eligible for housing grant
- In terms of the eligibility of the Guthi land, the issue is that most do not have tenancy certificates in their names.
- This is so because most have not paid taxes in a number of years and do not have the required documentation
- In acknowledgment of the issues faced in paying taxes, the government is allowing the tenants to apply for tenancy certificates once again. 97 applications have already come in
- For this certificate, a tax of 5000 NR has to be paid by the tenants
- In addition to this, there are also issues where the certificate is in the name of the forefathers and has not been transferred
- In such cases, the tenants need to bring a valid tenancy certificate as well as a documentation by the Gaonpalika representatives, acknowledging the relationship of the tenant with the certificate holder

*Meeting Attended By* :

1. **ERM**: Manish Singh
2. **NESS**: Madhav Bhatta
3. **Stakeholder Group: Land and Revenue Department**
4. **Stakeholder Representatives: Kishan Uppadhayay**

*Meeting – VIII*

| *Basic details* | |
|---|---|
| **Location: Dhunche** | |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 5th May 2017 | |
| **Purpose of the visit**: A discussion on the role and key objectives of the agencies and the possibility of associating with them for the LALRP process | |

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| *Key points Discussed* : | |
|---|---|
| • The veterinary department is already involved in various trainings and support mechanisms such as poultry farming, boar farming and livestock rearing.<br>• In addition to training the department also provides support for households in terms of providing sow pairs for boar farming and chicks for poultry farming<br>• The department is willing and keen to engage with the project and play a part in the LRP and ESTP process<br>• However, the department would appreciate a communication as early as possible, as the department's budgets for the trainings are sanctioned on an annual basis at the beginning of the year itself | |
| *Meeting Attended By* : | |
| 1. | **ERM**: Manish Singh |
| 2. | **NESS**: Madhav Bhatta |
| 3. | **Stakeholder Group: Veterinary Department** |
| 4. | **Stakeholder Representatives: district representative** |

*Meeting – IX*

| *Basic details* | |
|---|---|
| **Location: Dhunche** | |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 12th April 2017 | |
| **Purpose of the visit**: to develop an understanding of the status of geological assessment | |

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*Key points Discussed* :

- According to the preliminary geology report,90% of Haku Besi, Thullu Haku and Sanu Haku are safe for residence
- However, there may be some individual households who would have to move out. For these households, who have alternative house, support of NR 2 lakh will be provided. This is not final though
- The eligibility of Guthi land for this support is being assessed presently
- 90 individuals have submitted requests for converting Guthi land to private land. This is presently in process and a newspaper notification has been issued in this regard
- Once eligible, they will also receive the cash support
- Gogone and Tiru have been most affected by the earthquake
- Overall displacement has been recommended, though an assessment of each individual household is presently underway
- For these households, alternative land has been identified for rehabilitating the residents from these villages.
- However, for the residents to be eligible for this, they should not have any other land than that impacted by the earthquake

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Manish Singh, Akshita Misra |
| 2. | **NESS**: Madhav Bhatta |
| | **Stakeholder Group:** CDO |
| 3. | **Stakeholder Representatives:** Chaumendra Neupaje (CDO, Rasuwa) |

*Meeting – X*

| *Basic details* | |
|---|---|
| **Location: Dhunche** | |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 5th May 2017 | |
| **Purpose of the visit**: A discussion on the role and key objectives of the agencies and the possibility of associating with them for the LALRP process | |

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*Key points Discussed* :

- There are numerous trainings provided by the department which are listed below

| S. | Training Head | Target | Duration | Location | Women | Men | Total Trained |
|---|---|---|---|---|---|---|---|
| 1 | Daka making | 10 | 03 months | Bhorle | 10 | | 10 |
| 2 | Industrial Growth Programme | | | | | | |
| 2.1 | Daka making | 10 | 2 months | Danda gaon | 12 | | 12 |
| 2.2 | Hosiery making | 10 | 45 days | Danda Gaon | 15 | | 15 |
| 2.3 | Hosiery making | 10 | 45 days | Thullu Gaon | 21 | | 21 |
| 2.4 | Daka making | 10 | 2 months | Thullu Gaon | 12 | | 12 |
| 3 | Advanced Entrepreneurship | 20 | | | | | |
| 4 | Shyama Making (conventional Enterprise growth programme) | 10 | 45 days | Syaphru Bazaar | 10 | | 10 |
| 5 | Shyama Making (capacity development and employment programme | 10 | 45 days | Syaphru Bazaar | 15 | | 15 |
| 6 | Youth Entrepreneurship and Industrial Manpower Development Programme | 20 | | | | | |
| 7 | Entrepreneurship Development Training | 20 | 10 days | Syaphru | | | 0 |
| 8 | Specific Training Programme for Earthquake Affected People | 100 | | | | | |
| 8.1 | Sewing and Tailoring | | 3 months | Bogetitar | 12 | | 12 |
| 8.2 | Worker training | | 45 days | Jivjive | 2 | 9 | 11 |
| 8.3 | Mechanic | | 45 days | Bogetitar | | 22 | 22 |
| 8.4 | House wiring | | 45 days | Thambuchet | 3 | 14 | 17 |
| 8.5 | Plumbing | | 45 days | Thambuchet | | 15 | 15 |
| 8.6 | Worker training | | 45 days | Thullu Syaphru | | 15 | 15 |
| 8.7 | Worker training | | 45 days | Ramche | | 10 | 10 |
| 9 | Capacity Development | 16 | | | | | |
| 9.1 | Sewing and knitting training for prison inmates | | 3 months | Dhunche Prison | | 10 | 10 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9.2 | Sewing and knitting training | | 3 months | Dhunche office | 11 | | 11 |
| 9.3 | Nepali handmade paper making | | 2 months | Bogetitar | 8 | 2 | 10 |
| 9.4 | Aaran Improvement and Remission Training | | 15 days | Kalikasthan | 5 | 5 | 10 |
| 9.5 | Jacket making | | 45 days | Itpare | 5 | 9 | 14 |
| 9.6 | Bracelet and Necklace making | | 15 days | Ghaderi danda | 9 | 1 | 10 |

- The trainings are usually one month long and extend from 11 am to 4 pm everyday. Daily allowance was paid to all attending

*Meeting Attended By* :

1. **ERM**: Manish Singh
2. **NESS**: Madhav Bhatta
3. **Stakeholder Group: Cottage Industry Department**
4. **Stakeholder Representatives: Female worker**

*Meeting – XI*

| *Basic details* | |
|---|---|
| **Location: Dhunche** |  |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 5th May 2017 | |
| **Purpose of the visit**: to develop an understanding of the living standards of the community and any specific issues faced by women | |

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*Key points Discussed* :

- There has been a significant change in the community profile in the post-earthquake scenario
- Earlier, women were only involved in household chores and taking care of their farms
- Now atleast one woman from each household is involved in income generation through stone breaking
- Only one person from the group got training for sewing
- The trainings desired by the women include the following:
    - Tailoring, sewing and knitting
    - Poultry farming
    - Livestock (buffalo) farming
    - Boar farming
- The women suggested the following additional support for the trainings identified;
    - Sewing: formulation of self help groups, appointment of one woman as an accountant, helping with procurement of at least one shop near the road for selling the produce, and cash assistance for paying the rent the first few months it takes to stabilize the business
    - Buffalo Farming: assistance in procuring a pair of buffaloes by bearing half the cost, help build the veterinary services already present in the village, set up an arrangement for procuring milk from the village for the project camps and offices;
    - Assistance in setting up a cooperative, but only for sale of milk

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Akshita Misra, Saumya Srivastava, Manish Singh |
| 2. | **NESS**: Sadhuram, Prakash |
| | **Stakeholder Group: Women from Haku VDC** |
| 3. | **Stakeholder Representatives: Dureli B.K, Kamisiya, Aidimaya Tamang, Kami Ghelmo, Yanjimi, Fyanjini, Sanguthi Tamang, Karsang Tamang, Risang Tamang, Abisa Tamang, Srimaya Tamang, Chepu Tamang, Putali Tamang,** |

*Meeting – XII*

| *Basic details* | |
|---|---|
| **Location:** Dhunche |  |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 05-05-2017 | |
| **Purpose of the visit**: To understand the Livelihood and Social Impact of the Project and earthquake from women's perspective | |

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*Key points Discussed* :

The summary of the discussions is provided below :

**Community Profile:** The attendees were women from the Haku VDC from wards Phool Bari, Thulo Haku and Thanku, who were living in Kebutol, Farm Camp and Dhunche after earthquake. The PAFs comprise of Tamang community which has been living in and around Dhunche after earthquake.

**Livelihood Profile of women before earthquake**:

- Sustenance based livelihoods were largely practiced by families prior to earthquake and the role of women was limited to agriculture, livestock and poultry farming
- The women were skilled at making alcohol from excess grains and used to sell the same (nearly 20% households);
- There was practically no exposure to handicrafts, tailoring, knitting etc. and such things were bought from market.

**Livelihood Profile of women after earthquake:**

- The women started engaging in labour work 5-6 months after earthquake when the aid from Government and NGOs started diminishing;
- The women undertaken less effort and skill intensive jobs like stone breaking and unskilled construction labour;
- The women work from 8:00 am to 5 pm earning 400-500 NPR. The women undertake labour work for 5-10 days in a month, in order to balance household responsibilities and work;
- Certain women have been trained on tailoring and knitting skills by NGOs which has ably trained them to manage the needs of the household, but the women have not been able to utilise the skills on a commercial level;
- The women have started undertaking cultivation, either on sharecropping basis near Dhunche, or in their original villages after 6-7 months from earthquake, in case of those PAFs whose land was cultivable.

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Manish Singh, Saumya Srivastava |
| 2. | **NESS**: Madhav Bhattrai, Prakash, Ramesh |
| 3. | **Stakeholder Group:** Women from Haku VDC<br>**Stakeholder Representatives:** Purna Kumari Tamang, Sonam Bhuti Tamang, Lachhi Sangmo Tamang, Mengmar Dolmo Tamang, Nima Yangde Tamang, Kanchi Maya Tamang, Kamisiya Tamang, Chenga Sangmo Tamang, Mendo Tamang |

*Meeting – XIII*

| *Basic details* | |
|---|---|
| **Location: Satbise** |  |
| **Project:** UT1- SIMF | |
| District: Nuwakot | |
| Date: 1st May 2017 | |
| **Purpose of the visit**: to develop an understanding of the living standards of the community and any specific issues faced by women | |

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*Key points Discussed* :

- The locals are primarily from Gogone and Tiru
- Immediately after the earthquake, the community had stayed in Dadagaon for one night, after which they moved to Satbise. All the residents in the Satbise camp are Tamang population
- There was no specific support from the Tamang community or any specific relief support given because they were Tamang. One Lama from Bhutan had however given support in terms of basic provisions
- They chose to stay here as there is a Buddhist Stupa in the immediate vicinity
- Some of the major issues faced by the population in the camp are as follows:
    - Temperature, it is too hot in comparison to Gogone and Tiru
    - They have to pay rent, as the IDP camp is based on private land
    - They have had to discontinue farm based livelihoods. The elders are forced to undertake stone breaking activities
    - Expenses have increased, apart from rent, basic provisions are more expensive.
    - Also, earlier, education and literacy in the community was not very important as the livelihoods were farm based, however now everyone needs education. The fees of schools and hostels is also high
    - The overall space available has also decreased, now the community cannot maintain livestock or vegetable gardens
    - There has also been a discontinuation of some basic traditions of the Tamang community. For instance, earlier, it was traditional for men to elope with a woman, and they would be recognized as married after a period of 4 years. however, now the marriages are done first, in keeping with the Hindu tradition
    - Another change that has occurred in the Tamang community is the change in marriage ages, from 12-13 years to 17-18 years of age
    - Another positive is that alcohol consumption has gone down
    - This camp is very small so did not attract much NGO support
    - Also there was an issue of the community belonging to Rasuwa district, while the camp was located in the Nuwakot district. This was primarily because the NGOs were given specific areas for working
    - Furthermore, some politicians from Bogetitar and Nuabesi, were involved in the beneficiary identification process. This resulted in Satbise not receiving any support in terms of earthquake relief from NGOs
- Crime rate is almost non-existent in the camp as almost everyone is related to each other
- The community would prefer education and tuition support for youth, masonry and electrician training for men and Tamang dress making training and sewing training for women. The project should also assist the community in getting access to agricultural land for farming

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Akshita Misra |
| 2. | **NESS**: Sadhuram, Madhav Bhatta |
| 3. | **Stakeholder Group: Tamang Women**<br>**Stakeholder Representatives: Phool Mayi Ghale, Damay Tamang, Chesang Ghale, Saruyu Ghale, Nema Yang gen, Kanchi Maya Tamang** |

*Basic details*

**Location:** Nuabesi

**Project:** UT1- SIMF

District: Nuwakot

Date: 08-05-2017

**Purpose of the visit**: To understand the Livelihood and Social Impact of the Project and earthquake on PAFs.

*Key points Discussed* :

The summary of the discussions is provided below :

**Community Profile:** The community in Nuabesi camp comprise of PAFs belonging to Tamang population, originally from Gogone, Tiru and Mailung. While there has not been much damage to the houses of PAFs from Mailung, but certain PAFs reported to be staying there in order to avail benefits of the relief activities.

**Place of residence:** The community members were accustomed to living in colder climate on the hills. However, their present place of residence has warmer climate, leading to diseases amongst people and death of livestock. The people originally from Tiru village want to go back to Tiru permanently (a few families have also started cultivation in Tiru), however the risky access to the village and the risk of landslides are major stumbling blocks. The PAFs from Gogone do not want to go back to their original village due to massive destruction caused due to earthquake in their village.

**Livelihood Profile:** The people mentioned that earlier agriculture, livestock and poultry used to be the primary source of livelihood for most of the families but the scenario has changed after earthquake. The people reported that some PAFs have cultivable land remaining in original village but majority of the PAFs are not cultivating it because it takes 5 hours to reach Tiru from Nuabesi. There is lack of land availability for share cropping in Nuabesi and around.

There is limited space for poultry farming in Nuabesi camp and hence only a few households engage in poultry. Piggery is a lucrative livelihood option but lack of space and general dislike of this activity leading to odour and diseases, by community poses limitations on the number of families practicing it. The goats, originally from colder areas (hills) do not survive in warm temperatures and thus a large number of PAFs are not undertaking goat farming. The above arguments explain the shift of livelihood sources of the PAFs in Nuabesi from land based to wage based livelihoods.

**Key Concerns**: While the people were working for road construction of project, there were persistent delays of 2-3 months in payment of wages. People are not sure if the delay in payment was because of NWEDC or local contractors. The people did not approach the NWEDC management as they were unsure about the right people to be approached for registering their concerns.

Furthermore, the people engaged in the road construction activity for NWEDC reported that wages paid were lower than the general wage rates in the area. The labour camp prior to earthquake comprised of labour from other places, which got 600 NPR per day and hence the wages of locals engaged in the project were also normalised; whereas the generally prevalent wage rates at that time were 800-1000 NPR per day.

**Key expectations from project:** The community mentioned the following expectations from project:

- Making proper roads to Tiru
- Business opportunities during construction phase.

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Manish Singh, Akshita Misra, Saumya Srivastava |
| 2. | **NESS:** Ramesh Kumar |
| 3. | **Stakeholder Group:** Residents of Nuabesi IDP camp – Males and Females |

*Meeting – XV*

| *Basic details* | |
|---|---|
| **Location:** Bogetitar |  |
| **Project:** UT1- SIMF | |
| District: Nuwakot | |
| Date: 07-05-2017 | |
| **Purpose of the visit**: To understand the Livelihood and Social Impact of the Project and earthquake on PAFs. | |

*Key points Discussed* :

The summary of discussion is provided below :

**Community Profile:** The attendees belonged to the villages of Gogone and Tiru and most of them have lost land and house in the earthquake of 2015. The PAFs comprise of Tamang community which has been living in Bogetitar after earthquake. The access to their original villages has been destroyed due to the earthquake and takes nearly 4-5 hours on an average. The trail is not fit for women, kids and elderly to travel.

**Place of residence:** The people, originally from Gogone and Tiru have been residing in Bogetitar camp for nearly 2 years. The community members seem to be strongly opinionated that blasting activity undertaken by the project augmented the extent of damage caused to their land and houses by the earthquake. Simultaneously, the community mentioned that there are certain benefits of shifting to Bogetitar, which are mentioned below.

- Proximity to market;
- Access to better school facilities;
- Exposure to a more organised/ urban life.

**Livelihood Profile:** The community reported that prior to earthquake, the people undertook subsistence agriculture and livestock and poultry farming. The major needs of the families were fulfilled within the village and the surplus grains were sold to the neighbouring families in lieu of other utilities.

However, in the new set up, there is no land available for cultivation and the sources of livelihood are wage based labour work. In this set up, majority of the provisions have to be bought from the market. Thus, there in an increase in the income of the household but that has not translated in improvement of living standard of the people as expenditure has also risen significantly.

**Future outlook:** The community reported that their interaction with the migrant labourers staying in the construction camp earlier was positive. There were healthy relations and the influx of labour had boosted sales in the area. In future as well, the community members are hopeful of better business opportunities, in light of influx of migrant labourers.

**Key Concerns**: The people of Bogetitar camp expressed their discontent on the membership of Jan Sarokar Samiti. It has been mentioned that the members of Jan Sarokar Samiti comprise of non PAFs and do not have any representation from the villages of Mailung, Tiru and Gogone. Furthermore, the members of Jan Sarokar Samiti conduct meetings without informing the PAFs and have reportedly got jobs and contract opportunities by UT-1.

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Manish Singh, Akshita Misra, Saumya Srivastava |
| 2. | **NESS:** Ramesh Kumar |
| 3. | **Stakeholder Group:** Residents of Bogetitar IDP Camp – Males and Females |

*Meeting – XVI*

| *Basic details* | |
|---|---|
| **Location: Bogetitar** |  |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 29th April 2017 | |
| **Purpose of the visit**: The impacts from the earthquake | |

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*Key points Discussed* :

- The residents of the camp are mostly from the Gogone and Tiru villages
- Cheku Lama is one of the political leaders of the community and has played an active role in the earthquake relief and rehabilitation activities
- The community has access to the summary of the geological report finding and according to that Gogone and Tiru is not safe for habitation
- The community is thus aware that they need to find an alternative resettlement location, as has been done for the residents of Naubise. The community is liaising with the government departments for the same
- The community has received multiple trainings, primarily focused on masonry and tailoring
- The trainings were not helpful to everyone as it was chosen in a hurried manner and were not of real interest to the recipients
- Another issue faced in the trainings provided is the duration, which was small and only allowed for a basic level training to be provided
- Furthermore, certain skills such as carpentry, though useful in terms of skill are not good for income generation, as the market is not there for the same

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Manish Singh |
| 2. | **NESS**: Ramesh |
| 3. | **Stakeholder Group: Youth Group in Bogetitar** |
| 4. | **Stakeholder Representatives:** Cheku Lama and others |

*Meeting – XVII*

| *Basic details* | |
|---|---|
| **Location: Farm Camp, Dhunche** |  |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 12th April 2017 | |
| **Purpose of the visit**: To understand the Livelihood and Social Impact of the Project and earthquake on PAFs and local community | |

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*Key points Discussed* :

- The Army constructed 32 rooms of 8X15 ft in the area one year ago along with 4 toilets and 4 bathrooms
- Each room also has a solar panel which was given by the Army
- For the time period, the Army is allowing the community to use the rooms till required by the Army
- The construction was undertaken in June, but the rooms were allocated only in September, after the community complained to the CDO.
- One room has been allocated to each family, so there are approx. 8-10 individuals per room;
- However, only those families who were residing in the camp at the time were given rooms. Two families who were not present in the area at the time were not allocated rooms
- Most of the families are from Haku, Thanku and Phoolbari. The families have been visiting their original villages regularly (at least 3 times in a year), and some are undertaking agriculture in the original villages. In some families, 1-2 family members remain in the original village while the others reside in the camp
- Most of the houses in the original village were completely damaged. Those who return to the village reside in temporary sheds
- INGOs are no longer active in the area, most have exited as their budgets got exhausted
- It is the community's understanding that only those with Patta/tenancy certificates will get the NPR 3 lakh for house reconstruction
- This was after the CEO of the reconstruction authority announced in March that even those with the tenancy certificate will get the reconstruction aid;
- The government is presently undertaking an assessment of each house in the village to assess damage from earthquake and the degree of risk associated with residing in the houses again
- The households have received the first instalment of 50,000 NR
- However, some households do not have lal purza or tenancy certificate. Those households have been asked to return the advance amount paid
- Most of the residents in the camp are engaged in stone breaking for income generation, with atleast 2-3 members of the family engaging in the activity
- 4 families have also purchased hens and chickens, one widow was given 1 buffalo by the government
- They want to keep livestock, however cannot keep them in the camp due to lack of space
- They will stay here for a year or two, if they are given rights to the land then they will stay otherwise they will go back to the original village
- The vulnerability in the family is in terms of elderly, women headed households, and physically handicapped

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Manish Singh, Akshita Misra |
| 2. | **NESS**: Madhav Bhatta |
| 3. | **Stakeholder Group:** Local community in Farm Camp, Dhunche<br>**Stakeholder Representatives:** Aidimaya Tamang and others |

*Meeting – XVIII*

| *Basic details* | |
|---|---|
| **Location: Nuabesi** | |
| **Project:** UT1- SIMF | |
| District: Nuwakot | |
| Date: 7th May 2017 | |
| **Purpose of the visit**: To develop an understanding of the role played by NGOs in assisting women to set up business enterprises. | |

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| *Key points*: |
|---|
| A lady from Dandagaon, living near Nuabesi IDP camp has opened a small shop near in a small portion of her shelter, around one month back. The shop serves ready to eat local snacks. The lady has set up the shop on a rented land, which the family also uses for accommodation. The rent for the shop is NRS 500 and the material for the temporary camp has been provided by the NGO, ACF. The electricity is generated through solar panels installed in the shop, which has also been provided by ACF.<br><br>The lady has studied till class 6 and is able to read, write and do basic calculations and hence no handholding was provided on this aspect. She started the shop with an initial investment of NRS 3000 for buying raw material and other ready to eat snacks supplies for 1 month. She earns NRS 250 to 300 per day by selling the snacks. The NGO ACF has supported 7-8 females in the area with infrastructure to set up similar small shops. |

| *Meeting Attended By* : | |
|---|---|
| 1. | **ERM**: Saumya Srivastava |
| 2. | **NESS**: Ramesh |
| 3. | **Key Informant:** Women Entrepreneur from Nuabesi |

*Meeting – XIX*

| *Basic details* | |
|---|---|
| **Location: Nuabesi** | |
| **Project:** UT1- SIMF | |
| District: Nuwakot | |
| Date: 8th May 2017 | |
| **Purpose of the visit**: To develop an understanding of the role played by NGOs in assisting women to set up business enterprises. | |

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| *Key points Discussed* : |
|---|
| • Ujala Pandit, is a local from Naubesi area<br>• She owned a poultry farm and shop prior to the earthquake in her village<br>• Post the earthquake- she set up a Fasal shop and poultry farm in Naubise camp area<br>• She has previous experience in running businesses<br>• She now earns 2000-3000 per day<br>• Her investment is 25000 every 10 days<br>• Husband and wife run the shop together<br>• The shop allows them to earn enough to keep 2 kids in boarding in Kathmandu<br>• The shop also keeps fancy stuff- carom board, and imported stuff<br>• She has around 300 chickens in the poultry farm<br>• She has previous experience in poultry farming and understands issues such as vaccinations and diseases etc<br>• She was one of the first to set up a shop in the area<br>• She does not have competition in the area<br>• She bought shares in Chilime- hasn't sold them- used them as collateral for loan for shop |

| *Meeting Attended By* : | |
|---|---|
| 1. | **ERM**: Akshita Misra |
| 2. | **NESS**: Ramesh |
| | **Stakeholder Group: Women Entrepreneurs** |
| 3. | **Stakeholder Representatives: Ujala Pandit** |

*Meeting – XX*

| *Basic details* | |
|---|---|
| **Location: Khalte, Lahare Pahuwa** |  |
| **Project:** UT1- SIMF | |
| District: Nuwakot | |
| Date: 13th April 2017 | |
| **Purpose of the visit**: understanding the livelihood profile of the community and reconstruction activities | |

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*Key points Discussed* :

- This parcel of land has been identified for rehabilitating the families permanently displaced by the earthquake from the Haku VDC.
- 4 months ago, 17 families from the Nuabesi camp came and started residing here
- These families came here because its government land, and they don't have to pay rent, as opposed to Nuabesi which is private land
- The families migrate to Kathmandu, trishuli and Batar for livelihood
- The families also moved here because levelling work was being undertaken earlier the land was un-habitable
- The Dhurmus Santhali foundation was chosen for the reconstruction of the houses on the land
- The standard design comprises of 2 bhk and 1 toilet
- The vulnerable households will be given priority
- However, this land is only 72 ropani, and approx. 6 annas will be required for each house,
- Since this land can only accommodate approx. 200 households, additional land will have to be identified as the total number of families to be rehabilitated is estimated at 500
- The community also wants a Buddhist temple and school to be built in the premises
- Since the land is close to the river, adequate flood protection and drainage will have to be planned
- Approx. 175 houses are to be reconstructed, of which 100 will be constructed by Kaduri and 75 will be made by Dhurmus Santhali
- There was a public meeting of the local community with the CDO, LDo and representatives of Kaduri and Dhurmus in March
- A total of 803 families are entitled for rehabilitation. However, this is based on a revision of the list of eligible entities. Initially only 753 individuals were identified. This list was disclosed, and then updated after one month
- For the purpose of this survey, a drone camera was used, the funds for which were provided by Japan
- This process was done almost a year ago
- Each lal purza will get one house
- Some families from Kalikastan have bought land in Battar, with financial assistance from Laccos
- The details of the trainings provided is as given below

| Training | Number of People per Batch | Duration per batch | Support Provided to beneficiaries |
|---|---|---|---|
| Poultry Farming | No batch size limitation | 7 days | • Accommodation<br>• Meals |
| Vegetable Farming | No batch size limitation | 7 days | |

| | | | |
|---|---|---|---|
| Driving | ~20 | 21 days | • Travel Allowance based on the following:<br>○ 1 hour of walking: NPR 100<br>○ Bus travel: ticket refund |
| Plumbing | ~20-25 | 390 hours/ 65 days | |
| Masonry | ~25 | 7 days | |
| Electrician | ~20 | 390 hours/ 65 days | |
| Daka Making | ~20-25 | 390 hours/ 65 days | |

- The beneficiaries for the trainings were chosen by the VDC Committee
- However, one major issue with all these trainings is that of market linkage
- Driving is the most preferred training amongst the young men
- Most of the agriculture is presently being undertaken on a share cropping basis, with the rice crop being cultivated on a 50:50 sharing basis. The cultivators get to keep the second crop grown

*Meeting Attended By* :

1. **ERM**: Manish Singh, Akshita Misra
2. **NESS**: Madhav Bhatta
   **Stakeholder Group:** local community at Khalte
3. **Stakeholder Representatives:** Om Singh, Parma Singh Tamang and others

*Meeting – XXI*

| *Basic details* | |
|---|---|
| **Location: Nuabesi** | |
| **Project:** UT1- SIMF | |
| District: Nuwakot | |
| Date: 13th April 2017 | |
| **Purpose of the visit**: to develop an understanding of the IDP camp and the local community dynamics in the same | |

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*Key points Discussed* :

- The restructuring of the administrative structure in the country will result in stronger local administration, as the Gaonpalika's wards will be stronger than the VDCs in the erstwhile set up
- However, how the new structure will be implemented is not completely clear right now
- The project is looking to buy additional land and houses in Mailung
- The land rates in Nuabesi have surged due to the OBOR project, which have resulted in land prices increasing to 50 lakh NR per ropani. It will also serve as the Gaonpalika centre
- This area will thus become an important trade centre as the road will pass through it
- Lumanti is one of the key NGOs active in the area
- Lumanti provided construction labour training, poultry and 200 chicks and piggery training. For women, Lumanti provided vegetable farming training
- However, these trainings were not very useful as it did not result in job creation. However, one factor to be noted was that not everyone wants to work, as they are not used to regular work
- In terms of preferred trainings, electrician courses, driving and mechanical trainings will be best suited for the local community
- Land has also been identified in Khalte for resettlement, this land was identified after repeated meetings with the PMO, NRA office, CDO, LDO and the cabinet

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Manish Singh, Akshita Misra |
| 2. | **NESS**: Madhav Bhatta |
| | **Stakeholder Group:** Key Informant Interview |
| 3. | **Stakeholder Representatives:** Ash Bir Tamang |

*Meeting – XXII*

| *Basic details* | |
|---|---|
| **Location: Nuabesi** |  |
| **Project:** UT1- SIMF | |
| District: Nuwakot | |
| Date: 3rd May 2017 | |
| **Purpose of the visit**: To develop an understanding on the prospects of foreign employment for women in the area | |

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| *Key points*: |
|---|
| Selmayo Ghale presently lives in Khalde with her 4 year old son, while her husband Chandra Man is working in a factory in Malaysia for nearly 2 years. Though Chandra Man started at a salary equivalent to NRS 12000 in Malaysia, he has grown and is earning an amount equivalent to NRS 25000.<br><br>Talking to Selmayo, it was also revealed that Selmayo herself worked in Lebanon for four years from 2010 to 2014. Selmayo got married at the age of 13 years and went to work in Lebanon when she was 16 years old. The amount charged from her by the Manpower Solutions Company (agent) was NRS 60000 in 2010. In Lebanon, she worked as a beautician for 2 years and then found a job as a Nanny and worked there for 2 more years. Her lodging and food expenses were borne by the employer in Lebanon and she could save around 4 lac NRS in four years which she has used for meeting various needs in Nepal. She found the stay is Lebanon very enticing and is planning to go for the next phase of foreign employment when her husband returns back to Nepal, so that there is someone to take care of their son. There is an increasing number of females in the community, who are going for foreign employment opportunities, irrespective of their marital status. |

| *Meeting Attended By* : | |
|---|---|
| 1. | **ERM**: Saumya Srivastava, Manish Singh |
| 2. | **NESS**: Madhav Bhattarai |
| 3. | **Key Informant:** Selmayao Ghale |

*Meeting – XXIII*

| *Basic details* | |
|---|---|
| **Location: Mailung** |  |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 14th April 2017 | |
| **Purpose of the visit**: to develop an understanding of the previous instances of benefits sharing in the area and their willingness to sell their land to the project | |

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*Key points Discussed* :

- The respondents lived in Nuabesi earlier, but have since the last few months moved back to Mailung, after the road repair work was started
- Their land was first bought by the Mailung Hydro power project, the project returned for making houses for 4 families. This has since then been divided into 7 families. The UT-1 project now is looking to buy the houses and land
- The negotiations are presently underway and DUBDC is undertaking surveys
- The residents are willing to sell as the fear the risk of earthquakes and landslides
- According to the information available, this land will be used for storage purposes
- The residents will move to Nuabesi. Trishuli, Battar or Kathmandu, depending upon the compensation paid. The prevalent land rate in the Nuabesi are is 50-60 lakh per NR
- In terms of compensation, the land owners want replacement land of similar value and employment in the project. the men can work as labourers or contractors, while women can work as housekeeping staff or in the kitchen. the land sellers should get priority in employment opportunities
- The residents are primarily petty contractors for the road construction, but for the last few months the work has stopped
- The community is aware that the PDA for the project has been signed, but don't know the details of the same. The PDA details will be disclosed at some point of time
- In keeping with previous experience, the affected area residents should get double shares, while the district residents should get single shares
- However, any resident who permanently leaves the district needs a migration certificate. If you have a migration certificate, you are not eligible for the benefit sharing mechanisms in place
- Upper Tama Kosi and Chilime are good case studies for benefit sharing measures
- Usually 10% of the shares in the project are made available at the district level
- The rural electrification usually occurs within a 500m radius of key project structures such as the intake, tunnel, powerhouse, Headrace tunnel, Shaft, Desander, Desilting chamber etc. 20 units of electricity is provided within this area

*Meeting Attended By* :

| | |
|---|---|
| 1. | **ERM**: Manish Singh, Akshita Misra |
| 2. | **NESS**: Madhav Bhatta |
| | **Stakeholder Group:** Local residents in Mailung |
| 3. | **Stakeholder Representatives:** Amrit Tamang, Phai Ram Tamang, Panch Bahadur Tamang, Lal Bahadur Tamang, Budhi Bahadur Tamang, Dirgha Bahadur Tamang |

*Meeting – XXIV*

| *Basic details* | |
|---|---|
| **Location:** Dhunche |  |
| **Project:** UT1- SIMF | |
| District: Rasuwa | |
| Date: 06-05-2017 | |
| **Purpose of the visit**: To understand the Livelihood and Social Impact of the Project and earthquake on PAFs. | |

*Key points Discussed* :

The summary of the discussions is provided below :

**Community Profile:** The attendees belonged to the Haku Besi VDC from ward numbers 3 and 7 which are Phool Bari and Thulo Haku. The PAFs comprise of Tamang community which has been living in and around Dhunche after earthquake. Dhunche and Haku Besi are on two different sides of the river Trishuli and the time taken to travel to one place form another takes 3 to 5 hours, depending on the age and fitness of the people and weather conditions. Haku VDC comprises of 9 wards, and their details are presented below.

Ward 1 – Mesing;
Ward 2 – Sanu Haku;
Ward 3 – Phool Bari and Haku Besi;
Ward 4, 5, 6 and 7 – Sanu Haku;
Ward 8&9 – Gogone.

The people started searching for safe places to stay near Dhunche after earthquake and eventually found places to settle in camps or temporary shelter in Kebutol, Pradhikaran Camps, Farm Camps, etc. These camps were mostly set up on Government land and did not require them to pay rent. The fear of landslides in Haku kept them in Dhunche for 8-9 months, before they started visiting their original villages again.

**Place of residence:** The people have been residing in and around Dhunche for 2 years but gradually the land owners have started moving to their original place of residence. The general trend in the area presently establishes that the people want to spend time in Dhunche during monsoon season, due to the fear of landslides and stay in Haku Besi otherwise, where a significant number of PAFs have started cultivating their own land.

It has been reported during the consultations that geo technical surveys are being conducted in all the villages and the decision on the final place of residence will be taken on that basis. The major roadblock in shifting back to Haku Besi and Phool Bari for PAFs is the lack of roads between the market (in Dhunche) and their villages.

For the ongoing confusion on housing grant, it was reported that it will be given to only those families whose land will be marked safe based on the study results. It was also highlighted during the consultations that the grant amount proposed is NPR 3 lac, but is not sufficient for the construction of the house design approved to be eligible for the grant.

**Livelihood Practices:** People resumed cultivation in their original land holdings in Haku VDC around the end of 2015 and 2016 beginning, while staying near Dhunche only. However the extent of cultivation was less than the usual, before earthquake.

There have been certain trainings identified by the local people, like masonry, carpentry, etc., which can help them in establishing steady sources of income during these changed circumstances. Haku Youth Society has been formed by the locals of the village staying in Dhunche to coordinate with NGOs in order to facilitate trainings for the locals. OM Nepal

| | |
|---|---|
| has been identified as an NGO which has reportedly agreed to provide training on masonry and carpentry to people such that a daily allowance of Rs 600 and a certificate will be provided to the trainees. The duration of the training has been identified to be 45 days and 30 people from each VDC are planned to be trained in this training programme to be conducted in consonance with OM Nepal. | |
| *Meeting Attended By* : | |
| 1. | **ERM**: Manish Singh, Akshita Misra, Saumya Srivastava |
| 2. | **NESS:** Sadhu Ram Khatri, Madhav Bhattrai |
| 3. | **Stakeholder Group:** Men living near Dhunche in Pradhikaran Camp, Kebutol and Dhunche Bazaar |
| 4. | **Stakeholder Representatives:** Dam Khayal Tamang, Lachhin Tamang, Faisring Tamang, Kami Waiba, Kale Tamang, Upreng Tamang, Ramesh Tamang, Dami Sangbo, Lopsang Tamang |

Annexure H

# Photo Documentation

# Photo-documentation

*Photo 1: Nuabesi IDP Camp*

*Photo 2: Batar IDP Camp*

*Photo 3: Satbesi IDP Camp*

*Photo 4: Farm Camp- Dhunche*

*Photo 5: Khalde IDP Camp*

*Photo 6: Bogetitar IDP Camp*

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Fax: + 91-0124 - 4170301

# Photo-documentation

*Photo 7: small cultivation at IDP Camp, Naubesi*


*Photo 8: Sanitation Facilities at IDP Camp, Bogetitar*

*Photo 9: Water Facilities in Bogetitar IDP Camp*

*Photo 10: IDP Camp Kebutol*

*Photo 11: IDP Camp Kebutol*

*Photo 12: IDP Camp Pradhikaran*

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# Photo-documentation

*Photo 13: Stone Breaking activities in Dhunche*

*Photo 14: Poultry Farming at Nuabesi*

*Photo 15: Goat Farming undertaken in limited space in Nuabesi IDP Camp*

*Photo 16: Weaving Training in progress at the Small and Cottage Industries Board - Dhunche*

*Photo 17: Homestay started by the earthquake affected population, with support from NGOs*

*Photo 18: Landslides near Gogone village as captured in 2017*

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# Photo-documentation

*Photo 19: Consultations with new land owners in Mailung*

*Photo 20: Consultations at Manekor*

*Photo 21: PAF Survey in Bogetitar*

*Photo 22:Local Community Consultation at Farm Camp*

*Photo 23:Group Discussion with Women Group in Dhunche*

*Photo 24: PAF Survey in Dhunche*

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# Photo-documentation

*Photo 25: Resettlement Site identified in Khalte*

*Photo 26: Land Clearance activities being undertaken at Khalte site*

*Photo 27: Proximity of Khalte Site to Trishuli river bank*

*Photo 28: Temporary Accomodation at Khalte Camp*

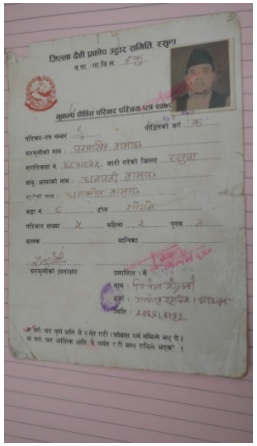

*Photo 29: ID Cards issued to earthquake impacted families by DDRC immediately post earthquake*

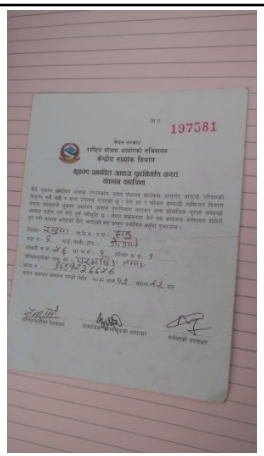


*Photo 30: Second ID Card issued by Central Statistics Department*

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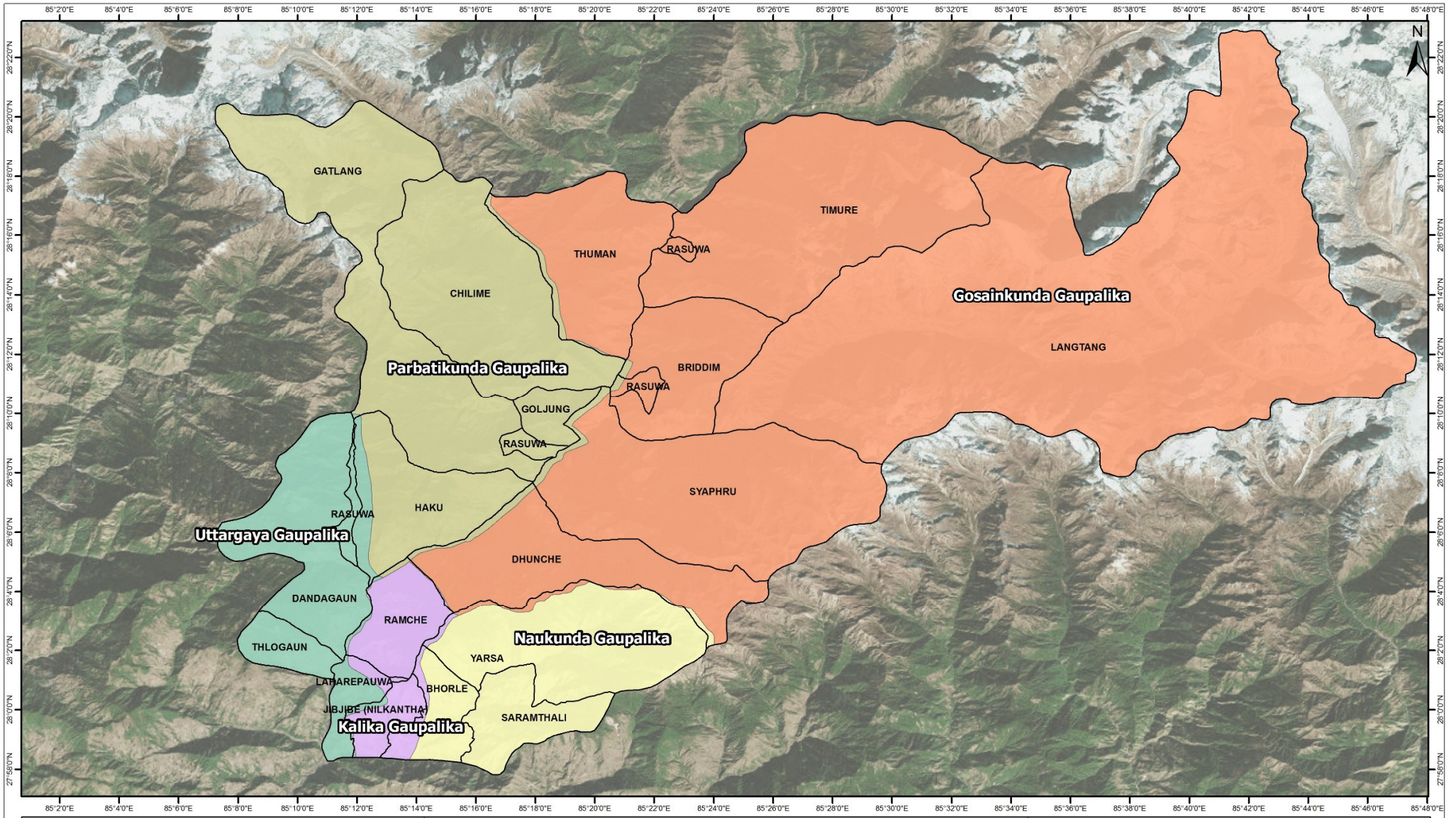


**Legend**

VDCs according to old administrative structure

**Gaupalika**

- Gosainkunda Gaupalika
- Kalika Gaupalika
- Naukunda Gaupalika
- Uttargaya Gaupalika
- Parbatikunda Gaupalika

# Change in administrative boundary in Area of Interet (AOI)

**Scale:**

0 5 10 20

Kilometers

**Data Source:**

Service Layer Credits:Esri, HERE, DeLorme,Intermap,Increment P Corp, GEBCO, USGS, FAO, NPS,NRCAN,GeoBase, IGN,Kadaster NL, Ordnance Survey, Esri Japan,METI,Esri China (Hong Kong),swisstopo, Mapmyindia, OpenStreetMap contributors and the GIS user community
Projection: WGS 1984

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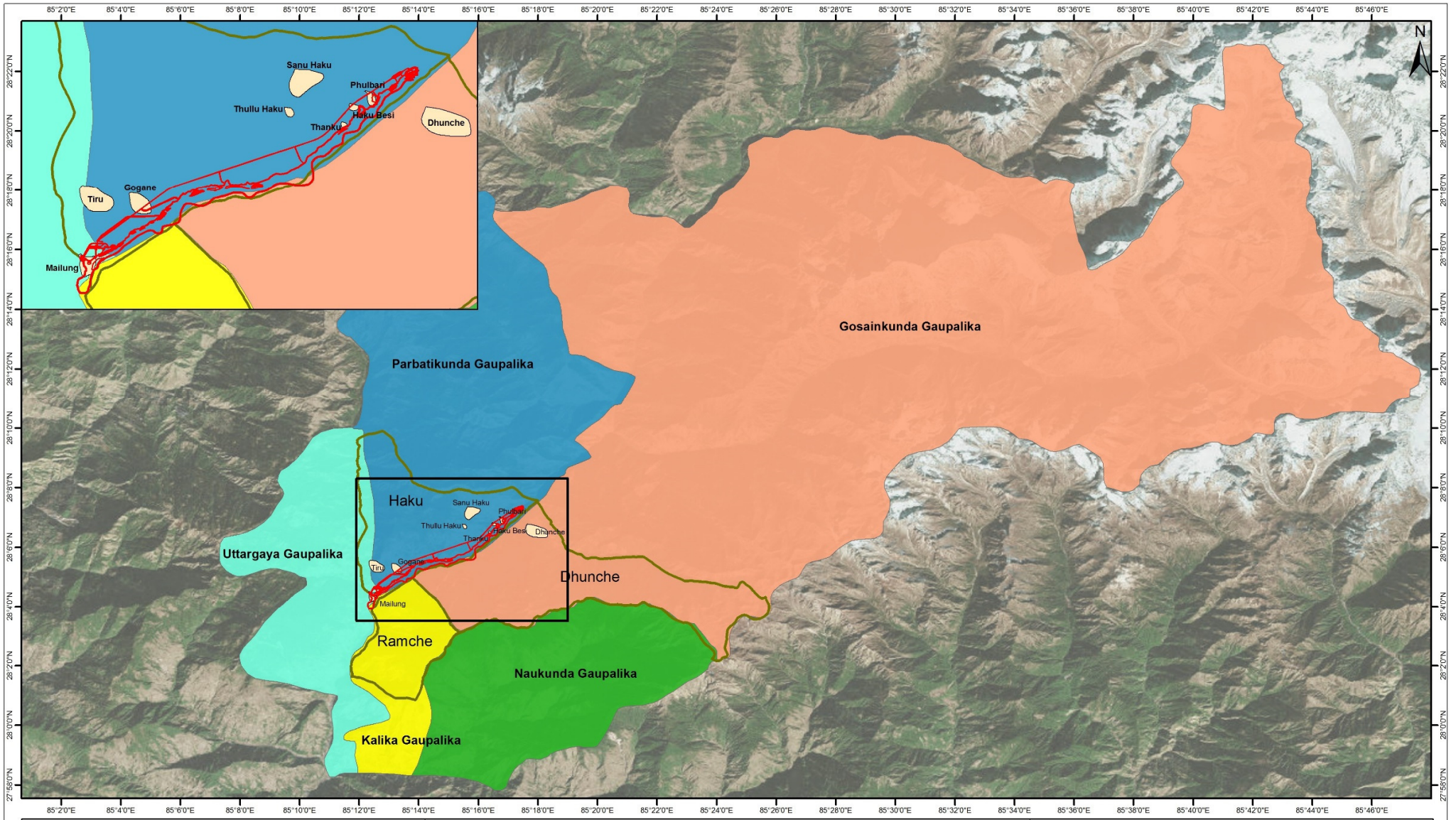


**Legend**

- Project Layout
- Impacted Villages
- VDCs according to old administrative structure

## Change in administrative boundary in Area of Interet (AOI)

**Scale:**

0 5 10 20

Kilometers

**Data Source:**

Service Layer Credits:Esri, HERE, DeLorme,Intermap,Increment P Corp, GEBCO, USGS, FAO, NPS,NRCAN,GeoBase, IGN,Kadaster NL, Ordnance Survey, Esri Japan,METI,Esri China (Hong Kong),swisstopo, Mapmyindia, OpenStreetMap contributors and the GIS user community
Projection: WGS 1984

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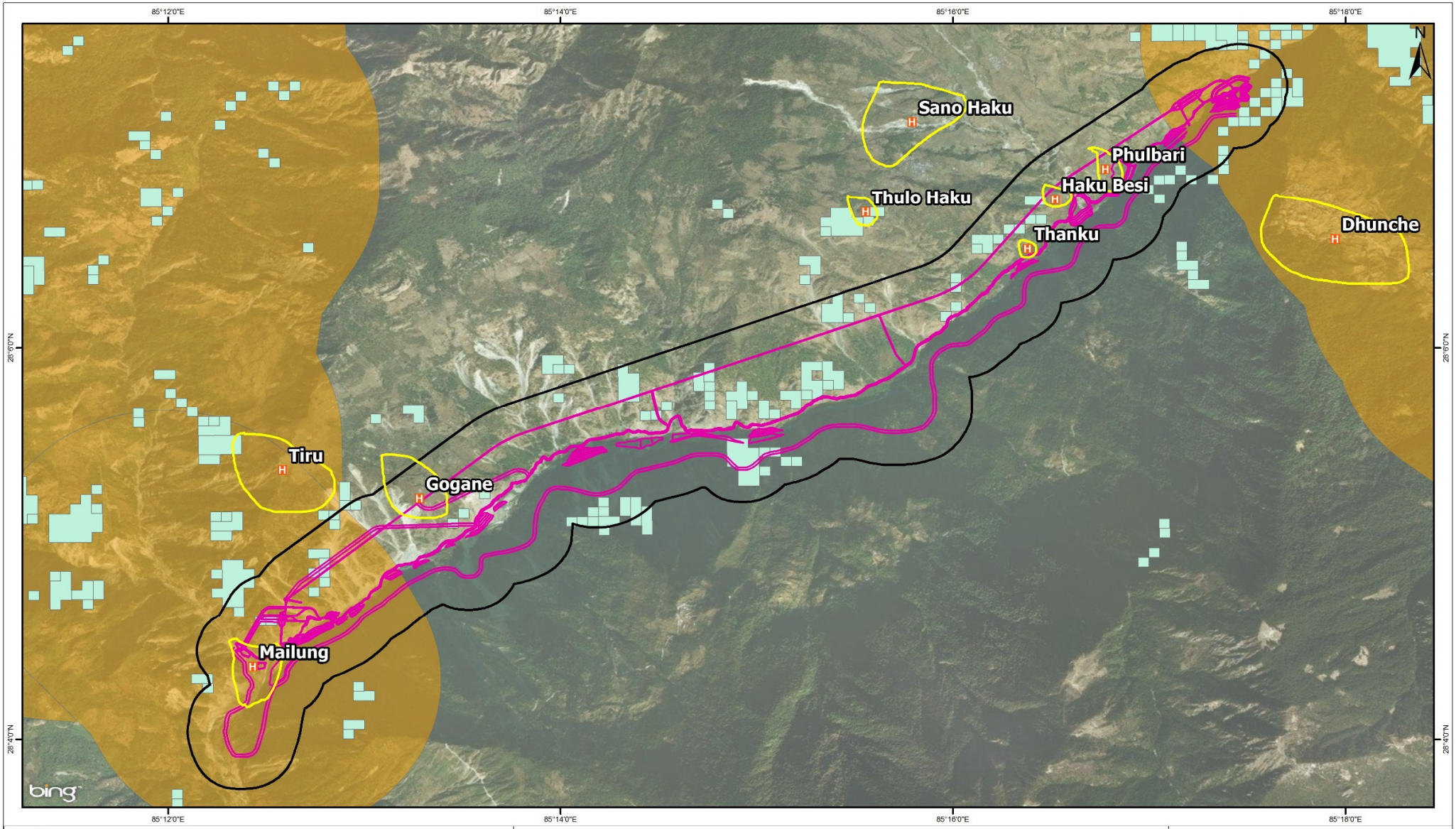


**Legend**

- Approximate Settlement
- Project Layout
- 300m Buffer around Project Layout
- Existing Landslides
- Potential Hazard Areas

# Recorded Landslides and Risk areas in Project Vicinity

**Scale:**

0 0.5 1 2
Kilometers

**Data Source:**

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Projection: WGS_984_UTM_ Zone_45N

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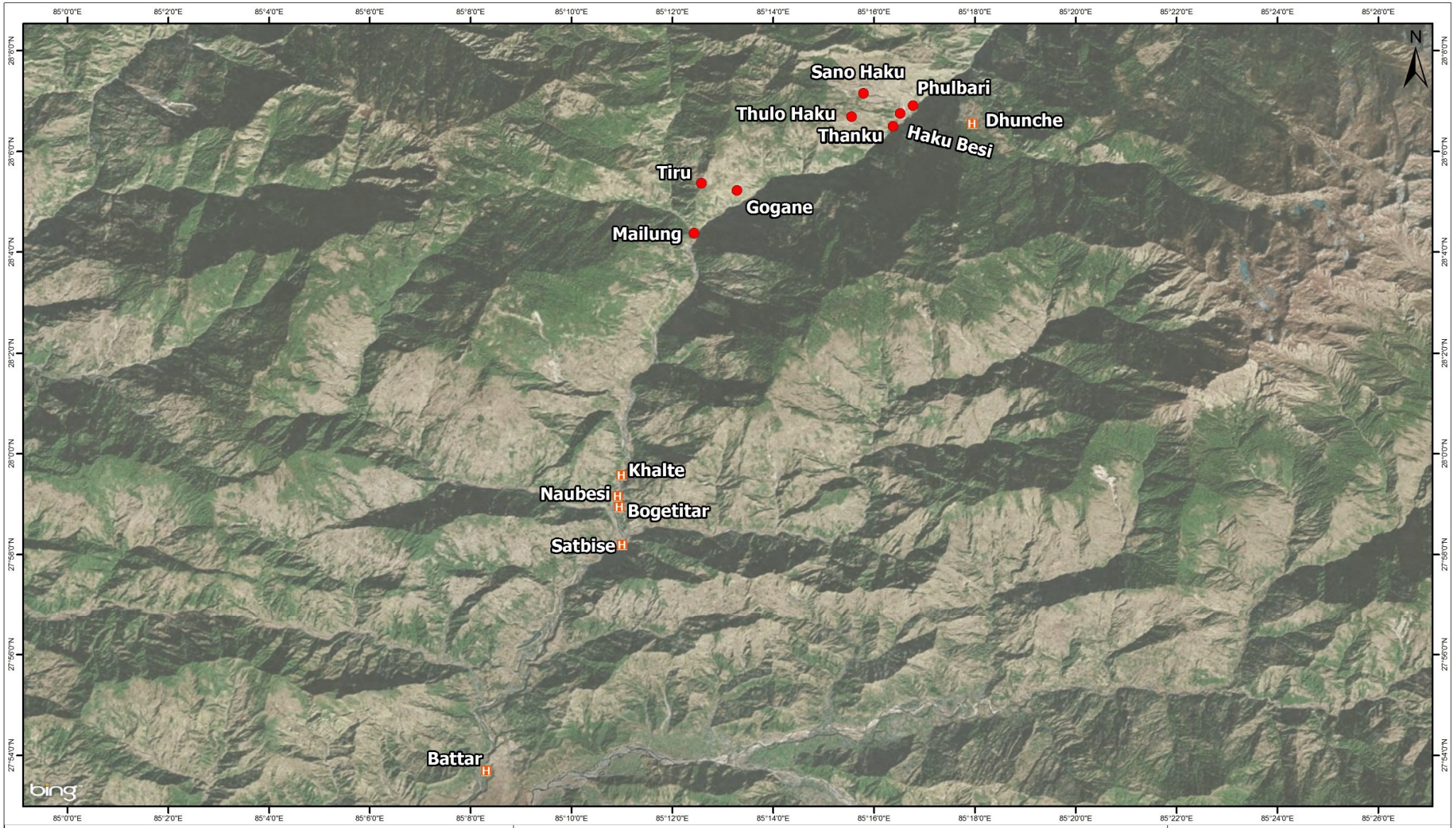


**Legend**

- Original Settlements
- H Settlements Post Earthquake

# Geographical Spread of PAFs- Pre Earthquake and Post Earthquake

**Scale:**

0 2.25 4.5 9
Kilometers

**Data Source:**

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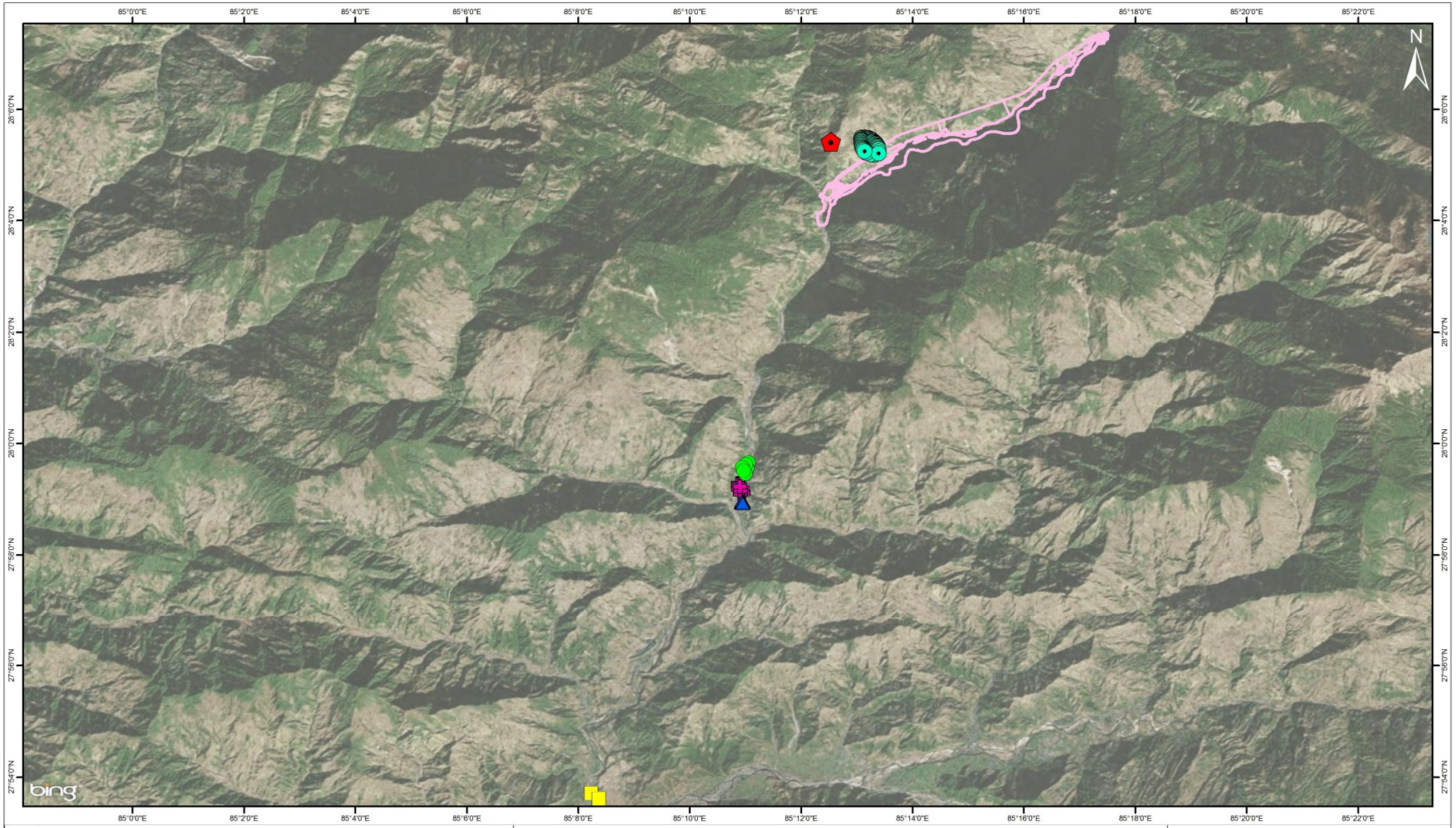


**Legend**

- Initial Settlements in Gogone (41)
- Settlements Relocated to Battar (2)
- Settlements Relocated to Bogetitar (20)
- Settlements Relocated to Khalte (6)
- Settlements Relocated to Naubesi (9)
- Settlements Relocated toTiru (1)
- Project Layout

# Dispersal of PAFs from Gogone to IDP Camps

**Scale:**

0 2 4 8
Kilometers

**Data Source:**

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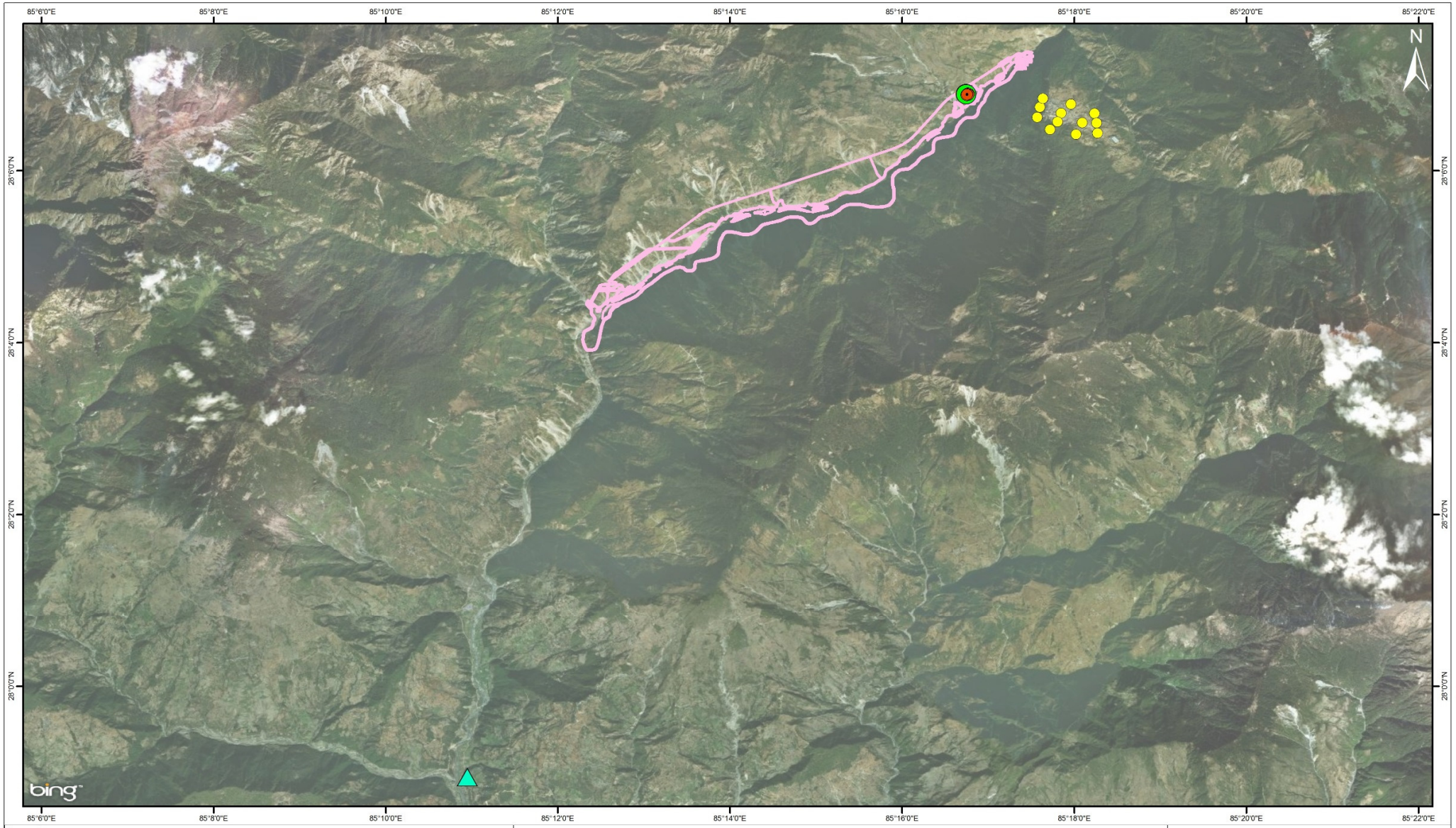


**Legend**

- Initial Settlements in Haku Besi (30)
- Settlements Relocated to Haku Besi (2)
- Settlements Relocated to Dhunche (12)
- Settlements Relocated to Bogetitar (1)
- Project Layout

# Dispersal of PAFs from Haku Besi to IDP Camps

**Scale:**

0 1.25 2.5 5
Kilometers

**Data Source:**

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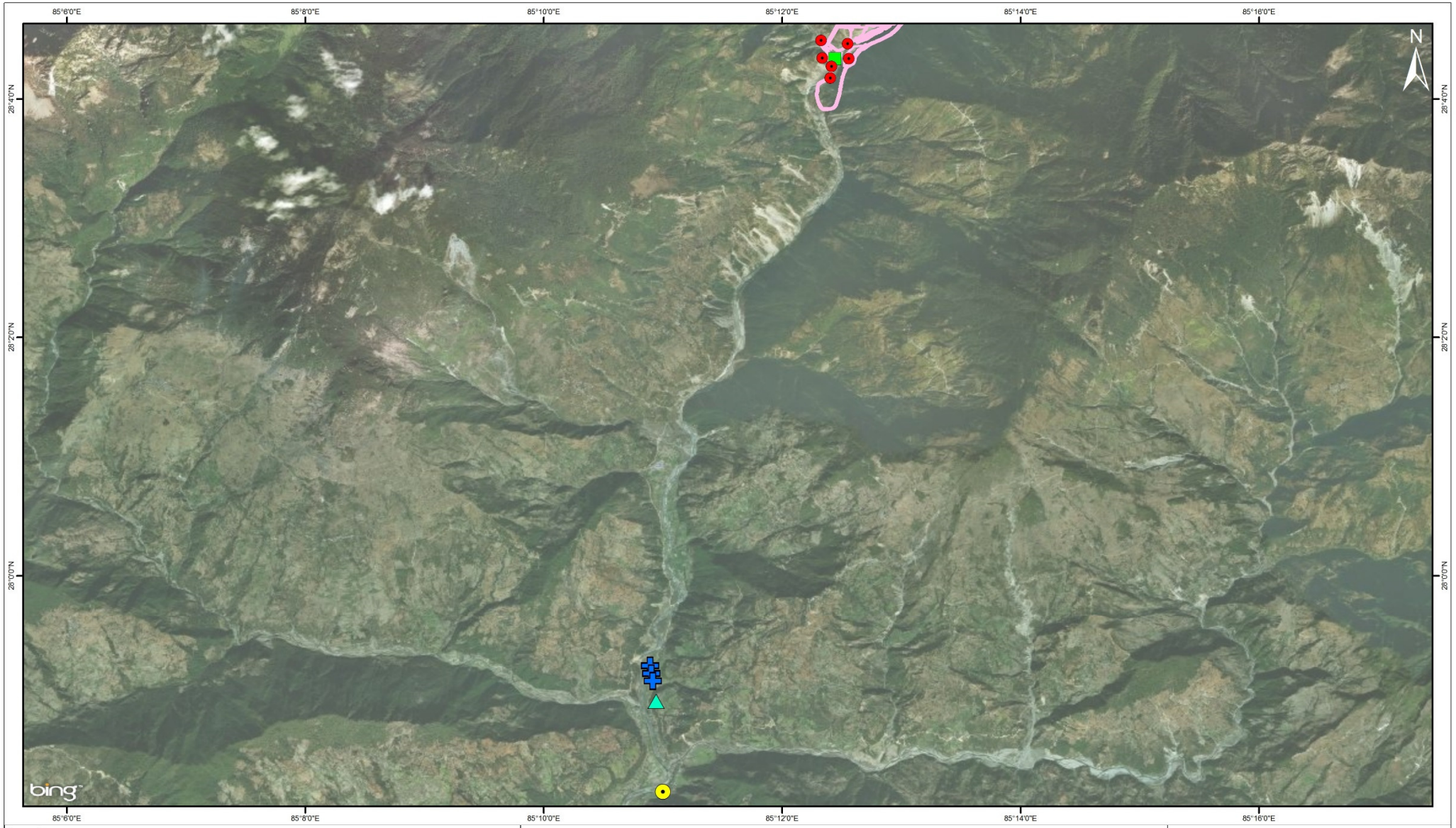


**Legend**

- Initial Settlements in Mailung (6)
- Settlements Relocated to Naubesi (3)
- Settlements Relocated to Bogetitar (1)
- Settlements Relocated to Satbise (1)
- Settlements Relocated to Mailung (1)
- Project Layout

# Dispersal of PAFs from Mailung to IDP Camps

**Scale:**

0 1 2 4
Kilometers

**Data Source:**

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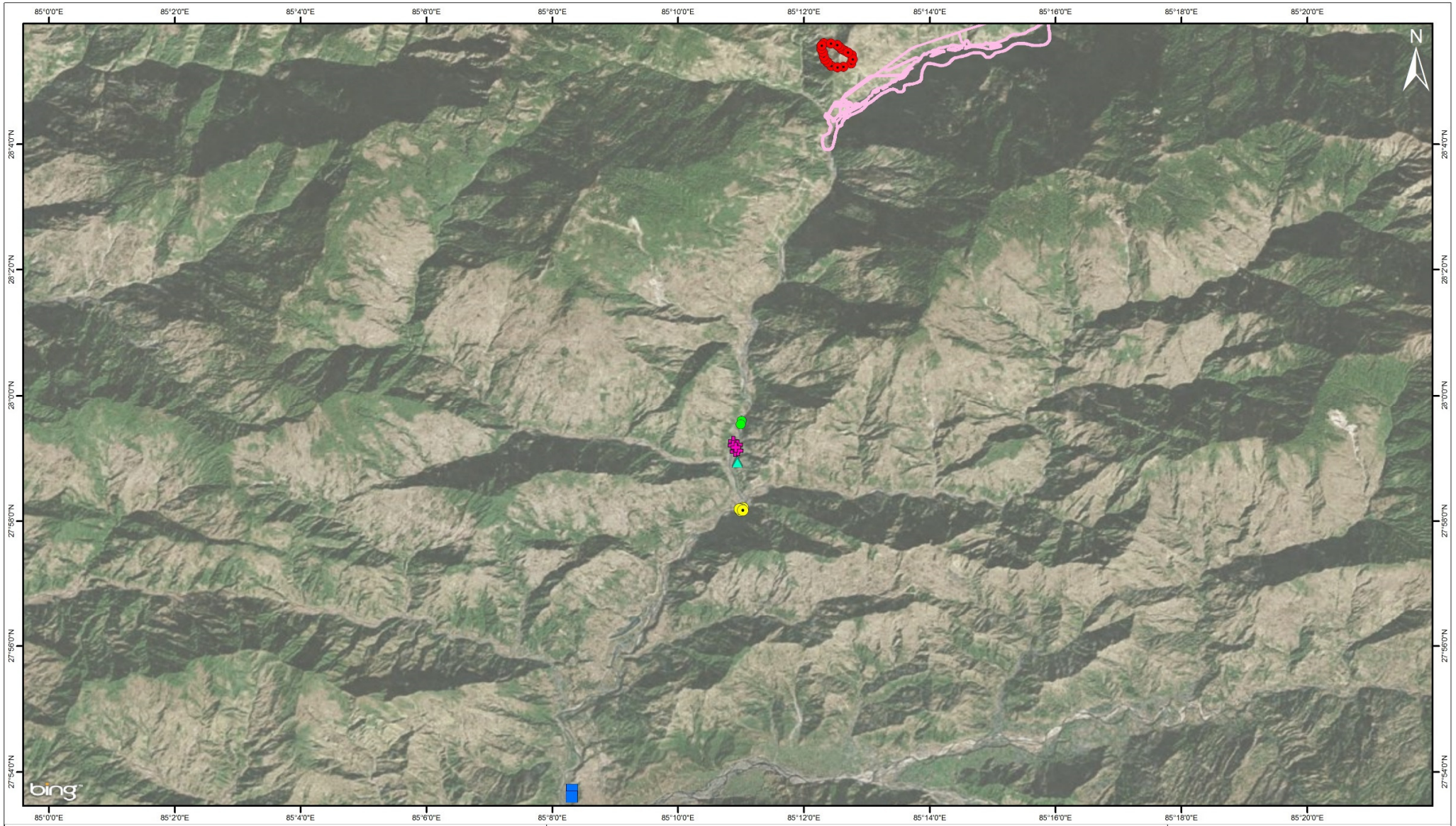


**Legend**

- Initial Settlements in Tiru (19)
- Settlements Relocated to Battar (2)
- Settlements Relocated to Bogetitar (2)
- Settlements Relocated to Khalte (2)
- Settlements Relocated to Naubesi (6)
- Settlements Relocated to Satbise (5)
- Project Layout

# Dispersal of PAFs from Tiru to IDP Camps

**Scale:**

0 1.75 3.5 7

Kilometers

**Data Source:**

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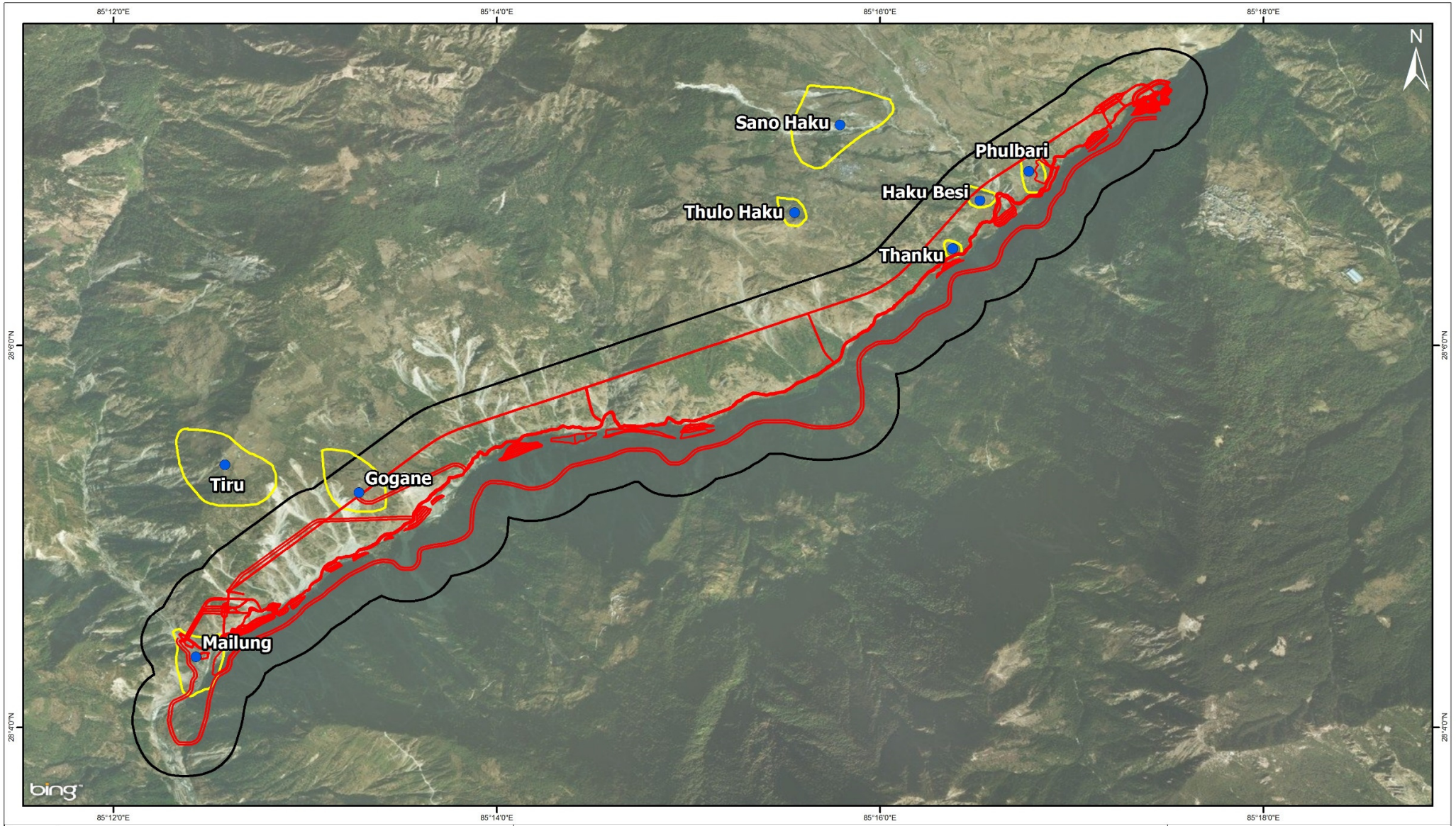


**Legend**

- Settlement
- Project Layout
- 300m Buffer

## Settlements in Vicinity of Project Footprint

**Scale:**

0 0.5 1 2
Kilometers

**Data Source:**

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Projection: WGS_984_UTM_ Zone_45N

**Environmental Resources Management**

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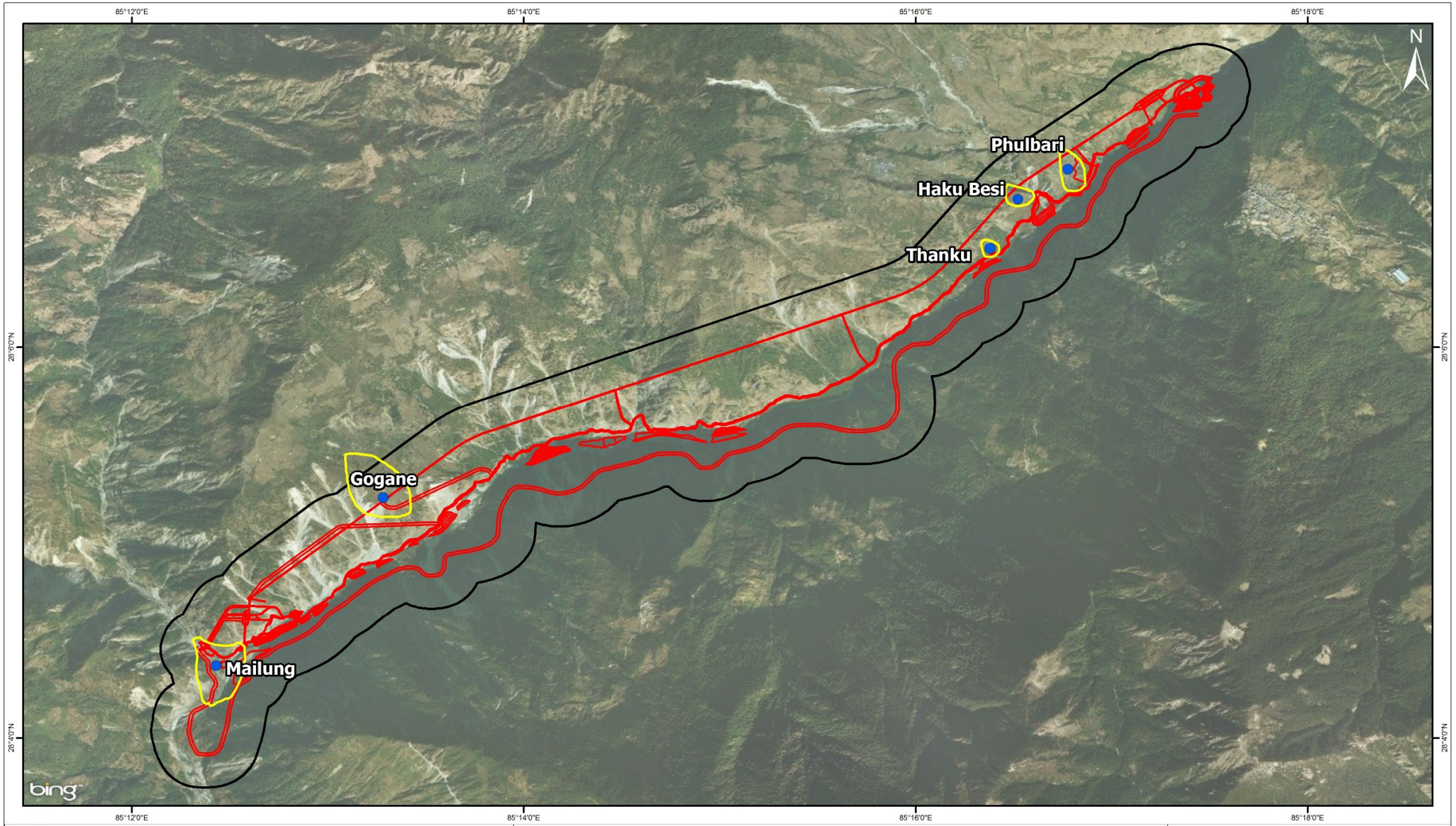


**Legend**

- Project Layout
- 300m buffer around Project Layout
- Settlements within 300m of Project Layout

## Settlements within 300m of Project Footprint

**Scale:**

0 0.5 1 2
Kilometers

**Data Source:**

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Projection: WGS_984_UTM_ Zone_45N

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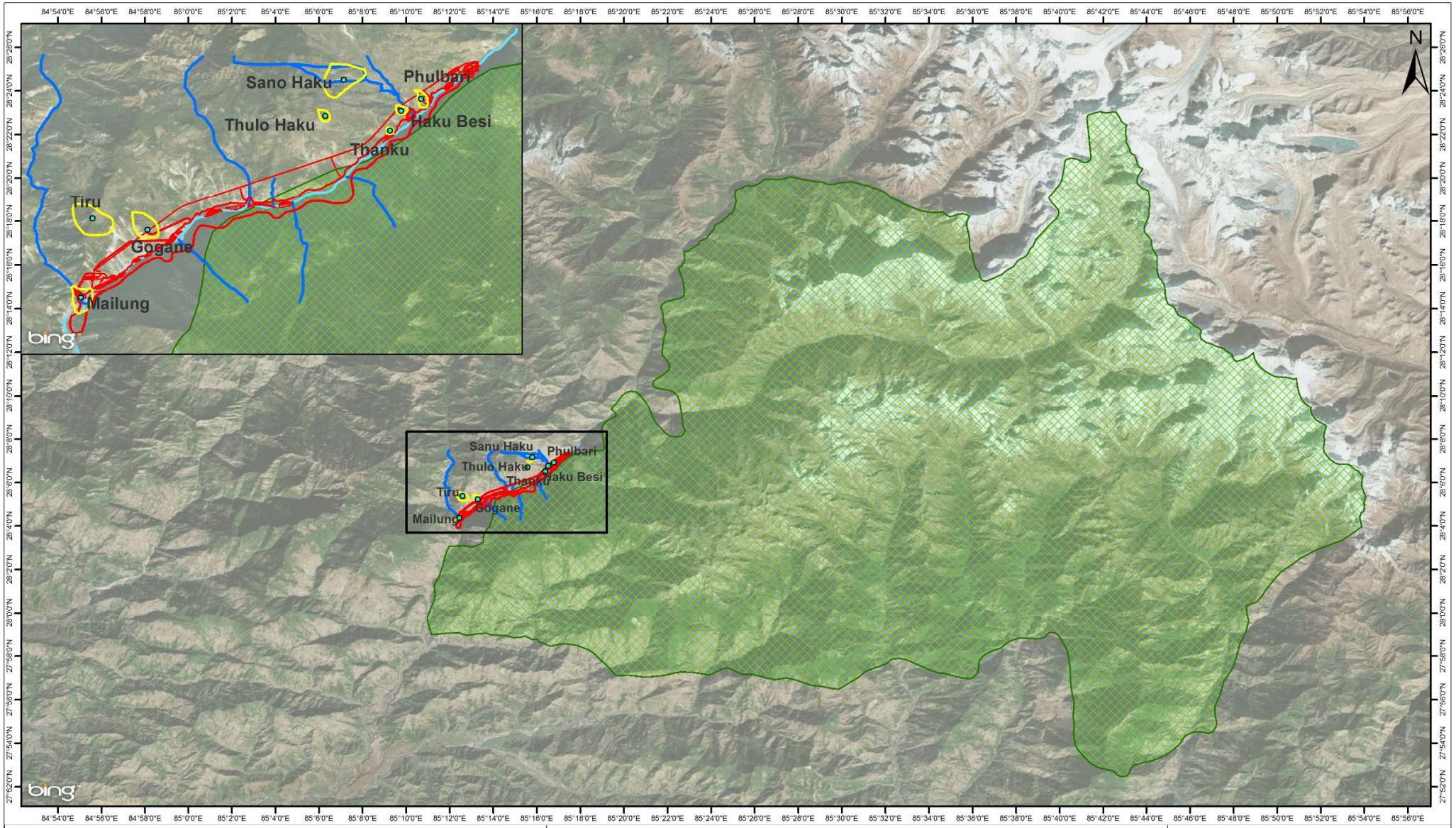


Legend

- Settlement
- Project Layout
- Streams
- Langtang National Park
- Trishuli River

# Ecological Sensitivity Map

Scale:

0 5 10 20

Kilometers

Data Source:

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Environmental Resources Management

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Annex I

# List of References and Studies Undertaken

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- Deformation of Earth's Surface from Nepal Quake, NASA- ARIA

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# *Appendix C*
# *Flora within the Environmental Area of Influence*

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# FLORA WITHIN THE ENVIRONMENTAL AREA OF INFLUENCE

## Table 1: Tree Species

| SN | Scientific name | Nepali name |
|---|---|---|
| 1 | *Aesandra butyracea* | Chiuri |
| 2 | *Albizia chinensis* | Kalo siris |
| 3 | *Alnus nepalensis* | Utis |
| 4 | *Bauhinia purpurea* | Tankee |
| 5 | *Boehmeria rugulosa* | Dar |
| 6 | *Bombax ceiba* | Simal |
| 7 | *Callicarpa arborea* | Maas Gedaa |
| 8 | *Cassia fistula* | Raajbriksha |
| 9 | *Castanopsis indica* | Dhalne katus |
| 10 | *Cinnamomum spp.* | Sinkaulee |
| 11 | *Engelhardia spicata* | Mauwa |
| 12 | *Ficus semicordata* | Khanayo |
| 13 | *Lagerstroemia* spp. | Asare |
| 14 | *Lyonia ovalifolia* | Angeri |
| 15 | *Machilus duthiei* | Kaulo |
| 16 | *Mallotus* spp. | Sindure |
| 17 | *Mangifera indica* | Aanp |
| 18 | *Melia azadirach* | Bakainu |
| 19 | *Myrica esculenta* | Kafal |
| 20 | *Phyllanthus emblica* | Amala |
| 21 | *Pinus roxburghii* | Rani sallo |
| 22 | *Populus ciliata* | Bhote pipal |
| 23 | *Rhododendron arboreum* | Lali gurans |
| 24 | *Rhus wallichii* | Bhalayo |
| 25 | *Salix spp.* | |
| 26 | *Schima wallichii* | Chilaune |
| 27 | *Shorea robusta* | Sal |
| 28 | *Symplocos pyrifolia* | Seti kath |
| 29 | *Syzygium cumini* | Jamun |
| 30 | *Terminalia alata* | Saaj |
| 31 | *Toona ciliata* | Tunee |
| 32 | *Unidentified 1* | Maletro |
| 33 | *Unidentified 2 (Araliaceaea)* | |
| 34 | *Unidentified 5* | Dipath (Tamang) |
| 35 | *Unidentified Rosaceae* | |

## Table 2: Shrub Species

| SN | Scientific name | Nepali name |
|---|---|---|
| 1 | *Achyranthes aspera* | Datiwan |
| 2 | *Agave americana* | Ketuki |
| 3 | *Ageratina adenophora* | Banmara |
| 4 | *Berberis asiatica* | Chutro |
| 5 | *Boehmeria platyphylla* | Kamle |
| 6 | *Chromolaena odorata* | Aule banmara |
| 7 | *Clerodondron serratum* | |
| 8 | *Colebrookia oppositifolia* | Dhusure |
| 9 | *Cotoneaster microphyllus* | |
| 10 | *Desmodium tiliaefolium* | Rato bakre ghans |
| 11 | *Euphorbia royleana* | Siundee |
| 12 | *Gaultheria fragrantissima* | Dhasingare |
| 13 | *Hypericum cordifolium* | Areli |
| 14 | *Indigofera constricta* | |
| 15 | *Indigofera dosua* | Phusre ghans |
| 16 | *Inula cappa* | Gaitihare |
| 17 | *Lonicera quinquelocularis* | Bangjhi |
| 18 | *Maesa chisia* | Bilauni |
| 19 | *Mimosa* spp. | |
| 20 | *Murraya paniculata* | |
| 21 | *Osbeckia stellata* | Rato chulsi |
| 22 | *Osyris wightiana* | Nun Dhicki |
| 23 | *Oxyspora paniculata* | |
| 24 | *Phyllanthus parvifolius* | Khareto |
| 25 | *Prinsepia utilis* | Dhatelo |
| 26 | *Rhamnus virgatus* | Kande painyu |
| 27 | *Rubia manjith* | Majitho |
| 28 | *Rubus ellipticus* | Ainselu |
| 29 | *Rubus foliolosus* | Kalo ainselu |
| 30 | *Sarcococca coriacea* | Fiti fiya |
| 31 | *Senna occidentalis* | Thulo Tapre |
| 32 | *Senna tora* | Tapre |
| 33 | *Solanum aculeatissimum* | Kantakaari |
| 34 | *Viburnum erubescens* | Ganmane |
| 35 | *Woodfordia fruticosa* | Dhainyaro |
| 36 | *Zanthoxylum acanthopodium* | Boke timmur |
| 37 | *Unidentified 4 (Urticaceae)* | |

## 6 Table 6.2-5: Herb Species Report from the Environmental Area of Influence

| SN | Scientific name | Nepali name |
|---|---|---|
| 1 | *Ageratum conyzoides* | Gandhe |
| 2 | *Amaranthus spinosus* | Lunde kanda |
| 3 | *Arisaema concinnum* | Sarpa ko makai |
| 4 | *Arisaema tortuosum* | Sarpa ko makai |
| 5 | *Artemisia vulgaris* | Titepati |
| 6 | *Arthraxon lancifolius* | Chitre bans |
| 7 | *Arundinaria* spp. | |
| 8 | *Arundinella nepalensis* | Phurke Khar |
| 9 | *Begonia picta* | Magar kanche |
| 10 | *Bidens pilosa* | Tikhe kuro |
| 11 | *Boenninghausenia albiflora* | Daampate |
| 12 | *Brachiaria ramosa* | Likhe Banso |
| 13 | *Calanthe puberula* | |
| 14 | *Carex cruciata* | Lamo hat katuwa |
| 15 | *Cheilanthes* spp. | |
| 16 | *Chrysopogon gryllus* | Dhaple ghans |
| 17 | *Cissampelos pareira* | Batul pate |
| 18 | *Clematis spp.* | |
| 19 | *Commelina benghalensis* | Kane |
| 20 | *Crassocephalum crepidioides* | Anikale jhar |
| 21 | *Curcuma angustifolia* | Kalo besar |
| 22 | *Cynodon dactylon* | Dubo |
| 23 | *Cynoglossum zeylanicum* | Kanike kuro |
| 24 | *Cyperus niveus* | Seto mothe |
| 25 | *Delphinium altissimum* | Bikhadi ghans |
| 26 | *Dicranopteris linearis* | |
| 27 | *Dioscorea bulbifera* | Gitthe tarul |
| 28 | *Dioscorea deltoidea* | Bhyakur tarul |
| 29 | *Drepanostachyum falcatum* | Sano nigalo |
| 30 | *Dryoathyrium* spp. | Kalo neuro |
| 31 | *Dryopteris chrysoc*oma | |
| 32 | *Eulaliopsis binata* | Babiyo |
| 33 | *Fragaria nubicola* | Bhuin ainselu |
| 34 | *Galium asperuloides* | |
| 35 | *Geranium nepalense* | |
| 36 | *Girardinia diversifolia* | Allo sisnu |
| 37 | *Hedychium ellipticum* | Rato saro |
| 38 | *Impatiens amplexicaulis* | Tiuree |
| 39 | *Imperata cylindrica* | Siru |
| 40 | *Ipoemea* spp. | |
| 41 | *Iris decora* | Padam pushkar |
| 42 | *Leucostegia immersa* | |
| 43 | *Lindelofia longiflora* | |
| 44 | *Malaxis muscifera* | |
| 45 | *Mentha* spp. | |
| 46 | *Murdannia edulis* | Nigale gava |
| 47 | *Nephrolepis cordifolia* | Paniamala |
| 48 | *Oleandra wallichii* | |
| 48 | *Onychium* spp. | |
| 50 | *Osbeckia stellate* | Rato chulsi |
| 51 | *Persicaria* spp. | |

| SN | Scientific name | Nepali name |
|---|---|---|
| 52 | *Phyllanthus urinaria* | Bhuin amala |
| 53 | *Polypodium* spp. | |
| 54 | *Polystichum prescottianum* | |
| 55 | *Pteris* spp. | |
| 56 | *Saccharum spontaneum* | Kans |
| 57 | *Satyrium nepalense* | |
| 58 | *Selaginella* spp. | |
| 59 | *Selinum tenuifolium* | Bhutkesh |
| 60 | *Sida* spp. | |
| 61 | *Spilanthus acmella* | Marati |
| 62 | *Thalictrum foliolosum* | Dampate |
| 63 | *Thalictrum punduanum* | Dampate |
| 64 | *Thalictrum spp.* | |
| 65 | *Thysanolaena maxima* | Amreso |
| 66 | *Unidentified 3 (Poaceae)* | |
| 67 | *Urena lobate* | Nalu kuro |
| 68 | *Urtica dioica* | Sisnu |
| 69 | *Xanthium strumarium* | Bhende kuro |

7

*Appendix D*
*Design Advice on Fish Ladder and Associated Spillway Designs at the UT-1 Hydropower Project*

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SWECO

REPORT

# NWEDC

NEPAL WATER & ENERGY DEVELOPMENT COMPANY

**Upper Trishuli-1**

14685001

## Design Advice on Fish Ladder and Associated Spillway Designs at the Upper Trisuli-1 Hydropower Project

JANUARY 2018

**Sweco Norway AS**

DEPARTMENT OF ENVIRONMENT

**HALVARD KAASA**

# REPORT

| Report no.: | Project no.: | Date: |
|---|---|---|
| 4 | 14685001 | January 2018 |
| **Client:** NWEDC | | |

## Design Advice on Fish Ladder and Associated Spillway Designs at the Upper Trisuli-1 Hydropower Project

This report describes the design advice on fish ladder and associated spillway at the UT-1 intake site, and as requested by NWEDC the report give comments to other challenges connected to the UT-1 HP development and to the river connectivity.

| **NWEDC comments 19th of January 2018** | **Report revised 29th of January 2018** |
|---|---|
| **Created by:** Halvard Kaasa | **Sign:**  |
| **Project responsible / dept.:** Sweco Norway AS | **Manager approval:** Karel Grootjans |

## Content



Attachments

1) Fish Ladder- conceptual design, Sweco, 26.04.2017
2) Illustration of overflow trough flapped gates

# 1 Introduction

The 216 MW upper Trishuli-1 Hydropower Project is located in the Rashuwa District of Nepal. It is a run-of-the-river project, and the developer is the Nepal Water & Energy Development Company Private Limited (NWEDC).

As a part of the process to ensure compliance of the Upper Trishuli-1 Hydropower Project (UT-1HPP) with Nepal national regulations and the IFC's Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Resources, NWEDC are required to build a fish passage across the intake weir.
This report gives comments and recommendations for technical solutions to keep river connectivity when the UT-1 is in operation.

# 2 Conditions for design

## A) Fish species

The overall dominat species in the UT-1 area of Trisuli is Asala (Shizothorax richardsonii). Shizothorax progastus per the EIA with recordings from 2011, and a report from DoFD from 2008/2009, has been detected in the area of UT-1 for 6 and 9 years ago.
In the agreement between NWEDC and Sweco Norge AS it is clearly mentioned that the fish ladder design shall be accommodated for the target species Shizothorax richardsonii and also for the Shizothorax progastus if this species is present in the area.
The last years S. progastus is not registered during field studies connected to the environmental program of UT-1.
Normally S.progastus has its preferred biotopes in lower altitudes (300 -850 m above sea level) and in warmer waters than at UT1. It might therefore be a possible explanation that S.progastus can be observed in the UT-1 area in varying degree depending of ecological conditions as water temperature, flow and population size. Another important measure might be the possibilities of upstream migrating obstacles as the cross-section dam at UT3A just downstream the UT-1 area. This UT3A dam site has been without a fish ladder the last years, but a fish ladder is planned to be built. Information given by NWEDC indicate that there is another HP planed just upstream of UT-1 Called UT-2 HEP that shall be developed with a cross section dam and a fish ladder.

As discussed with NWEDC the design of the fish ladder for UT-1 will be with focus on Shizothorax richardsonii and, as last years of registrations show, not accommodated for S. progastus.

**B) Flow through the fish ladder**

In this report, the fish ladder flow proposal interplay with the NWEDC minimum release proposal that is 10% of mean monthly flow which mean a little bit less than 4 $m^3/s$ during the spring season (UT-1 Detail Design Report 2017). On that basis, the flow in the fish ladder will approximately be 1 $m^3/s$ and with additional attraction water to the entrance of the fish ladder of 1 $m^3/s$. This mean that the total flow connected to the fish ladder entrance is approximately 50% of the minimum flow. The rest of the e-flow that will be released from the head pond, shall flow into the pool at the entrance of the fish ladder. From an ecological point of view the fish ladder do not need to be operated during the period when there is now upstream fish migration in the UT-1 area.

**C) Available space**

The space along the riverside downstream the dam is per information from NWEDC restricted and there is not available area to prepare a nature liker fish way. Due to the height of the dam and the available space there is need to design a compact fish ladder.

# 3 The fish ladder principles

The fish ladder shall mainly serve the upstream migration of the target species Snow Trout (Shizothorax richardsonii). The total height of the fish ladder will be approximately 30 m. The exact height will be decided when the design of the fish ladder entrance pool is settled. To meet the requirements for migration of Snow Trout the total number of pools will be close to 100.

## 3.1 The entrance pool outside the fish ladder

In principle, the entrance pool just outside the fish ladder shall be attractive for Snow Trout. Substantial flow and spurt of water are qualities needed to attract this species. Approximately 50% of the proposed minimum flow will enter the pool from the fish ladder. Rest of the e-flow passing from the head pond shall also enter the pool outside the fish ladder. See figure 1.

The conditions in the pool outside the fish ladder entrance is crucial for the functionality of the fish ladder.

A. The conditions in the river up to the outlet from the fish ladder must be adapted to the behaviour of the migrating fish species during the whole upstream fish migrating season.
B. The fish ladder entrance pool shall be situated close to the upper part of the fish migrating section.
C. Water velocity in the pool where water passing outside of the entrance of pool no 1, shall be no more than 0,3m - 0,6 m/s during the upstream migrating period.
D. The pool shall be equipped with some hiding-places for fish
E. The depth outside the entrance of the fish ladder shall be at least 2m.
F. If needed this pool shall be sheltered from high flows and high current velocities originated from the spillway and from the radial gates. This to prevent damage on the fish ladder entrance and to avoid bad conditions for fish.

## 3.2 Fish ladder pool no 1

The pool no 1 is 5m x 4,3 m and the inside height is 2,5 m (see Figure no 1 and the enclosed drawings in attachment 1).
The outlet from the chamber has two vertical slots with the ability to let trough 1,5 $m^3/s$ with highest water velocity of 1m/s and that the step between water level in the outside pool and in the chamber no 1 is between 0,20 – 0,25 m dependent of the flow variations. The width of the openings is 0,6 m (Figure 2).

At the bottom of the chamber there shall be constructed hiding places for Shizothoracx richardsonii, where they can hide during daytime. These hiding places should be possible to cleane for sediments if needed.

Attraction water shall be added at the top of the concrete roof that is covering chamber 1 and 2. (see Figure 4). Water shall fall from the 5 m wide front of the distributor bay and hit the water surface just outside the vertical slot entrance. Attraction water shall also enter Pool no 1 trough pipes in the concrete roof. The total amount of attraction water added shall be approximately the same flow as in the fish ladder. See figure 1 and attached drawing of the fish ladder entrance (Attachment 1).

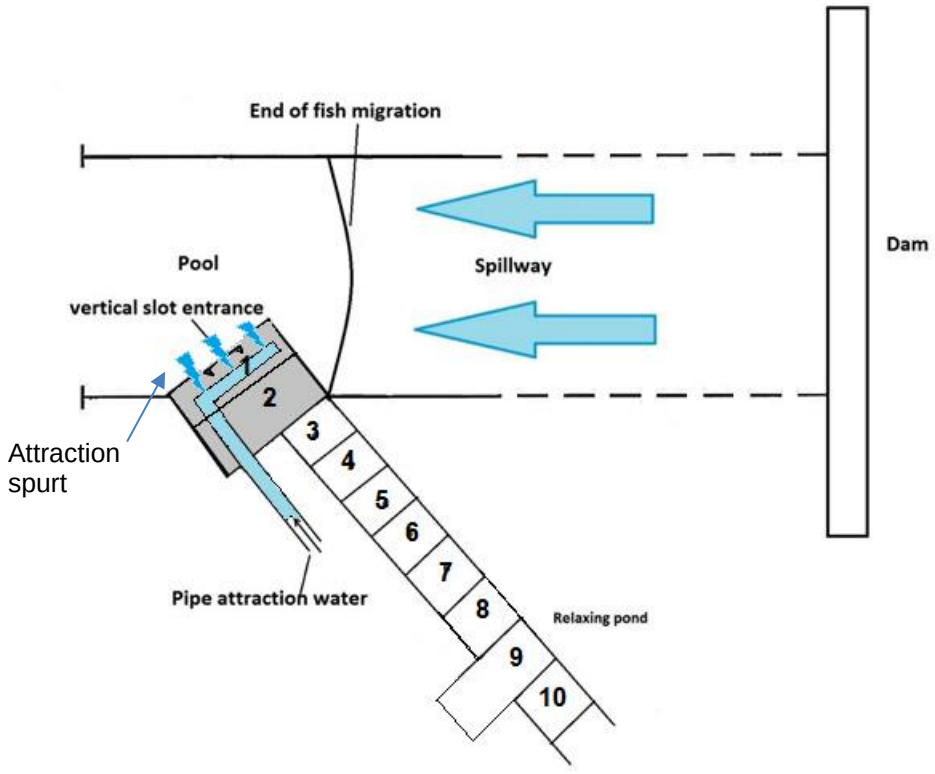


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*Fig. 1 The principal of the fish ladder entrance.*

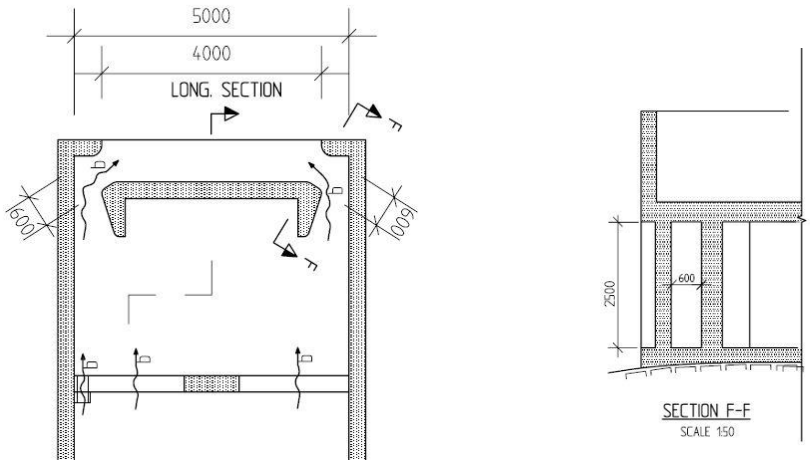



*Figure 2. Transekt including vertical slots*

### 3.3 Fish ladder pool no 2

The pool no 2 is 5m x 3 m and the inside height is 2,5 m. Here are two notches in the front wall to slow down the water velocity, see figure 3. The water velocity shall be below 1,5m/s and the step between chamber 1 and chamber 2 shall be between 0,23 – 0,27 m dependent of the flow variations.
There is an orifice at the right side and close to the bottom of 0,2m x 0,2 m that is possible for fish to enter and also serve as a drainage of the upstream chamber.

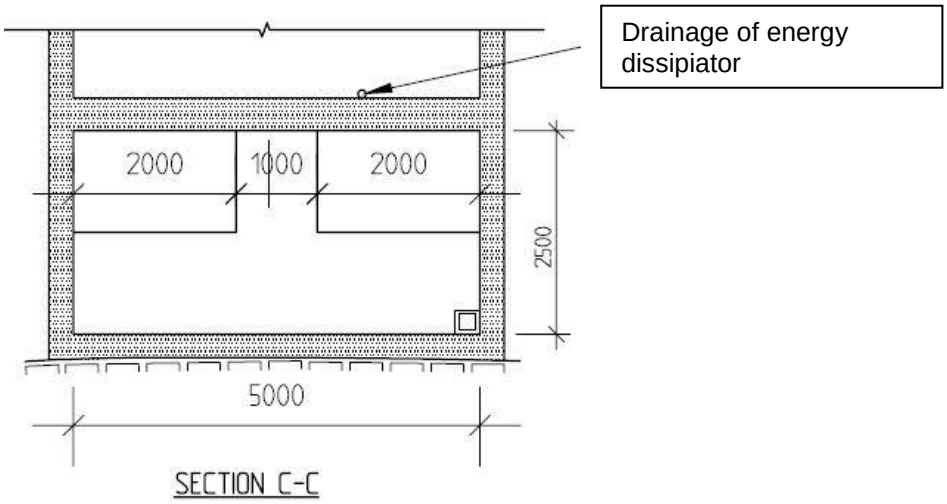



*Fig. 3 Outlet from pool no 2 have 2 overflow notches.*

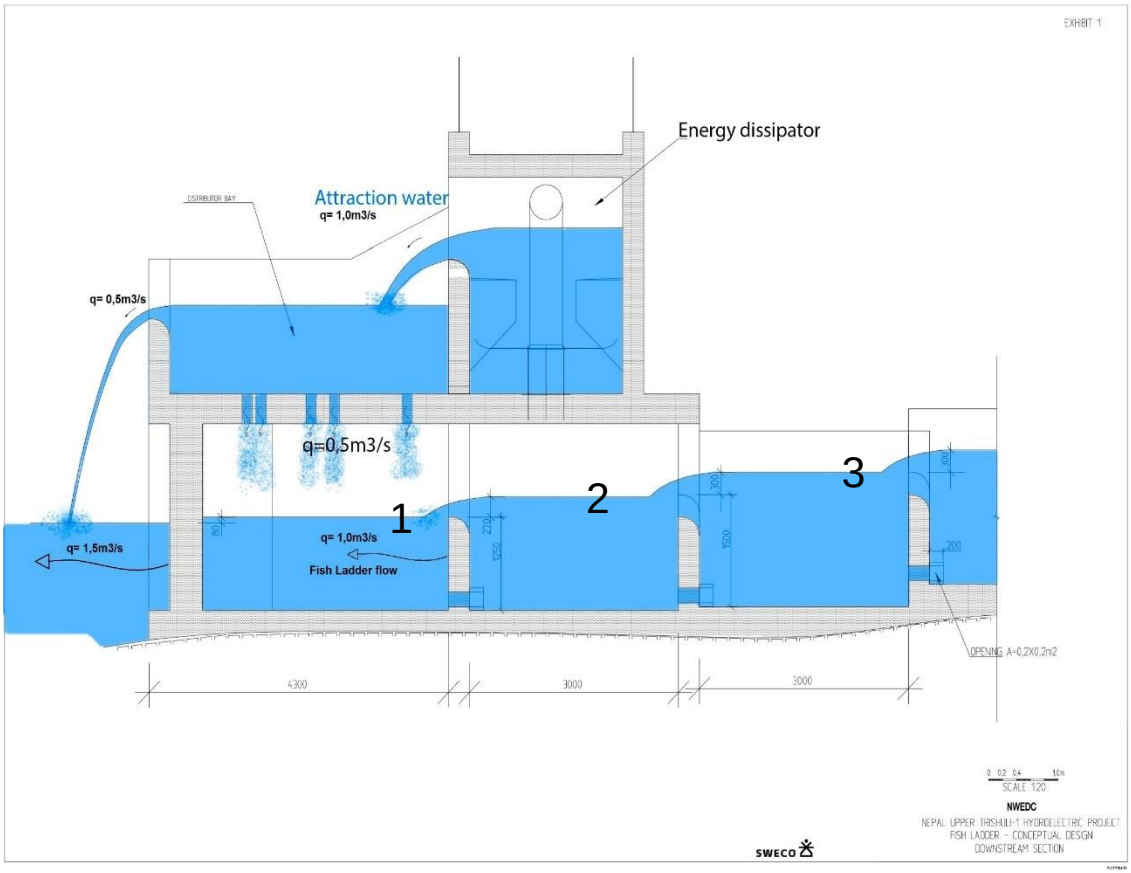



*Figure 4. The 3 first fish ladder pools, the attraction water energy dissipiator as well as visualization of the distribution of the attraction water in front of pool no 1 and also direct to pool no 1.*

## 3.4 Fish ladder pool no 3 to 8

The pool no 3 to no 8 is 4 m x 3 m with inside height of 2,5 m. Here is one notch in the front wall as shown in Figue 5. The design gives good hydraulic conditions for Snow Trout (Shizothorax richardsonii) with flow up to 1m$^3$/s. In the front wall in each pool it is an orifice close to the bottom of 0,2m x 0,2 m that is possible for fish to enter, and that also serve as a drainage of the upstream chamber. Maximum velocity trough the overflow notch shall be 2m/s. The step between the overflow notch to the water level downstream shall be approximately 0,3m (see figure 3), and the notch alters between right and left position se Figure 6.

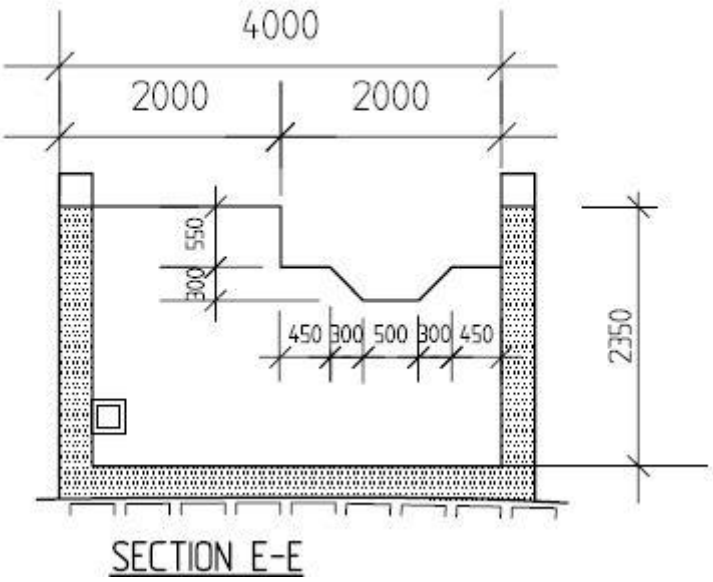



*Figure 5 The outlet from fish ladder pool no 3 to no 8 has a notch designed to give good hydraulic conditions with flow up to 1m³/s. This notch is alternating right and left as moving upstream.*

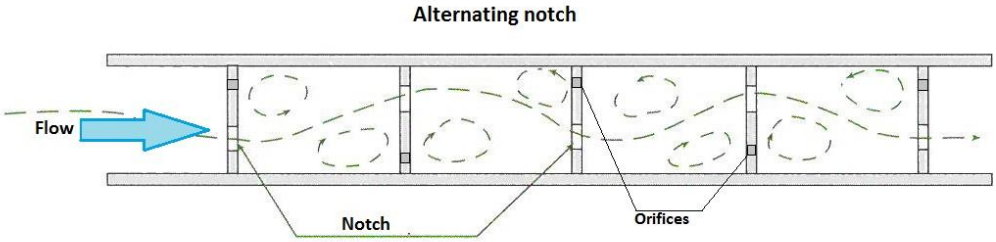



*Figure 6 Principal of altering notches in a fish ladder*

### 3.5 Fish ladder pool no 9

The fish ladder pool no 9 is a resting pool of 5 x 4m and inside height 2,5 m see Figure 1. The inlet and outlet notches of this chamber is as in chamber nr 3 to 8. See figure 5 and 7. At the bottom of the chamber there shall be constructed hiding places for Shizothoracx richardsonii. This hiding places must be constructed so as it is possible to clean the pool for sediments. This type of resting pools shall be repeated upstream in the fish ladder with 6 normal pools in-between.

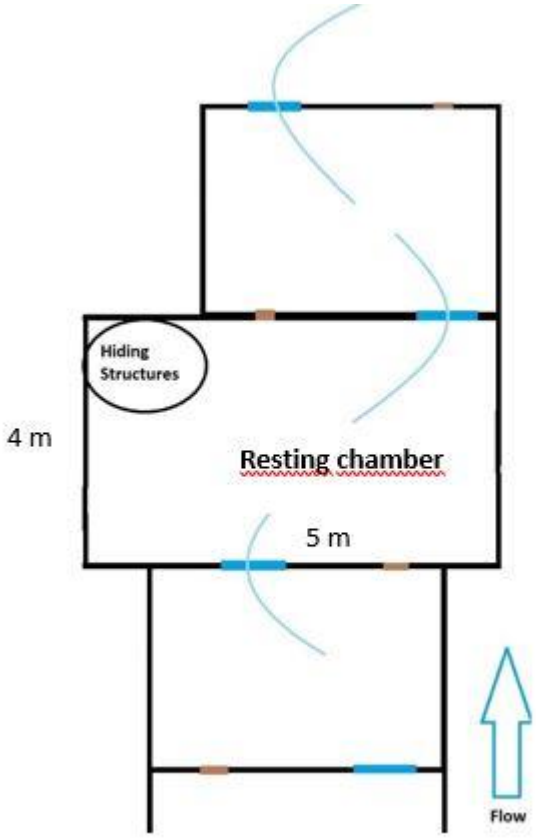



*Figure 7 Resting camber or resting pool is bigger than the normal fish ladder pools and is equipped with hiding structures at the bottom level in the calm part of the pool.*

### 3.6 Fish ladder pool no 10 and to the top of the ladder

After pool no 9 every seventh pool shall be a resting pool, the other pools shall be of same size and principle as chamber 3 with alternating notches. The pools might be built in other combinations than straight after each other. For instance, different compact solutions, see examples Fig. 8. This way of preparing the design must be decided by NWEDC as a function of the available space at Haku site.

At the top of the fish ladder where the ladder enters the weir there shall be a technical solution that may adjust the flow into the ladder according to the water level in the intake pond. The top fish ladder pool shall be 4m x 3m as pool no 3, and the flow from the inlet weir head pond approximately 1 $m^3/s$ with relative slow velocities with maximum 0,7m/s from the weir head pond to the top fish ladder pool. This make it easy for migrating fish to enter the weir head pond.
The inlet from the head pond to the fish ladder must be equipped with a gate to control and finetune the flow in the fish ladder. It must also be possible to turn of the fish ladder flow and if necessary to include an automatic adjustment of the fish ladder flow as a function of the

water level in the weir head pond. As described by NWEDC the normal elevation in the intake pond is EL 1255.
The exit from the fish ladder at the top of the weir shall be localized as far away from the HP intake site as possible and in an area where the water velocities upstream the weir and outside the topmost chamber in the intake pond shall be not more than 0,3m/s. These conditions must be considered by design of the weir.
The design of these technical facilities shall be done by NWEDC.

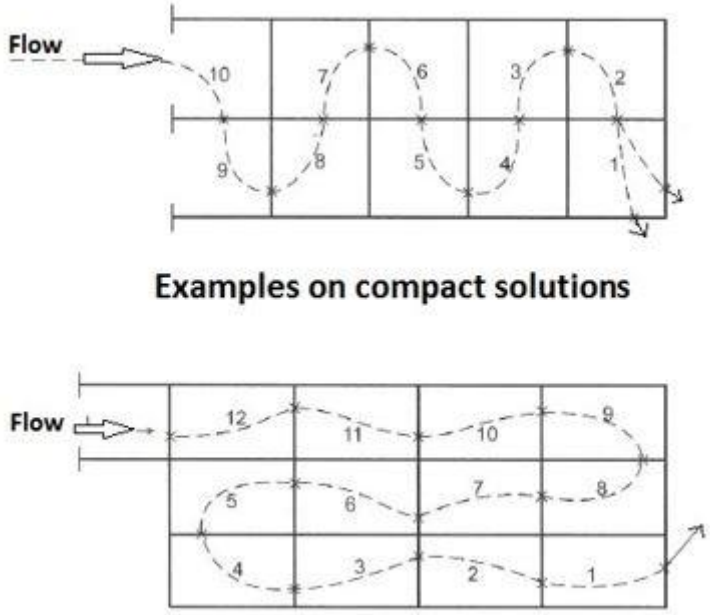


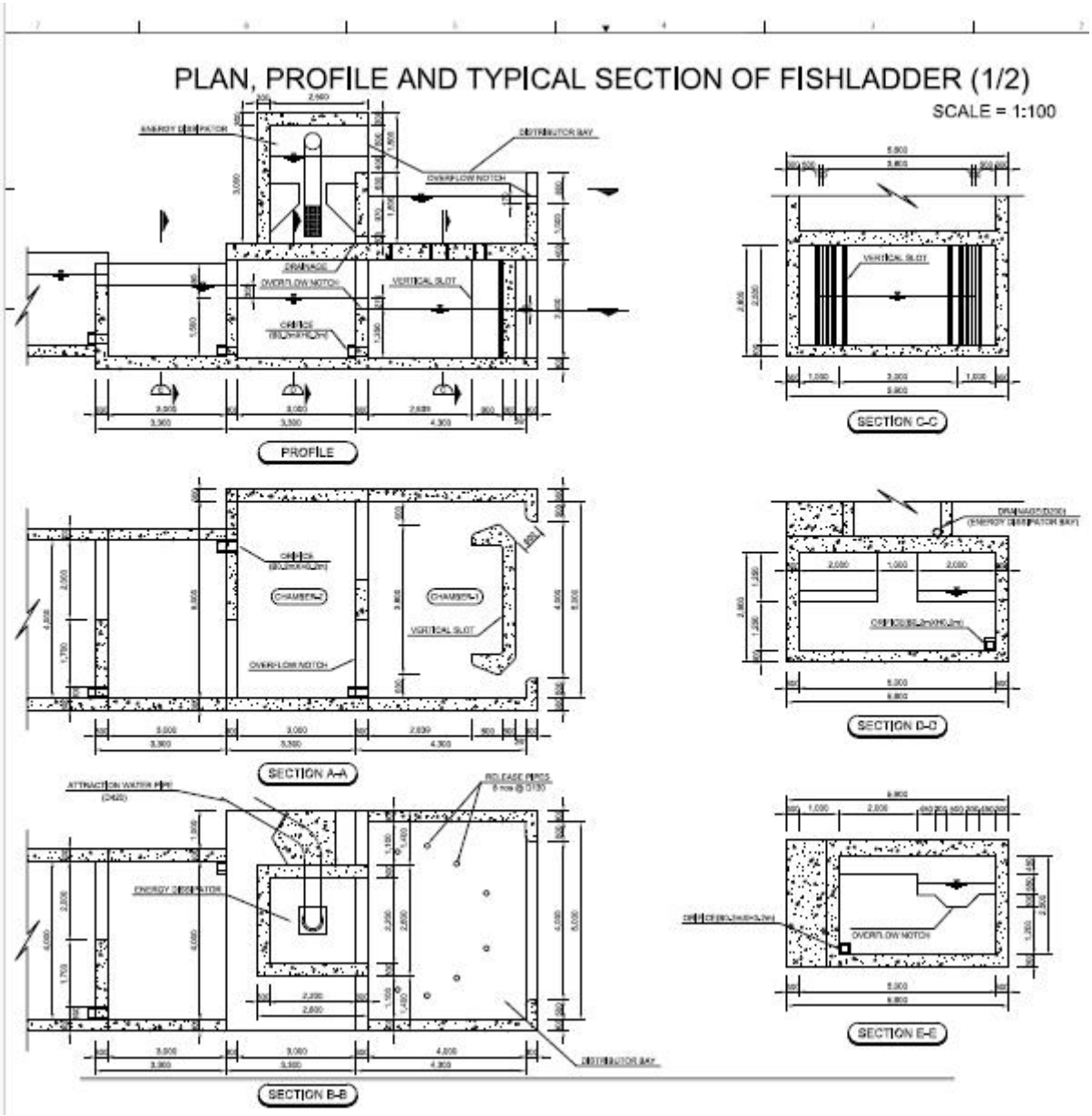

*Figure 8. Examples of compact design of fish ladders.*

## 4 Evaluation of the fish ladder design prepared by NWEDC's Design engineers (DKJV).

Based on the principles of the fish ladder design prepared by Sweco, se chapter 3 and attachment 1 in this report, NWEDC's design engineers in DKJV has prepared the fish ladder drawings shown in figure 9. Review of this drawings by SWECO gave 2 comments:

**1**) The overflow weirs are shown with square edges. They should preferably be given a rounded upstream face as shown on the Sweco-drawing (Conceptual design, attachment 1). A square edge will raise the water level more than the estimated level,
**2**) The outlet of the attraction water pipe (in the energy dissipator box) should be fixed with bars of stainless steel (as shown on the Sweco-drawing). Design engineer shall incorporate these two points.

Looking at fish ladder design in figure 9 (1/2 and 2/2), prepared by DKJV, it seemed that principles of fish ladder design suggested is incorporated and that design as such is appropriate for fish migration.


PLAN, PROFILE AND TYPICAL SECTION OF FISHLADDER (1/2)
SCALE = 1:100
PROFILE
SECTION A–A
SECTION B–B
SECTION C–C
SECTION D–D
SECTION E–E
OVERFLOW NOTCH
VERTICAL SLOT
CHAMBER-1
CHAMBER-2
DRAINAGE
ENERGY DISSIPATOR
DISTRIBUTOR BAY
RELEASE PIPES

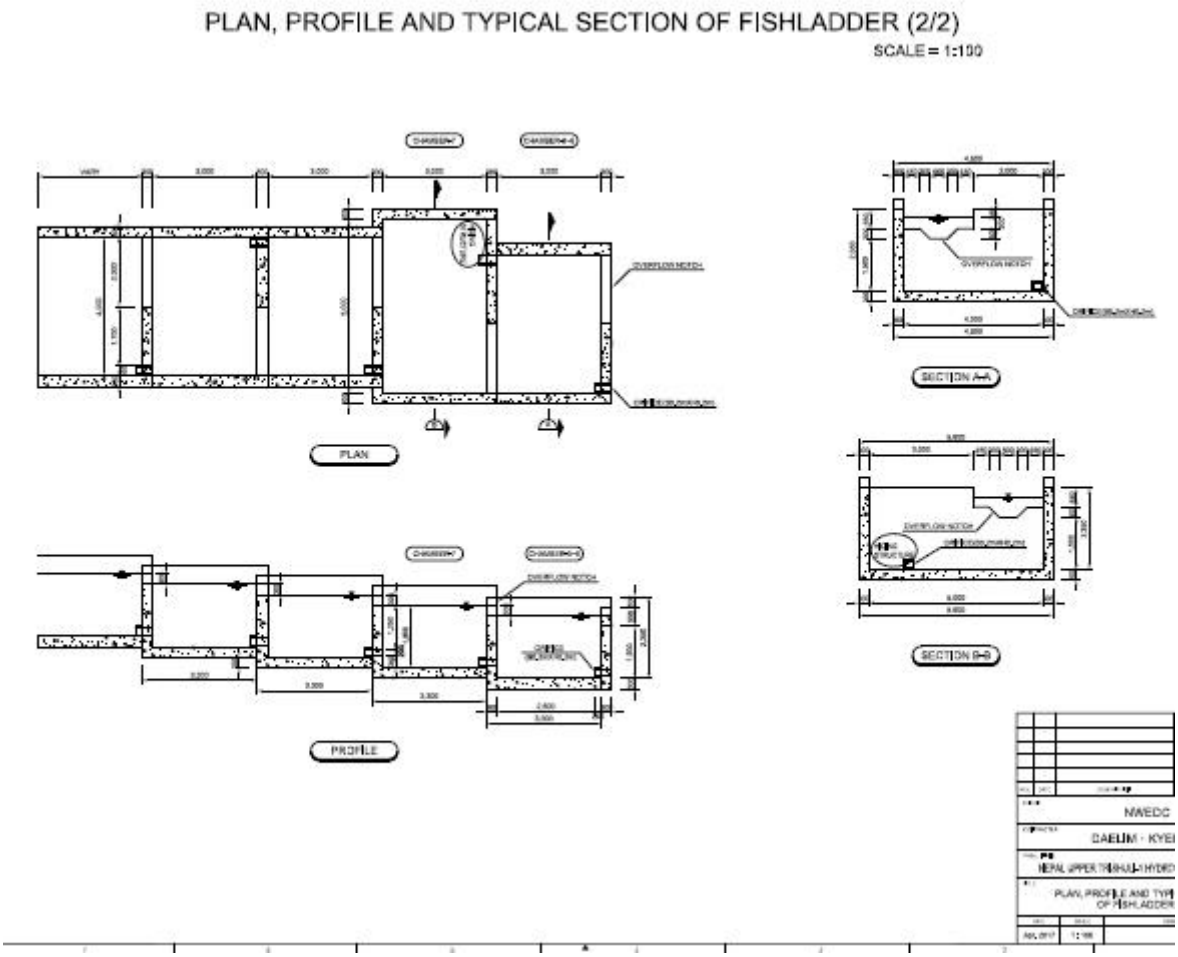



*Figure 9, consisting of two parts 1/2 and 2/2. Plan Profile and Typical Section of Fish Ladder prepared by NWEDC's Design Engineer (DKJV)*

## 5 Upstream migrating challenges not connected to the fish ladder

A fish ladder might be well designed and well-built but the success depends on the conditions in the river downstream the fish ladder and of technical solutions of the entrance area and exit area of the fish ladders.

- The conditions at the confluence of the tailrace and the river should be paid attention so as the upstream migrating fish easily find the old riverbed.
- The dewatered river section should be examined for possible obstacles that might hinder upstream fish migration during the period of minimum flow release.
- The river section just downstream the weir should be adapted to the behavior of the migrating fish species so as the upper part of the fish migrating section meet the fish ladder entrance, see paragraph 3.1.
- The water level in the pool of the fish ladder entrance will by existing design fluctuate between 1229.1 (5m$^3$/s) to 1,231,5 (154.4m$^3$/s). Fluctuations of up to 2,4m might lead to challenges concerning fish migration.

## 6 Downstream fish migration

When making an investment in an expensive fish ladder to keep the upstream eco-corridor open, it requires mitigating actions to also keep the sustainability of the downstream eco-corridor. If the mortality of downstream migrating fish is high, the eco-system services will

suffer, and over a relatively short time span the fish population using this eco-corridor will be decimated or extinct. If the mortality of downstream migrating fish is high and if mitigation of these harmful effects has low success it is better not letting the fish migrate upstream through a fish ladder.

To prevent a damaging fish population development the following topics should be considered:

1) Current in the intake pond
The main surface current entering the intake pond and weir should preferably point at the spillway See figure 10. The reason is that downstream adult fish probably migrate downstream in the main current during monsoon.
If needed a current guiding mechanism could be designed.

A question raised is if the fish ladder might be an attractive point to enter for downstream migrating fish. Due to the low flow in the fish ladder compared to the flow entering the settling basin a fish ladder would not serve as a suitable downstream migrating corridor.

2) Pool downstream of the weir
An important point is that fish migrating downstream across the weir should follow a smooth spillway and meet a soft landing in a downstream pool (see Sweco report of 15.08.2016, Fish Passage, evaluation of plans and recommendations, chapter 2.4).
The designed pool downstream the UT-1 weir does not serve as a soft-landing area for downstream migrating fish that are passing through the flapped gates.
When the flapped gates as designed at the top of the radial gates are used, they might serve as an opportunity for downstream migrating fish to pass over the weir. This will lead fish to fall 15 m and then hit the concrete basement. Heights above 5m will led to increased injurie and mortality. (see illustration, attachment 2). With a free fall of 15 m the fish will reach a velocity that even if hitting a water surface there will be high grade of injurie and mortality. To reduce the frequency of fish mortality due to passing through the flapped gates during monsoon, it is recommendable to use the flapped gates only short periods and to direct the excess water to a spillway at the left side of the weir, see figure 10. It might also be a positive solution to put one or more flapped gates at the top of the spillway as indicated in figure 10.

3) Tunnel entrapment
During low flow season and during early and late monsoon most of the flow are passing through the power station. In these periods most of the down migrating fish, fry and eggs also follow the flow to the settling basins before they enter the HP tunnel and the point of no return. Francis turbines show relatively high fish mortality, but it is a hope that fry and eggs have a reasonable survival rate. To reduce this mortality significantly a possibility might be to prepare fish guiding mechanisms in the settling basins. In the settling basins, the water velocity is slow which normally give good conditions for building guiding mechanisms.

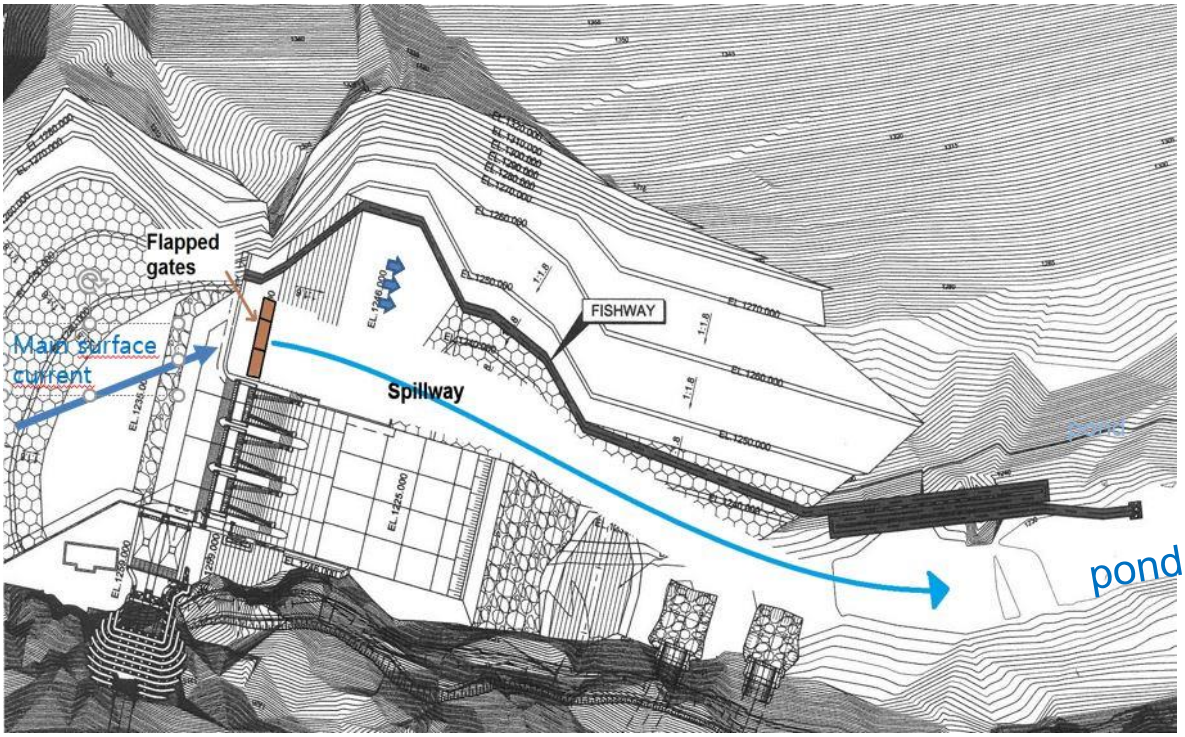



*Figure 10 Upstream and downstream fish migration possibilities across the Upper Trisuli dam.*

For more detailed information and discussions connected to the upstream and downstream migrations se the Sweco report of 15.08.2016.

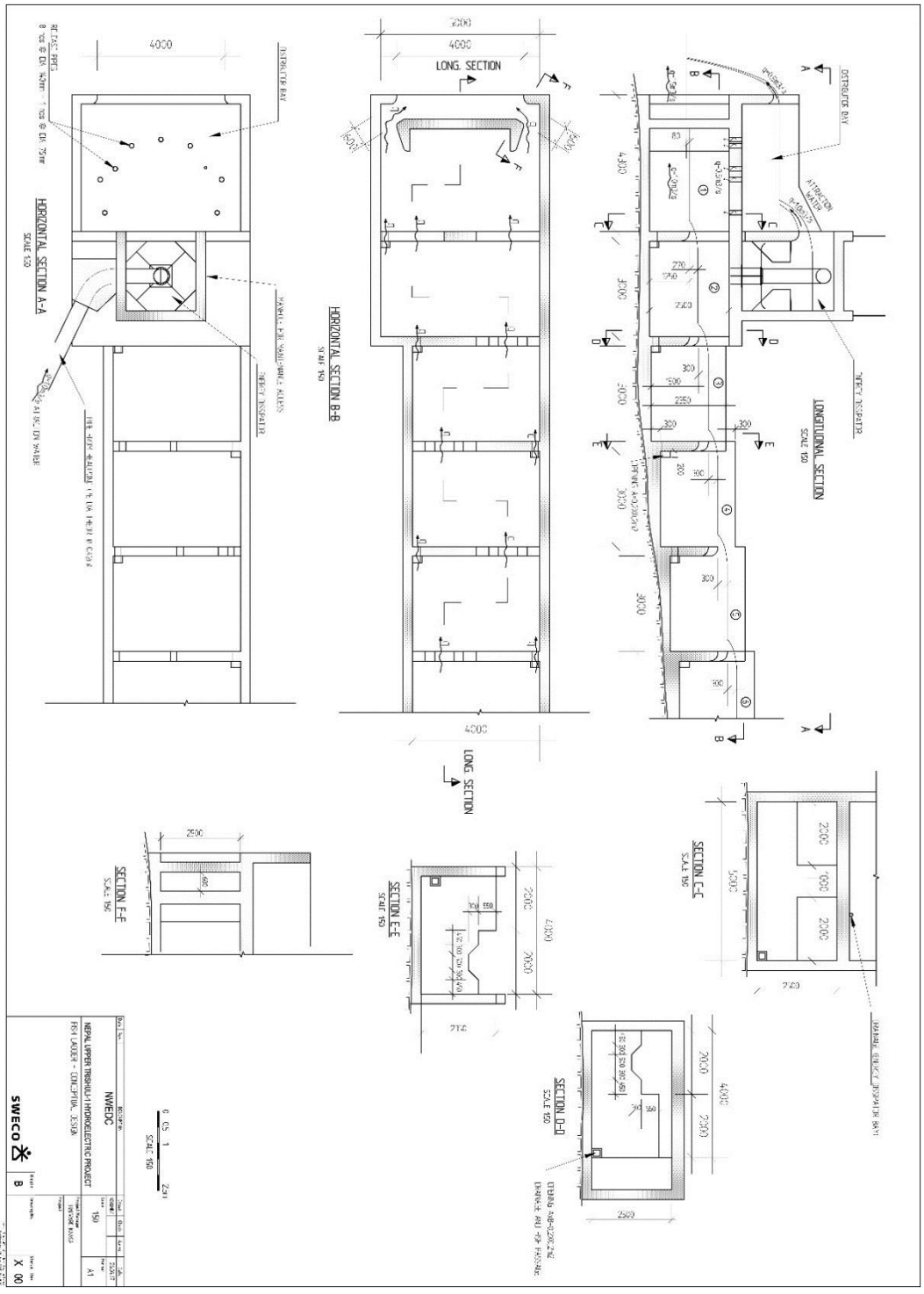
Some recommendations concerning the **management of the fish ladder:**

- High resolution flow data and temperature data will be good fish ladder management tools. Hourly flow data of a wet year, a medium wet year and a dry year, and hourly water temperatures give ability to understand functionality according to timeline and to be able to recommend technical solutions for the inlet and the outlet of the fish ladder.
  The fish do not respond to average values of flow and temperature.

- Detection of the upstream fish migration season is important to decide technical solutions of the fish ladder entrance and for the management plan as operating periods of the fish ladder.

- Detection of the downstream fish migration will give good basis for management recommendations. The fish migrations are probably fluctuating between years and are probably related to temperature. Until better data of fish migration is available it is not possible to restrict the fish migration period to the low flow situation.

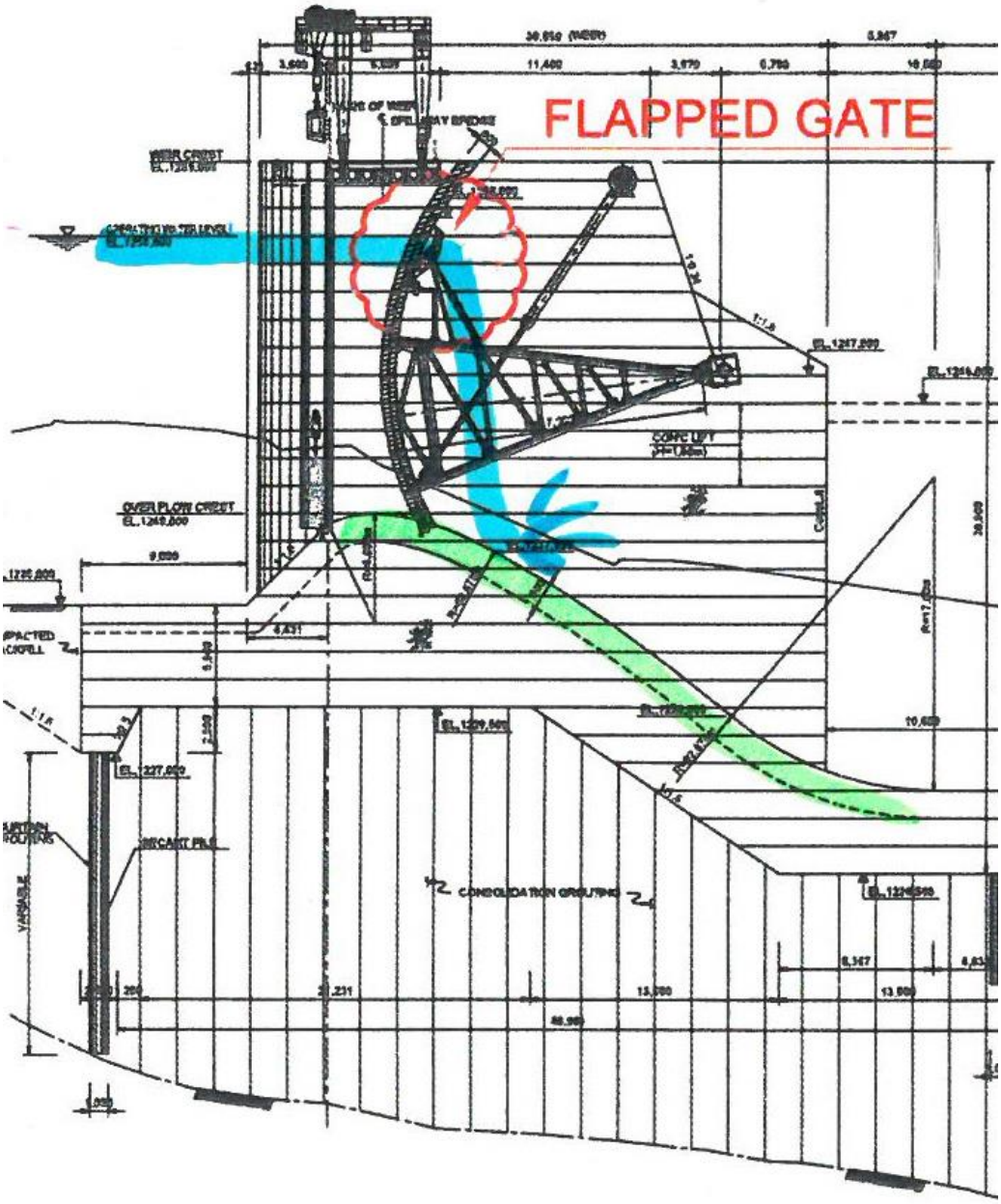
## **Attachment 1**. **Conceptual fish ladder design, made by SWECO.**






repo001.

**Attachment 2**. **Illustration of overflow trough flapped gates at the top of the radial gates.**



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# *Appendix E*
# *Scenario-Based Evaluation of Flow Impacts on S. richardsonni in the Trishuli River*

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# Nepal Water and Energy Development Company (NWEDC) Limited

Naxal, Kathmandu

## A Final Report

## on

# Upper Trishuli-1 HEP, Nepal: Scenario-based evaluation of flow impacts on *S. richardsonii* in the Trishuli River

## Report Prepared by:

S.A.N. Engineering Solutions Pvt. Ltd.
Bakhundole, Lalitpur

Ph.: 01-5530600

Email: sansolutions2015@gmail.com

April 2017

## Executive Summary

Nepal has a huge potential for hydropower development. After the introduction of Hydropower Development Policy, 2001 there has been active involvement of private sector in hydropower development of Nepal. Most of the projects are being constructed by the local hydropower developers whereas some of the projects with greater installed capacities are being developed under the financial assistance by international funding agencies such as the World Bank and Asian Development Bank.

The Upper Trishuli-1 Hydroelectric Project (216 MW) is a Run-of-River type project being developed by Nepal Water and Energy Development Company (NWEDC). The project is funded by the International Finance Corporation (IFC). As a requirement of sustainable hydropower development and to meet the performance standards of IFC with regards to biodiversity conservation, an Eflows assessment followed by formulation of Environmental Flows Management Plan (EFMP) is carried out.

The Eflows assessment is carried out at three sites, viz.: upstream of dam site, in the dewatered river reach and downstream of the powerhouse site. About 12 km of the dewatered river reach is considered for eflows assessment. DRIFT model developed by Southern Waters is used to study the consequences of flow alteration due to project development on the life of *Schizothorax richardsonii*. Thus, the ecosystem indicators that are likely to be influential in the life of *S. richardsonii* as a result of flow changes are considered in this study. Similarly, baseline ecological status of each study site is evaluated and possible ecological changes of these sites due to flow alteration after the hydropower project is in place are evaluated.

The results of the study shows that the baseline ecological status of eflows site 1 (upstream of dam site) and site 3 (downstream of powerhouse site) are not changed significantly and seems to have minimum effect on the life of *S. richardsonii*. On the other hand, the ecological integrity and fish populations will be impacted in the dewatered river reach due to flow diversion for power generation. However, with the provision of efficient and functional fish passage the effects can be minimized. The results of the EFlows assessment also show that the best EFlows scenario for the *S. richardsonii* is the release of more water during the winter (low flow) months. However, power generation will be negatively impacted with the release of more water, with a loss of approximately 4.9 % of power if 20% of mean monthly flow is released. And, it is highly unlikely that the project will be financially viable with this power loss.

As NWEDC has exhibited commitment to biodiversity management for UT-1 through extensive baseline data collection, inclusion of a fish ladder that will meet international standards, a cumulative impacts assessment and this EFlows assessment, release of agreed eflows followed by appropriate mitigation measures during the project implementation shall be recommended for reducing the impacts on *S. Richardsonii* in the dewatered river reach.

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## List of figures



## List of tables

## Acronyms

| | |
|---|---|
| DRIFT | Downstream Response to Imposed Flow Transformation |
| EFlows | Environmental Flows |
| EFMP | Environmental Flows Management Plan |
| HEP | Hydroeletric Project |
| IFC | International Finance Corporation |
| NWEDC | Nepal Water and Energy Development Company |
| VDC | Village Development Committee |

# 1 Introduction

## 1.1 Background

### *1.1.1 The Trishuli River*

The Trishuli River is a trans-boundary river and is one of the eight sub-basins of the Gandaki River basin in Central Nepal. It covers an area of 32 000 $km^2$, which is 13% of the total Gandaki area. The Trishuli watershed lies within the physiographic Highland and Midland zones defined by average altitudes of ~2000 m and high valley landscapes.

The Trishuli River originates in the Tibet Autonomous Region of the People's Republic of China, where it is known as Bhote Koshi. The catchment area of Bhote Koshi in Tibet is ~3 170 $km^2$ for a river length of 120 km. The ~106 km of Trishuli River within Nepal shows a high gradient in the initial 40 km with rapids dominating the longitudinal profile but there are no impassable falls (CIA UT-1, 2014, ESSA).

### *1.1.2 The Project*

The proposed Upper Trishuli-1 HEP (216 MW) is a 'Run-of –River' type project being developed by Nepal Water and Energy Development Company (NWEDC) Ltd. The main project features are the headworks (including diversion weir, intake, and diversion tunnel), desander basin, headrace tunnel (including surge tank, vertical shaft) and powerhouse, including the tailrace tunnel. The project is located in Rasuwa District, Bagmati Zone 80 km northeast of Kathmandu. The intake site is located at Hakubesi of Haku VDC and powerhouse site at Mailun of Haku VDC. The catchment area at the intake site is 4 350.88 $km^2$ and the design discharge at Q51 is 76 $m^3/s$. By utilizing the net head of 333.93 m, an average annual energy of 1533.1 GWh could be produced. The total project cost is estimated to be around US$ 382.583 Million and is expected to be completed within 5 years from the start of construction. The location map of Upper Trishuli-1 HEP is given in Figure 1.1.

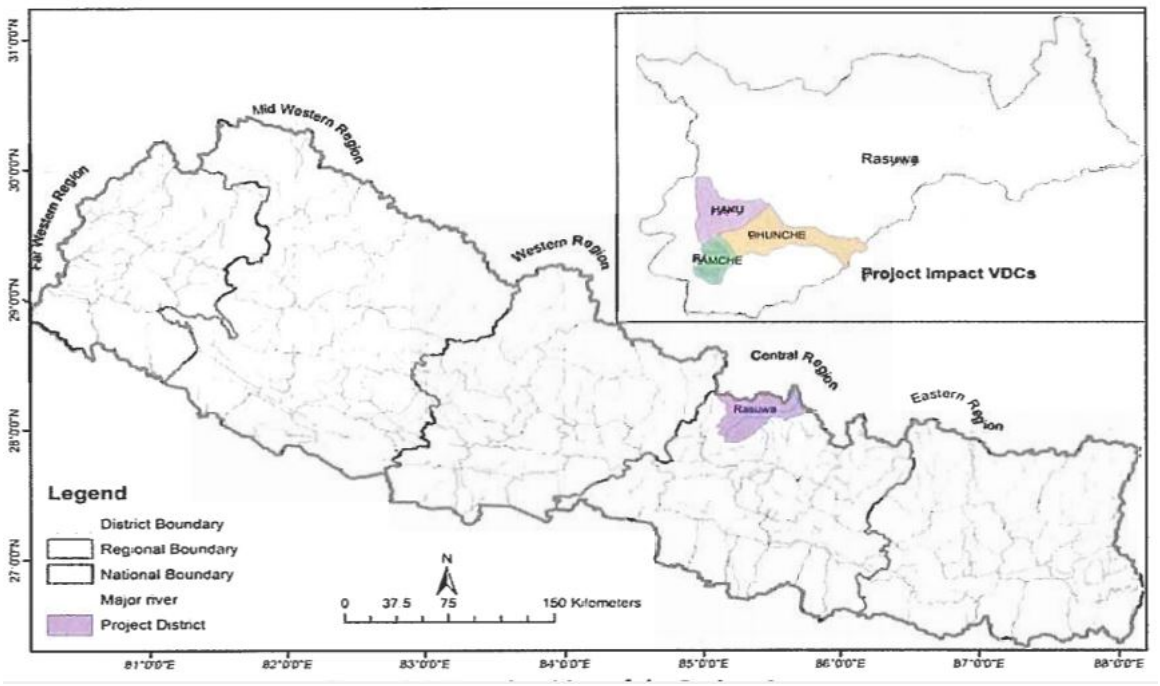



**Figure 1.1 Location of Upper Trishuli-1 HEP, Nepal (Approved EIA Report of UT-1 HEP)**

The design features of the project are shown in Table 1.1.

**Table 1.1 Upper Trishuli-1 HEP design features (NWEDC)**

| Item | Description |
|---|---|
| Catchment area at intake site | 4350 $km^2$ |
| Design Discharge at Q51 | 76 $m^3/s$ |
| Net Head | 324 m |
| Plant Capacity | 216 MW (72 MW x 3 units) |
| Average Annual Energy | 1 533.1 Gwh |
| Saleable Energy | 1 456.4 Gwh |
| Diversion Structure | Concrete Gravity Dam/Weir of height 32.0 m and overall length of 100.90 m. |
| Intake | 2 Nos. each of 3.25 m wide and 6.5 m high |
| Desanding basin | Underground(3 chambered) with effective length of 115 m |
| Headrace Tunnel | 9.715 km long, 6.5 m diameter |
| Surge tank | 292 m deep, 8.5 m diameter on top, restricted orifice type |
| Tailrace tunnel | 178 m long, 6.5 m diameter |
| Penstock | 3 steel lined penstock tunnels |
| Powerhouse | Underground |

## 1.2 The EFlows assessment

### *1.2.1 Terms of Reference*

The contract agreement for preparation of Environmental Flows Management Plan (EFMP) of UT-1 HEP between Nepal Water and Energy Development Company (NWEDC), the client and S.A.N. Engineering Solutions Pvt. Ltd. (the consultant) was signed between the two parties based on the following Terms of Reference.

(i) Introduction

As a part of process to ensure compliance of the Upper Trishuli-1 Hydroelectric Project (UT-1HEP) with Nepal national regulations and the IFC's Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Resources, NWEDC is required to develop environmental flow management to maintain viable populations during construction and operations of the Upper Trishuli-1 Hydropower Project.

(ii) Objectives

In line with IFC's Performance Standard, the objective of this scope of work is to develop an Environmental Flows Management Plan (EFMP) to maintain viable fish populations during construction and operations of the Upper Trishuli -1 Hydroelectric Project (UT-1 HEP), Nepal.

(iii) Approach to the study

The Consultant's effort was streamlined to meet the objectives as outlined by the Scope of Work.

The Hydropower Development Policy (HDP 2001) is the guiding document for EFlows releases in the design of hydropower projects in Nepal. According to HDP, a developer is required to release 10% of the minimum monthly average flow or the quantum stated in the Environment Impact Assessment (EIA) Report, whichever is higher, as a minimum flow criterion. This minimum flow, in fact, does not constitute an EFlows provision as it does not consider the aquatic ecosystem in the study reach, nor any potential knock-on effects downstream of that reach. With the involvement of donor agencies such as Asian Development Bank and the World Bank Group in hydropower development in Nepal, however, there has been a growing concern about ensuring sustainable hydropower development and adherence to the performance standards of these donor agencies.

The Consultant will develop EFMP for UT-1 HEP to meet IFC Performance Standard 6, i.e., no net loss of biodiversity. That said, the timing and other limitations that define the study necessitate a rapid approach that focuses on the mitigation of any residual impacts on *Schizothorax richardsonii* with a 10% of minimum monthly average flow release in place and a reliance on existing information, including unpublished relationships between *S. richardsonii* and flow established for similar rivers in the Himalayan region. To this end, the evaluation of flow scenarios comprising different minimum flow releases will be done used the DRIFT Method (Brown *et al*. 2013), which has been successfully implemented in the Neelum/Jhelum Basin in Pakistan-administered Kashmir.

The key questions addressed were:

- At what time of the year, and in what part of its life cycle, does *S. richardsonii* utilise the study reach?
- Does a minimum release of 10% of minimum monthly average flow adversely affect *S. richardsonii*'s migration and, by inference, its breeding success?
- If so, is it possible to implement a regime whereby the flow is increased beyond 10% of minimum monthly average flow releases during certain days in the period March to May to mitigate any potential negative impacts to the onset of upstream migration as well as to reduce potential impairment of the overall spring upstream migration process, while maintaining economically-viable power generation?

Evaluation of the above was based on the assumption that there were no major negative impacts to the river morphology and/or spawning sites that could either impede or improve migration and/or spawning. An additional question related to whether or not changes to stream channel morphology as a result of the various flow rates evaluated would directly or indirectly alter physical habitats used by *S. richardsonii*, and whether there is any scope to improve existing habitat downstream of UT-1 HEP.

The results of the evaluations will inform discussion and agreement on an EFlows regime for the study reach, which will then form the basis of the EFMP.

The EFlows assessment focuses on three sites, viz.: upstream of UT-1 HEP, the dewatered reach and downstream of the tailrace as indicated in Figure 1.2. The other two sites, one at headworks of Mailun Khola Hydropower Project and the other at confluence of the Trishuli River and Mailun Khola were considered simply as the places where snow trout migrate to and from.


**Figure 1.2 Study area for the Upper Trishuli-1 HEP EFlows assessment**

The sites marked 1, 2 and 3 are located upstream of the dam, in the dewatered section and downstream of the powerhouse, respectively.

## 1.3 Limitations of the study

The level of detail achieved in this assessment is commensurate with available data and information, budget and programme. Thus, although the process applied in this assessment is similar to that used in more detailed EFlows assessments, it is a coarse-level assessment, with the focus on the identification of major risks to the ecosystem associated with the Upper Trishuli HEP using responses to flow and sediment changes developed for a different but similar river.

The following exclusions, limitations and assumptions apply:

- The study:
    - focuses on *S. richardsonii*
    - uses existing information
    - excludes any hydraulic modelling or topographical survey of the study reach
- Changes to stream channel morphology are evaluated qualitatively only.
- Scenarios include UT-1 HEP only.

The Client provided the following:

- 20-30 years daily flow data for pre-UT-1 conditions in the study reach.
- Flow regime, including spills, with UT-1 HEP in place with a minimum monthly average release of 10%, covering the same period as the per-UT-1 hydrological time-series.
- Information related to sediment supply to and deposition in the UT-1 reservoir.
- Operational rules related to flushing sediments.
- The number of scenarios evaluated is limited to six, plus baseline.
- Offsets were not evaluated in terms of feasibility, effectiveness or cost, and detailed design was not be undertaken
- Stakeholder engagement was excluded

Finally, data are always a limiting factor in environmental studies. With contemporary understanding of how aquatic ecosystems function, it has become easier to predict what will change and the direction of change. It is less easy to predict by how much ecosystem components will change and how long it will take. For this reason:

- all predictions should be evaluated with due cognizance of the assumptions necessitated by the constraints of the study; and
- it is better to evaluate the outcome of the scenarios relative to one another rather than as absolute individual predictions of change.

# 2 EFlows sites

An EFlows assessment was carried out at three sites, *viz*.: upstream of the dam site, dewatered river reach and downstream of the powerhouse. Due to the diversion of flow from intake, natural flow conditions in the section of the river between the dam site and the power house site will be impaired. This impairment is greatest in the dewatered river reach, but there will also be effects at upstream of the dam site and downstream of the tailrace. Thus, the EFlows study considered the three sites shown in Figure 1.2. The locations of these sites are as follows:

i) Site 1: 28$^{o}$ 07' 36.40"N, 85$^{o}$ 17' 52.41"E Upstream of Dam site
ii) Site 2: 28$^{o}$ 05' 27.76"N, 85$^{o}$ 14' 7.87"E Dewatered Zone
iii) Site 3: 28$^{o}$ 04' 13.87"N, 85$^{o}$ 12' 28.63"E Downstream of Power House Site.

Since the EFlows sites 1 and 3 are located close to the headworks site and the powerhouse site respectively, the length of the river that was considered for the eflows study is approximately 12 km. As mentioned in the Terms of reference for EFMP formulation, the dewatered river reach was only considered for the eflows assessment.

# 3 Hydrology

The baseline hydrological and scenario daily time-series data were provided by NWEDC. These are based largely on flow data obtained from the Department of Hydrology and Meteorology (DHM) gauging station at Betrawati, located 12 km D/s of intake. The best available long-term hydrological data were for the period 1967 to 2013, and so this was the period on which the EFlows assessment was based.

Details of the hydrological data available for the Upper Trishuli River and the procedures undertaken to obtain then are covered in **Hydrological Analysis of Detail Design Report-II, Civil of UT-1 HEP**.

The hydrological record for the Trishuli River suggests that this is a flood-pulse system, with four well-defined seasons (Figure 3.1). Figure 3.2 provides some examples of the year-on-year variation in flow and flow seasons at one of the EFlows sites. The seasonal divisions shown in these figures are those identified in DRIFT using the parameters listed in Table 3.1.


**Figure 3.1 One year (1967) of the baseline hydrological record at Site 2, showing the seasonal divisions, from left to right, into: Dry, Transitional 1, Wet, Transitional 2, and back into Dry.**

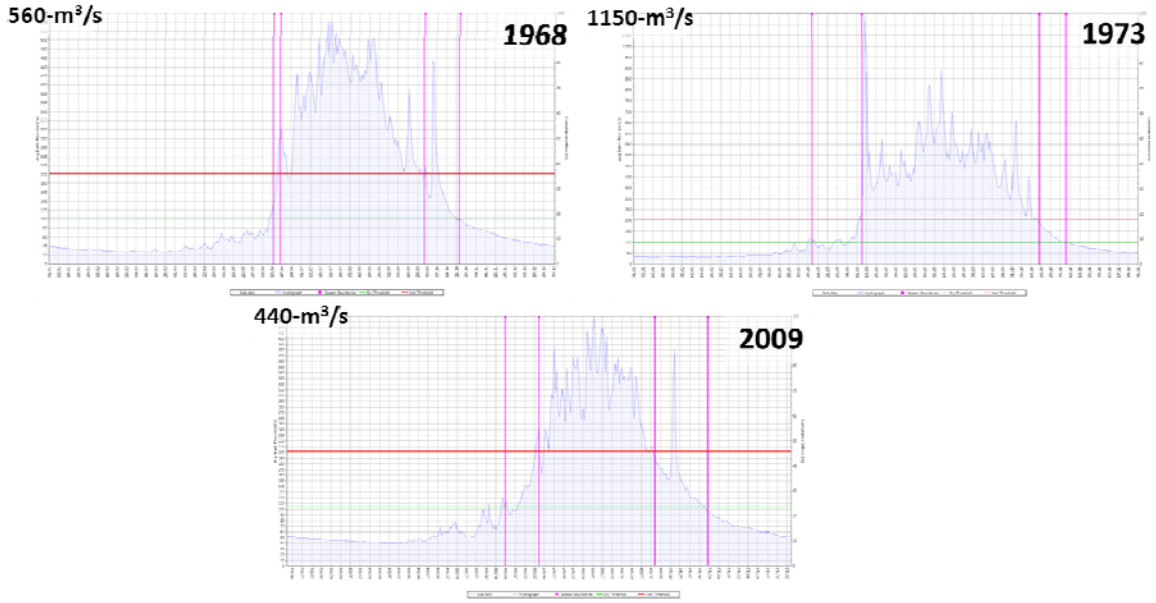



**Figure 3.2 Examples of year-on-year variation in flows and flow seasons in the baseline time-series at Site 2. The maximum discharge is indicated at the top left of each example.**

**Table 3.1 Parameters used for seasonal divisions**

| Division | Parameter |
|---|---|
| Start of the hydrological year | January |
| End of Dry season | 4 x minimum dry season discharge |
| Start of Wet season | 1.1 x mean annual discharge |
| End of Transition 2 | 4 x minimum dry season discharge, and the recession rate < 0.1 $m^3$/day over 10 days |

Once the seasons were defined, DRIFT calculated a suite of ecologically-relevant flow indicators that were used by the specialists to determine the flow-related links to the ecosystem indicators (Section 7). The flow indicators and the reasons for their selection as indicators are given in Table 3.2. Each flow indicator was calculated for each year in the hydrological record, thereby deriving an annual times-series of 47 years for each flow indicator (see examples in Figure 3.3).

The flow indicators are used as drivers of change in other aspects of the river ecosystem. They are reported in the results to provide context for and understanding about the ecosystem responses. They are not used in the calculation of ecosystem integrity.

**Table 3.2 Flow indicators used in the Upper Trishuli River**

| Indicator | Reason for selection as indicators |
|---|---|
| Mean annual runoff | Gives an indication of annual abstraction/addition of water, if any. |
| Dry season minimum 5-day discharge | Dry season minimum 5-day average flows influence available habitat area, fish movement, and winter temperatures (buffering) |
| Dry season onset | Onset and duration of seasons:<br>• link with climatic factors<br>• cues fruiting and flowering<br>• cues migration/breeding<br>• support life-history patterns. |
| Dry season duration | The dry season is typically the harshest season for aquatic life to survive. This is the time when flows are low, water quality influences potentially stronger and temperatures (either hot or cold) are most challenging. Increases in the duration of this harsh period can have significant influence on overall chances of survival. |
| Dry season average daily volume | Dry periods<br>• promote in-channel growth<br>• support larval stages<br>• maintain intra-annual variability. |
| Wet season onset | Onset and duration of seasons:<br>• link with climatic factors<br>• cues fruiting and flowering<br>• cues migration/breeding<br>• support life-history patterns. |
| Wet season duration | Important for supporting life-stages, such as hatching and growth of young. The wet season is also when most erosion and deposition occurs due to the higher shear stress and sediment loads in the river. |
| Wet season flood volume | Floods:<br>• dictate channel form<br>• flush and deposit sediment and debris<br>• promotes habitat diversity<br>• support floodplains<br>• distribute seeds<br>• facilitate connectivity<br>• control terrestrial encroachment. |
| Transition1 and Transition2 average daily volume | Dry-wet-dry transitions:<br>• distribute sediments and nutrients flushed from the watershed<br>• distribute seeds<br>• support migration of adults and larvae |
| Transition 2 recession slope | Transition 2 recession shape refers to the speed at which the flows change from wet season flows to dry season flows. Under natural conditions this is usually a relatively gentle transition, but this can change with impoundments. If it is a very quick transition then there can be issue of bank collapse and/or stranding similar to those described for 'within-day range in discharge'. |

Flow changes in the dry and transition seasons are included as this when water resource infrastructure has the potential to exert a large effect on water-level fluctuations. The Trishuli Scenarios did not include consideration of peaking-power operations. Had this been necessary then additional flow indicators linked to within-day range in discharge: Wet, transition and dry seasons would also have been selected. Changes in water level over short periods are important for a number of reasons:

- the shear stress changes rapidly as flow rate changes affecting both the water surface slope and the depth of the river. Thus conditions, for erosion but also for animals and plants, change rapidly over this time, often to a point where they can no longer maintain their position in the channel, resulting is wash-away.
- rapid decreases flow can also lead to stranding of animals as flows recede from an area quicker than the animals can respond.
- as water levels decrease, riverbanks may not drain as quickly as the river recedes, leading to an over pressuring within the banks that reduces bank stability.

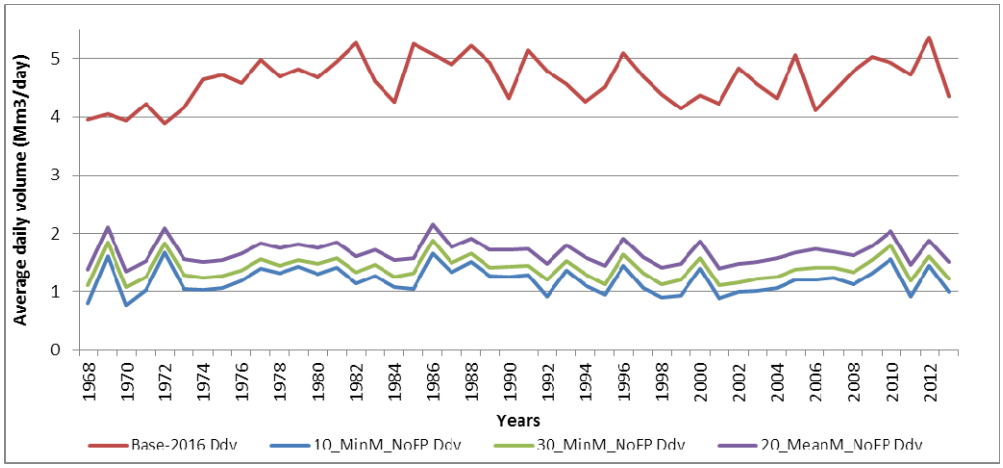



**Figure 3.3 Examples of annual time-series of a DRIFT flow indicator: average daily volume in the dry season (showing four scenarios).**

# 4 Life history considerations – *Schizothorax richardsonii*

*Schizothorax richardsoni,* which is locally known as the snow trout or Asla (together with other *Schizothorax* species) is found in the rivers and streams of mountainous areas of the Himalayas, India, Afghanistan and Nepal.

It is listed as Vulnerable in the IUCN Red Data List (www.iucnredlist.org). The justification provided is: "*Although S. richardsonii is widely distributed along the Himalayan foothills and previous studies have indicated that it is abundantly and commonly found, recent observations over the last 5 to 10 years indicate drastic declines in many areas of its range due to introduction of exotics, damming and overfishing. While in some areas the declines are more than 90%, the overall reduction is inferred to be less than 50% with similar rates predicted in the future. The species is therefore assessed as Vulnerable. However, there is a strong belief that if alien species introductions are carried out throughout its range, this species may completely be displaced by exotic salmonids*" (Vishwanath 2010).

*S. richardsonii* prefers to live among rocks and is primarily a bottom feeder, preferably near big submerged stones. It is mainly herbivorous, feeding mainly on algal slimes, aquatic plants and detritus, but also aquatic insect larvae encrusted on the rocks (Vishwanath 2010). Asla has two spawning periods (March-April and October-November). It migrates from lakes and rivers of the valley to the adjoining tributaries to find suitable places for breeding, mainly in side streams or a side channels along the main river bed (Jhingran 1991; Welcomme 1985 and Sunder 1997).

A summary of key life history aspects of *S. richardsonii* is provided in Table 4.1.

Introduction of exotic salmonids, such as Rainbow Trout, in hill streams and reservoirs of the Himalayan foothills are a serious threat to the survival of *S. richardsonii*. Fishing for ornamental trade is also a threat in Nagaland and they are widely utilised as food (Vishwanath 2010).

## 4.1 Presence of *S. richardsonii* at EFlow Site 1 and 2 in winter

One of the key aspects of snow trout life history of relevance for this project is its temperature tolerances. Some studies suggest that *S. richardsonii* will not be found in the upper reaches of Himalayan rivers in the cold winter months (e.g., Shrestha 1990; Sivakumar 2008; Talwar and Jhingran 1991) as it has a low tolerance for temperatures lower than 7-10$^{o}$C (Shrestha and Khanna 1976, http://nmcg.nic.in/BioFish.aspx). However, *S. richardsonii* was recorded in the vicinity of EFlow Site 1 and 2 in this study (Kaasa, 2015), and in the EIA for the Upper Trishuli-1 HEP (Approved EIA, Feb. 2013), in the winter at temperatures of ~7$^{o}$C.

**Table 4.1 Summary of key life history aspects of *S. richardsonii***

| Habitat, food and temporal pattern | | Juveniles | | Adults (non-breeding) | | Spawning | |
|---|---|---|---|---|---|---|---|
| | | Information/ data | References | Information/data | References | Information/data | References |
| Habitat and flow preferences | Description of habitat | - | - | Found in rivers and streams of mountainous areas of the Himalayas, India, Afghanistan and Nepal | Menon (1999); Sunder et al. (1999); Talwar and Jhingran (1991) | Clear water on gravelly/stony grounds or on fine pebbles (50-80 mm diameter) | Shrestha and Khanna (1976) |
| | Altitude | - | - | In Trishuli River, snow trout abundant in the 1875 m-3125 mamsl zone and prefers rapid, pool and riffle types of habitats. | IUCN Red List of Threatened Species (Vishwanath, W.) | | |
| | Substrate | Stones and gravels | Raina and Petr (1999) | Rocks and big submerged stones | IUCN Red List of Threatened Species (Vishwanath, W.) | Developing eggs and larvae have been seen in semi-stagnant nursery beds along riverbanks interspaced with gravel and stones. | Raina and Petr (1999) |
| | Depth | <0.75 m | Shrestha and Khanna (1976) | 1-3 m | http://nmcg.nic.in/BioFish.aspx | 1-3 m | Shrestha and Khanna (1976) |
| | Velocity | 0-2 m/s | Shrestha and Khanna (1976) | 2-8.4 m/s | http://nmcg.nic.in/BioFish.aspx | 2-8.4 m/s | Shrestha and Khanna (1976) |
| | Temperature | 10-18 0C | Shrestha and Khanna (1976) | 7.2-22 0C | http://nmcg.nic.in/BioFish.aspx | 12-15 0C | Shrestha and Khanna (1976) |
| | Dissolved O2 | 6-8 mg/l | http://www.fao.org/docrep/005/y3994e/y3994e0q.htm | 6-8 mg/l | http://www.fao.org/docrep/005/y3994e/y3994e0q.htm | 10-15 mg/l | Sunder (1997); Shrestha and Khanna (1976) |
| Food preferences | | Invertebrates, algae | | Omnivorous and opportunist feeder. Mainly algae, fish and invertebrates | Shrestha (1990); Jhingran (1991) | n/a | n/a |
| Additional information | Information/data | | | | | References | |
| Migration | Snow Trout migrate upstream at the start of the monsoon season in March-April (gravel/pebble spawning and downstream at the end of this season in October-November for spawning | | | | | Shrestha (1990); Negi (1994); Talwar and Jhingran (1991) | |

| Habitat, food and temporal pattern | | Juveniles | | Adults (non-breeding) | | Spawning | |
|---|---|---|---|---|---|---|---|
| | | Information/ data | References | Information/data | References | Information/data | References |
| Triggers | Breeding is triggered by snow melt and rise in turbidity. Fish move to breeding grounds in shallow side pools, side-channels and tributaries of the river with cobbles and gravely beds. Eggs hatch in this season, and fries and fingerlings remain in shallow waters in side channels | | | | | Jhingran (1991); Welcomme (1985); Sunder (1997) | |
| Spawning behaviour | Snow Trout spawns when two years old, depending on food supply. Mature Asla has a change in colour during the breeding time. Mature males develop tubercles on either side of the snout, faint yellow colour of the body, and reddish colour of fins. Females spawn in natural as well as in artificial environments. *S. richardsonii* can spawn naturally or by stripping the wild/cultured mature female during the spawning season. It spawns in September/October and March/April. | | | | | http://www.fao.org/docrep/005/y3994e/y3994e0q.htm | |

| Months | Flow Conditions | Fish Behaviour | References |
|---|---|---|---|
| May/June | Onset of flood season | Snow Trout spawns in spring. By this time of the year, the fish eggs reach to its final stage of maturity provided the aquatic system provides sufficient food required for proper development of eggs. Once the eggs reach to their final stage of maturity, the fish is ready to spawn under various triggers like the snowmelt, rise in water temperature, comparatively higher turbidity level, swelling of rivers, creation of side channels etc. mainly linked with the monsoon rains and snow melt in the upper reaches of the Himalayan rivers | Negi (1994); Rafique and Qureshi (1997); Talwar and Jhingran (1991) |
| October November | Onset of winter season | Snow Trout migrates downstream during winter as water temperatures decline in the upper reaches of the rivers, and may spawn again at this time. It is not found in the upper reaches of the rivers in the cold winter months | EF Assessment UT-1 HEP, ESSA, Nov. 2014; Shrestha (1990); Sivakumar (2008); Talwar and Jhingran (1991) |

# 5 Ecosystem indicators

Ecosystem indicators are comprised of riverine components that respond to a change in river flow (or sediment) by changing their abundance; concentration; or extent (area).

The focus of this assessment is *S. richardsonii* and so the ecosystem indicators selected to capture the response to changes in water flow and longitudinal connectivity are limited to those considered to be most influential in the life history of *S. richardsonii.* Thus, the supporting ecosystem indicators focus on *S. richardsonii* habitat and food.

The ecosystem indicators and the reasons for selection are provided in Table 5.1.

**Table 5.1 Ecosystem indicators**

| Discipline | Indicators | Reason for selection as indicators |
|---|---|---|
| Geo-morphology | Suspended sediment load | Suspended load is important for creating and maintaining various habitats. |
| | Exposed sand and gravel bars | Sand and gravel bars during provides habitat for invertebrates and fish.<br>Cobble and boulder bars provide habitat for invertebrates and fish. |
| | Exposed cobble and boulder bars | |
| | Median bed sediment size (armouring) | The average size of river bed sediment is an important habitat component for many fish species. |
| | Area of secondary channels, back waters | Secondary channels and backwaters provide important instream habitat for many fish species. These slower velocity areas, usually with well-developed marginal vegetation, act as refugia for juvenile fish. |
| Algae | Algae | *S. richardsonii* feeds on algae and invertebrates |
| Macro-invertebrates | EPT abundance | *S. richardsonii* feeds on algae and invertebrates |
| Fish | Snow trout (*S. richardsonii*) abundance | *S. richardsonii* is listed as Vulnerable in the IUCN Red Data List. It is widely distributed along the Himalayan foothills (India, Afghanistan, Pakistan, Nepal), but drastic declines have been recorded over the last 5 to years in many areas of its range due to:<br>• introduction of alien species,<br>• damming, and<br>• overfishing. |

Each indicator is linked with other indicators deemed to driving change. The aim is not try to capture every conceivable link, but rather to restrict the linkages to those that are most meaningful and can be used to predict the bulk of the likely responses to a change in the supply of water, sediment or longitudinal connectivity.

# 6 Ecological Status

The scores and descriptions for Ecological Status categories are provided in Table 6.1.

**Table 6.1 Categories for Baseline Ecological Status (after Kleynhans 1997)**

| Ecological category | Description of the habitat condition |
|---|---|
| **A** | Unmodified. Still in a natural condition. |
| **B** | Slightly modified. A small change in natural habitats and biota has taken place but the ecosystem functions are essentially unchanged. |
| **C** | Moderately modified. Loss and change of natural habitat and biota has occurred, but the basic ecosystem functions are still predominantly unchanged. |
| **D** | Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred. |
| **E** | Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive. |
| **F** | Critically / Extremely modified. The system has been critically modified with an almost complete loss of natural habitat and biota. In the worst instances, basic ecosystem functions have been changed and the changes are irreversible. |

## 6.1 Baseline Ecological Status of the EFlows sites

The Baseline Ecological Status (BES) used for the Trishuli River in this assessment is summarised in Table 6.2.

**Table 6.2 BES of the EFlows sites on the Upper Trishuli River at 2016.**

| Discipline | 1 | 2 | 3 |
|---|---|---|---|
| Geomorphology | A/B | A/B | A/B |
| Algae | B | B | B |
| Macronvertebrates | A/B | A/B | A/B |
| Fish | B | B | B |
| Overall BES | B | B | B |

# 7 Response curves

The response curves do not address any of the scenarios directly. The curves are drawn for a range of possible changes in each linked indicator, regardless of what is expected to occur in any of the scenarios. For this reason, some of the explanations and/or X-axes refer to conditions that are unlikely to occur under any of the scenarios but are needed for completion of the Response Curves. In addition, each response curve has a shape that assumes that all other conditions (indicators) remain at baseline.

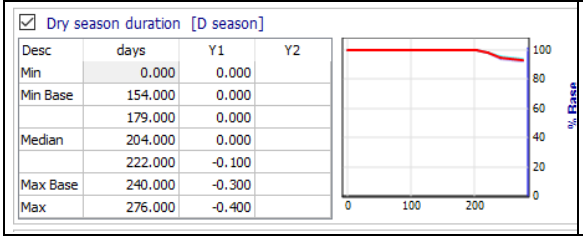
The relationships are similar across all areas, although the actual curves may differ slightly from what is shown here. For the exact relationship used for each focus area please refer to the DSS. The focus area used as an example is denoted in the caption.

The response curves relationships used for this assessment were not derived specifically for the assessment for the Upper Trishuli River. They were derived for Alwan Snow Trout in similar Himalayan river (the Neelum-Jhelum River) and used in this assessment. Links to sediment supply were excluded from the DSS because the EFlows team was assured by the Client that the sediment regime upstream and downstream of Upper Trishuli HEP would remain at baseline levels. Rainbow Trout were also excluded from the assessment. This was because there were no curves for rainbow trout for the Neelum-Jhelum, and because rainbow trout in the study area are escapees from nearby trout farms.

The linked indicators, the response curves and the explanations of the shape of the response curves for each of the indicators, using Site 2 as an example, are tabulated as follows:



**Table 7.1 Exposed sand and gravel bars**

| Linked indicator and response curve | Explanation |
|---|---|
|  | During the dry season when sediment levels are low, finer sediment is scoured from the active channel, leading to a slow loss of sand/gravel bars. The longer the dry season, the more erosion of bars will occur. |

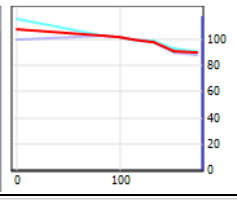
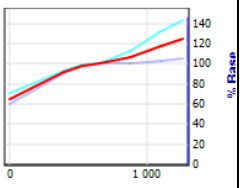
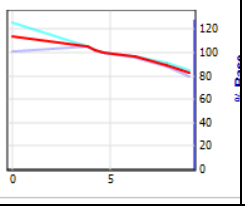
| Linked indicator and response curve | Explanation |
|---|---|
| ☑ Wet season duration [F season]<br>Desc / days / Y1 / Y2<br>Min 0.000 0.500<br>Min Base 84.000 0.100<br>98.000 0.050<br>Median 112.000 0.000<br>131.500 -0.100<br>Max Base 151.000 -0.500<br>Max 173.650 -0.600<br>  | Longer wet seasons mean a longer period of high flows with relatively lower sediment loads (in this river observed data suggest that the peak sediment loads generally occur early in the wet season, prior to peak discharge). Thus longer wet seasons may mean greater erosion (widening/deepening) in the main channel, causing some reduction of sand/gravel. |
| ☑ Max 5d wet season Q [F season]<br>Desc / m3/s / Y1 / Y2<br>Min 0.000 -2.000<br>Min Base 391.480 -0.500<br>522.460 -0.100<br>Median 653.440 0.000<br>873.940 0.300<br>Max Base 1094.440 1.200<br>Max 1258.606 1.500<br>  | Larger floods are associated with higher sediment loads, and with widespread channel instability and reworking of the channel bed and banks. Large floods will thus introduce more sediment and create more sand/gravel bars during the flood season (which can be exposed as sand/gravel bars during the dry season). |
| ☑ Dry season ave daily vol [D season]<br>Desc / Mm3/d / Y1 / Y2<br>Min 0.000 1.000<br>Min Base 3.890 0.200<br>4.283 0.100<br>Median 4.675 0.000<br>6.286 -0.200<br>Max Base 7.896 -0.600<br>Max 9.081 -1.000<br>  | Lower flows mean that more bars will be exposed. |

**Table 7.2 Exposed cobble and boulder bars**

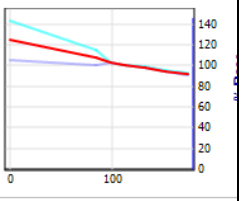
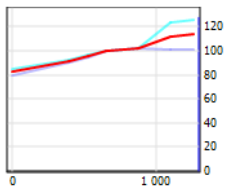
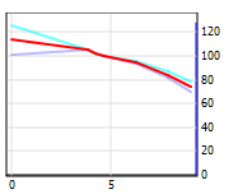
| Linked indicator and response curve | Explanation |
|---|---|
| ☑ Wet season duration [F season]<br>Desc / days / Y1 / Y2<br>Min 0.000 1.500<br>Min Base 84.000 0.500<br>98.000 0.100<br>Median 112.000 0.000<br>131.500 -0.100<br>Max Base 151.000 -0.300<br>Max 173.650 -0.500<br>  | Longer wet seasons mean a longer period of high flows with relatively lower sediment loads (in this river observed data suggest that the peak sediment loads generally occur early in the wet season, prior to peak discharge). Thus longer wet seasons may mean greater erosion (widening/deepening) in the main channel, with some potential loss of cobble bars. |
| ☑ Max 5d wet season Q [F season]<br>Desc / m3/s / Y1 / Y2<br>Min 0.000 -1.000<br>Min Base 391.480 -0.500<br>522.460 -0.250<br>Median 653.440 0.000<br>873.940 0.100<br>Max Base 1094.440 0.900<br>Max 1258.606 1.000<br>  | Very large floods tend to redistribute sediments across the channel, and in rivers with a cobble matrix these events should enlarge existing and create additional bars. Very small floods may not overcome thresholds to redistribute bed sediments across the valley floor, allowing bars to over time be incorporated in to the bank. |
| ☑ Dry season ave daily vol [D season]<br>Desc / Mm3/d / Y1 / Y2<br>Min 0.000 1.000<br>Min Base 3.890 0.200<br>4.283 0.100<br>Median 4.675 0.000<br>6.286 -0.300<br>Max Base 7.896 -0.900<br>Max 9.081 -1.500<br>  | Lower flows mean that more bars will be exposed |

**Table 7.3 Median bed sediment size**

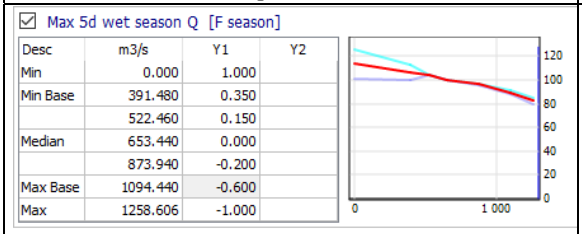
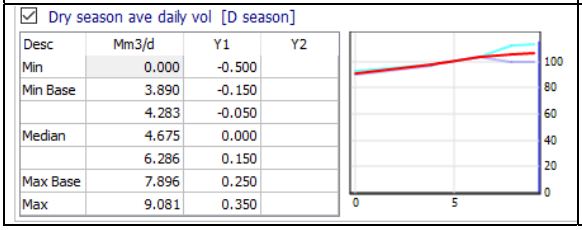
| Linked indicator and response curve | Explanation |
|---|---|
|  | Larger floods are associated with higher sediment loads, and with widespread channel instability and reworking of the channel bed and banks. Large floods will thus reset the channel sediments, resulting in overall finer average bed sediment conditions. |
|  | The lower the dry season discharge, the more fines that can deposited on the channel bed and thus the smaller the mean bed sediment size will become. The higher the dry season discharge, the more fines that will be removed and the coarser the (now armoured) channel bed will become. |

**Table 7.4 Area of secondary channels and backwaters**

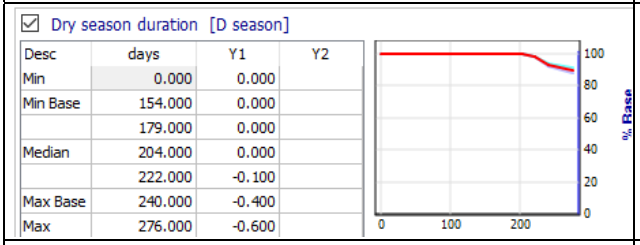
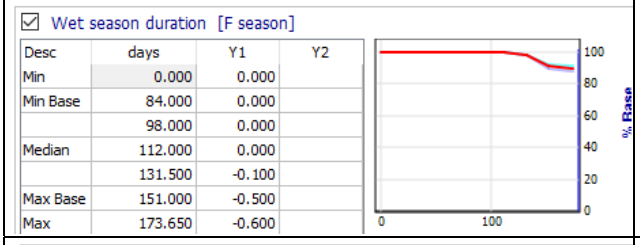
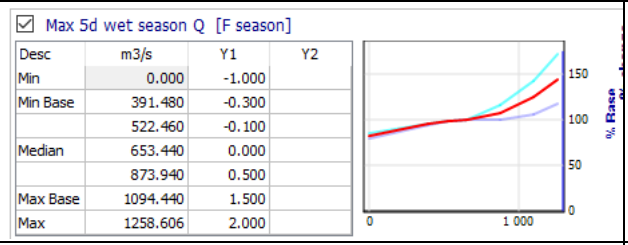
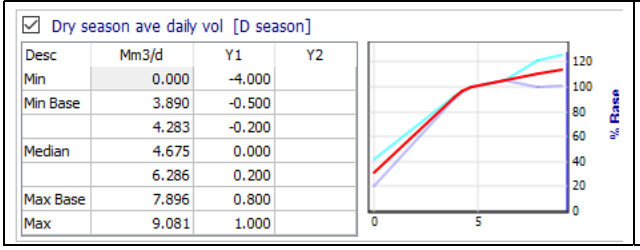
| Linked indicator and response curve | Explanation |
|---|---|
|  | During the dry season when sediment levels are low, the active channel bed slowly erodes, increasing capacity and leading to a slow abandonment of secondary channels. The longer the dry season, the more secondary channel abandonment will occur. This process will be exacerbated by reductions in sediment from upstream dams. |
|  | longer wet seasons mean a longer period of high flows with relatively lower sediment loads (in this river observed data suggest that the peak sediment loads generally occur early in the wet season, prior to peak discharge). Thus longer wet seasons may mean greater erosion (widening/deepening) in the main channel, causing some loss of secondary channels. |
|  | Very large floods will overwiden the channel and erode areas for secondary channels to form. Very small/failed floods may not be able to counteract channel narrowing of the low flow season. |
|  | The higher the average dry season flows, the more secondary channels will remain active during the low flow season (and thus available for instream biota). |

**Table 7.5 Algae**

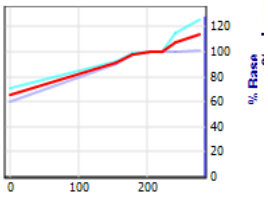
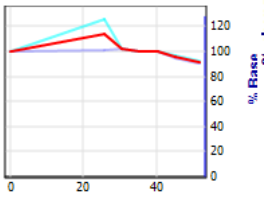
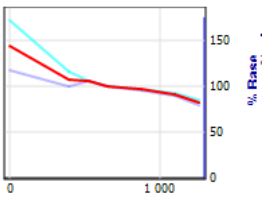
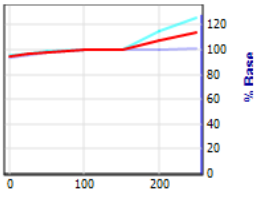
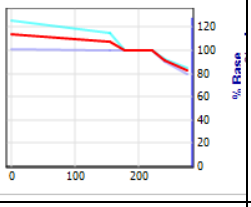
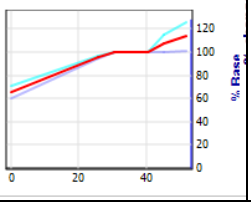
| Linked indicator and response curve | Explanation |
|---|---|
| ☑ Dry season duration [D season]<br>Desc / days / Y1 / Y2<br>Min 0.000 -2.000<br>Min Base 154.000 -0.500<br>179.000 -0.100<br>Median 204.000 0.000<br>222.000 0.000<br>Max Base 240.000 0.500<br>Max 276.000 1.000<br>  | Longer dry season - more time for algae to become established and temperatures also favourable towards the end of the dry season. |
| ☑ Min 5d dry season Q [D season]<br>Desc / m3/s / Y1 / Y2<br>Min 0.000 0.000<br>Min Base 25.620 1.000<br>30.570 0.100<br>Median 35.520 0.000<br>40.260 0.000<br>Max Base 45.000 -0.250<br>Max 51.750 -0.500<br>  | Lower discharge - calmer conditions, better for algae, to a point. At 0 cumecs the river will freeze. |
| ☑ Max 5d wet season Q [F season]<br>Desc / m3/s / Y1 / Y2<br>Min 0.000 2.000<br>Min Base 391.480 0.500<br>522.460 0.200<br>Median 653.440 0.000<br>873.940 -0.200<br>Max Base 1094.440 -0.500<br>Max 1258.606 -1.000<br>  | Lower peak flows and warm conditions will favour algae growth. Higher turbidity and currents will adversely affect the population. |
| ☑ Median bed sediment size (armouring) [F season]<br>Desc / %Base / Y1 / Y2<br>Min 0.000 -0.300<br>Min Base 25.000 -0.200<br>50.000 -0.100<br>Median 100.000 0.000<br>150.000 0.000<br>Max Base 200.000 0.500<br>Max 250.000 1.000<br>  | The more stable (armoured) the bed, the greater the flows necessary to remove algae. |

**Table 7.6 EPT (Ephemeroptera, Plecoptera and Trichoptera)**

| Linked indicator and response curve | Explanation |
|---|---|
| ☑ Dry season duration [D season]<br>Desc / days / Y1 / Y2<br>Min 0.000 1.000<br>Min Base 154.000 0.500<br>179.000 0.000<br>Median 204.000 0.000<br>222.000 0.000<br>Max Base 240.000 -0.500<br>Max 276.000 -1.000<br>  | Aquatic invertebrates have life-histories that are adapted to wide variations in seasonal flows, but populations are likely to drop slightly if the low-flow period is too long. A longer period of low-flows is also likely to increase the risks of mortality as a result of high water temperature once the seasons change. |
| ☑ Min 5d dry season Q [D season]<br>Desc / m3/s / Y1 / Y2<br>Min 0.000 -2.000<br>Min Base 25.620 -0.250<br>30.570 0.000<br>Median 35.520 0.000<br>40.260 0.000<br>Max Base 45.000 0.500<br>Max 51.750 1.000<br>  | With less discharge there is less wetted area. |

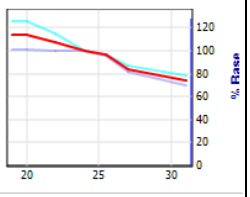
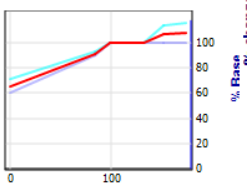
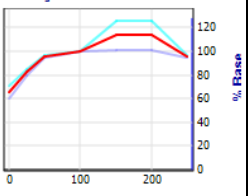
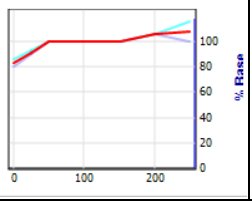
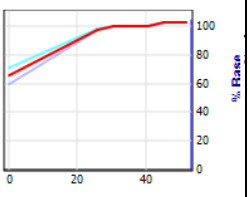
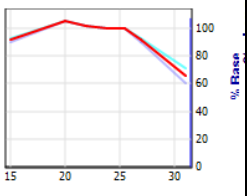
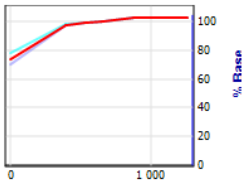
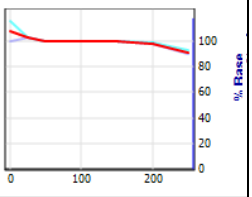
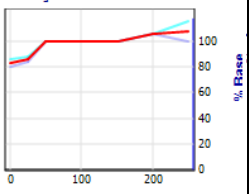
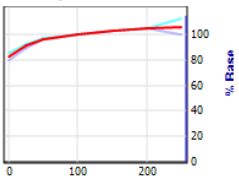
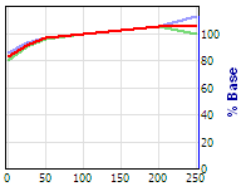
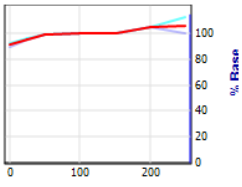
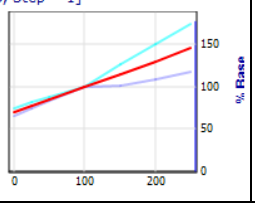
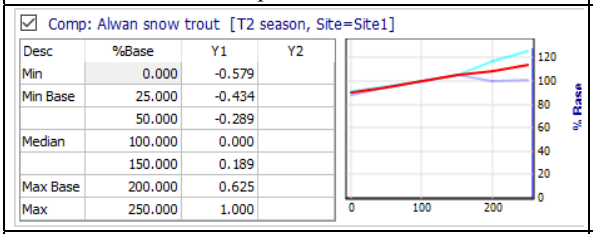
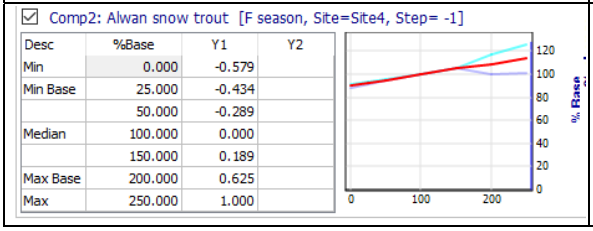
| Linked indicator and response curve | Explanation |
|---|---|
| ☑ Wet season onset [F season]<br>Desc / cal week / Y1 / Y2<br>Min 19.000 1.000<br>Min Base 20.000 1.000<br>22.000 0.500<br>Median 24.000 0.000<br>25.500 -0.200<br>Max Base 27.000 -0.900<br>Max 31.050 -1.500<br>  | Delayed onset will affect cues for emergence/laying eggs |
| ☑ Wet season duration [F season]<br>Desc / days / Y1 / Y2<br>Min 0.000 -2.000<br>Min Base 84.000 -0.500<br>98.000 0.000<br>Median 112.000 0.000<br>131.500 0.000<br>Max Base 151.000 0.400<br>Max 173.650 0.500<br>  | The absence of a wet period will not provide the cues needed for hatching of eggs. Sufficient wet season duration is required to provide time for eggs to mature and hatch. |
| ☑ Median bed sediment size (armouring) [D season]<br>Desc / %Base / Y1 / Y2<br>Min 0.000 -2.000<br>Min Base 25.000 -1.000<br>50.000 -0.250<br>Median 100.000 0.000<br>150.000 1.000<br>Max Base 200.000 1.000<br>Max 250.000 -0.250<br>  | Fine sediments are difficult to attach to, EPT will do better with a more armoured bed to a point beyond which they will decline again.. |
| ☑ Algae [F season]<br>Desc / %Base / Y1 / Y2<br>Min 0.000 -1.000<br>Min Base 25.000 -0.500<br>50.000 0.000<br>Median 100.000 0.000<br>150.000 0.000<br>Max Base 200.000 0.200<br>Max 250.000 0.500<br>  | EPT eat algae. |

**Table 7.7 Snow trout - *S. richardsonii***

| Linked indicator and response curve | Explanation |
|---|---|
| ☑ Min 5d dry season Q [D season]<br>Desc / m3/s / Y1 / Y2<br>Min 0.000 -2.000<br>Min Base 25.620 -0.150<br>30.570 0.000<br>Median 35.520 0.000<br>40.260 0.000<br>Max Base 45.000 0.100<br>Max 51.750 0.100<br>  | Lower flows = lower water levels, low temperatures as a result of lack of buffering. Can tolerate low temperatures and high turbidity. Field surveys in winter recorded temperatures of around 8oC, and air temperatures around 8-9oC. |

| Linked indicator and response curve | Explanation |
|---|---|
| ☑ Wet season onset [F season]<br>Desc / cal week / Y1 / Y2<br>Min 15.000 -0.500<br>Min Base 20.000 0.200<br>22.000 0.050<br>Median 24.000 0.000<br>25.500 0.000<br>Max Base 27.000 -0.500<br>Max 31.050 -2.000<br>  | The snow trout breeds during summer season from May to August (Negi 1994). By this time of the year, the fish eggs reach to its final stage of maturity provided the aquatic system provides sufficient food required for proper development of eggs. Once the eggs reach to their final stage of maturity, the fish is ready to spawn under various triggers like the snowmelt, rise in water temperature, comparatively higher turbidity level, swelling of rivers, creation of side channels etc. mainly linked with the monsoon rains and snow melt in the upper reaches of the Himalayan rivers (Rafique and Qureshi 1997). The breeding triggers, however, should coincide with the maturity of eggs in the ovary of fish for successful spawning.<br>Early onset of the flood season (a month before the median) is predicted to lead to better food availability early in the season, which would help the proper development of eggs leading to improved breeding.<br>In years when there is a delayed onset of the flood season, it is predicted that the fish would have mature eggs but could miss the necessary triggers for breeding. Eggs could perish within the fish and be reabsorbed. Failure of the flood season would mean that breeding habitats in the side channels do not become available, resulting in the failure of breeding. |
| ☑ Max 5d wet season Q [F season]<br>Desc / m3/s / Y1 / Y2<br>Min 0.000 -1.500<br>Min Base 391.480 -0.150<br>522.460 -0.050<br>Median 653.440 0.000<br>873.940 0.100<br>Max Base 1094.440 0.100<br>Max 1258.606 0.100<br>  | Lower flows in the wet season = lower water levels: may result in higher water temperatures as a result of lack of buffering. Can tolerate a range of water temperatures 8°C to 22°C (Sharma, 1989) [optimal temperature 15-16°C]. Field surveys in summer recorded temperatures of around 14-16oC. |
| ☑ Exposed sand and gravel bars [D season]<br>Desc / %Base / Y1 / Y2<br>Min 0.000 0.500<br>Min Base 25.000 0.100<br>50.000 0.000<br>Median 100.000 0.000<br>150.000 0.000<br>Max Base 200.000 -0.100<br>Max 250.000 -0.500<br>  | Prefer breeding habitat is side streams and back waters with gravel, rocky, cobbly bed. Pools and crevices preferred for wintering. Expanding sand and gravel bars will deteriorate habitat quality (pools and riffles). |

| Linked indicator and response curve | Explanation |
|---|---|
| ☑ Median bed sediment size (armouring) [F season]<br>Desc %Base Y1 Y2<br>Min 0.000 -1.000<br>Min Base 25.000 -0.800<br>50.000 0.000<br>Median 100.000 0.000<br>150.000 0.000<br>Max Base 200.000 0.200<br>Max 250.000 0.500<br>  | The fish favour areas with gravel and algae. Gravel beds, free of fine sediment, provide habitat for attached algae and are the feeding and breeding grounds for snow trout. Armouring would increase the availability of food for this fish, while fine sediment in the bed would reduce the area available for algal growth (Talwar and Jhingran 1991; Raina and Petr 1999). With decreasing particles size, there would be a higher chance of embeddedness of the spawning areas. The smaller particles fill the interstitial spaces and make it hard for attached algae to grow on the gravely and cobble bed resulting in less fish food production and hence a considerable decrease in fish population. Accumulation of larger particles in the river bed (armouring) result in a growth of attached algae which is food for the fish. It also becomes the breeding habitat for fish as it prefers the gravely and cobble bed for breeding. Consequently, the armouring of the bed results in a modest increase in fish population. |
| ☑ Area of secondary channels,back waters [D season]<br>Desc %Base Y1 Y2<br>Min 0.000 -1.000<br>Min Base 25.000 -0.500<br>50.000 -0.200<br>Median 100.000 0.000<br>150.000 0.100<br>Max Base 200.000 0.200<br>Max 250.000 0.300<br>  | |
| ☑ Algae [D season]<br>Desc %Base Y1 Y2<br>Min 0.000 -1.000<br>Min Base 25.000 -0.500<br>50.000 -0.200<br>Median 100.000 0.000<br>150.000 0.100<br>Max Base 200.000 0.200<br>Max 250.000 0.300<br>  | Snow trout are omnivorous and feed on algae and aquatic invertebrates (mainly EPT; Raina and Petr 1999). Its mouth is adapted to scraping algae from stones (Rai et. al. undated)). |
| ☑ EPT abundance [F season]<br>Desc %PD Y1 Y2<br>Min 0.000 -0.500<br>Min Base 25.000 -0.250<br>50.000 -0.050<br>Median 100.000 0.000<br>150.000 0.000<br>Max Base 200.000 0.200<br>Max 250.000 0.300<br>  | Snow trout are omnivorous and feed on algae and aquatic invertebrates (mainly EPT; Raina and Petr 1999). They are opportunist feeders and their dependence on invertebrates varies depending on the season and stage of maturity. In years with low EPT productivity, the fish would have less invertebrate food and the population would be compromised (Jhingran 1991).<br>In years with high EPT productivity, all age classes of fish would have better growth and fattening for overwintering and a high fecundity rate, which would lead to overall higher numbers. |
| ☑ Alwan snow trout [T1 season, Site=Site3, Step= -1]<br>Desc %Base Y1 Y2<br>Min 0.000 -1.737<br>Min Base 25.000 -1.303<br>50.000 -0.868<br>Median 100.000 0.000<br>150.000 1.000<br>Max Base 200.000 1.640<br>Max 250.000 2.020<br>  | Alsa migrates to Site 2 from downstream |

| Linked indicator and response curve | Explanation |
|---|---|
|  Comp: Alwan snow trout [T2 season, Site=Site1]<br>Desc %Base Y1 Y2<br>Min 0.000 -0.579<br>Min Base 25.000 -0.434<br>50.000 -0.289<br>Median 100.000 0.000<br>150.000 0.189<br>Max Base 200.000 0.625<br>Max 250.000 1.000<br>0 100 200<br>120 100 80 60 40 20 0<br>% Base | Alsa migrates to Site 2 from upstream |
|  Comp2: Alwan snow trout [F season, Site=Site4, Step= -1]<br>Desc %Base Y1 Y2<br>Min 0.000 -0.579<br>Min Base 25.000 -0.434<br>50.000 -0.289<br>Median 100.000 0.000<br>150.000 0.189<br>Max Base 200.000 0.625<br>Max 250.000 1.000<br>0 100 200<br>120 100 80 60 40 20 0<br>% Base | Alsa migrates to Site 2 from the Mailun tributary |

# 8 Scenarios

The Upper Trishuli-1 EFlows assessment comprises consideration of a series of design and operational scenarios for the proposed Upper Trishuli-1 HEP against a **2016 Baseline**.

The scenarios include permutations of:

i. Operating rules – different levels and patterns of EFlows releases
ii. Fish passages – presence/absence of fish passages.

The option of including permutations of sediment maintenance rules were considered but excluded because the EFlows team was assured by the Client that the sediment regime upstream and downstream of Upper Trishuli HEP would remain at baseline levels[1].

Eleven scenarios were selected for assessment as summarised in Table 8.1.

**Table 8.1 Scenarios selected for assessment**

| # | Code | Description | Fish Passage |
|---|---|---|---|
| 1 | Base-2016 | - | - |
| 2 | 10_MeanM_NoFP | 10% of mean baseline monthly flow | No |
| 3 | 10_MinM_NoFP | 10% of minimum baseline monthly flow | No |
| 4 | 30_MinM_NoFP | 30% of minimum baseline monthly flow | No |
| 5 | 20_MeanM_NoFP | 30_MinM, except : 20% of baseline dry season mean monthly flow (10.60 $m^3/s$) until calendar week 22 (end May) and after week 44 (end October), unless 30_MinM was higher.<br>Aim: Test a higher dry season flow, as Scenarios 2, 3, and 4 all had very low flows and severe effects. | No |
| 6 | 202_W_noFP | 30_MinM, except if 30_MinM was below 202$m^3/s$ (The T1/W threshold) between weeks 26 (end June) and week 40 (beginning October), in which case 202$m^3/s$ was supplied.<br>Aim: To test the ameliorating effects of a less severely shortened wet season | No |
| 7 | 10_MeanM_FP | 10% of mean baseline monthly flow | Yes |
| 8 | 10_MinM_FP | 10% of minimum baseline monthly flow | Yes |
| 9 | 30_MinM_FP | 30% of minimum baseline monthly flow | Yes |
| 10 | 20_MeanM_FP | 30_MinM, except : 20% of baseline dry season mean monthly flow (10.60 $m^3/s$) until calendar week 22 (end May) and after week 44 (end October), unless 30_MinM was higher.<br>Aim: Test a higher dry season flow, as Scenarios 2, 3, and 4 all had very low flows and severe effects. | Yes |
| 11 | 202_W_FP | 30_MinM, except if 30_MinM was below 202$m^3/s$ (The T1/W threshold) between weeks 26 (end June) and week 40 (beginning October), in which case 202$m^3/s$ was supplied.<br>Aim: To test the ameliorating effects of a less severely shortened wet season | Yes |

[1] This is an important assumption as it is rare that in-channel weirs have no effect on the downstream movement of suspended or bedload sediments, and changes in sediment supply can be a major cause of impact to rivers downstream of dams and weirs.

## 8.1 Assumption for barriers to fish

The influence of the Upper Trishuli-1 HEP weir and reservoir on Asla populations at the various sites is partially attributable to the barrier created to the movement of fish between breeding and feeding areas, or between the main steam and tributaries. To account for this influence, the DRIFT DSS considered the influence of Upper Trishuli-1 HEP on the movement of Asla snow trout between the EFlows sites.

Within the DRIFT DSS, the barrier effect of water resource developments is modelled through specifying percentage reductions (or increases) in the "connectivity" between one site and another. Connectivity effects are specified per indicator. For the purposes of illustrating *potential* impacts of fish passage the following applied:

- With UT weir in place and no fish passage: 100% reduction in both upstream and downstream connectivity for *S. richardsonii* between Site1 and Site2.
- With UT weir in place with a fish passage: 50% reduction in both upstream and downstream connectivity for *S. richardsonii* between Site1 and Site2.

The change in connectivity that was modelled in DRIFT does not imply that this level is achievable.

The impact of the barrier on fish is dictated by a combination of migration success and dependence on migration. For instance, a population of fish may depend on getting past a barrier in order to access spawning / breeding grounds, and there may be no other location where the fish breed: this population would be highly dependent on migration.

# 9 Results of scenario analyses

For each scenario, the predicted changes in the river ecosystem are evaluated per site as:

1. estimated mean percentage change from baseline in the abundance, area or concentration of key indicators, and;
2. a time-series of abundance, area or concentration of key indicators under the flow regime resulting from each scenario.

Site 1 is not affected by flow changes as a result of Upper Trishuli-1 HEP, but depending on the scenarios, they may be affected by the barrier effect of the Upper Trishuli-1 Weir. Similarly Sites 3 and 4 (on the Mailun Tributary) are not affected by flow changes as a result of Upper Trishuli-1 HEP, but may be affected by the barrier created by the weir. Site 2 is expected to be affected by flow changes as a result of Upper Trishuli-1 HEP, plus by the barrier created by the weir.

## 9.1 Site 1[2]

### *9.1.1 Characteristics of the flow regime of each scenario at Site 1*

The main characteristics (median values) of the flow regimes associated with each of the scenarios are summarised in Table 9.1.

If constructed, Upper Trishuli-1 HEP would not affect flows or sediment supply at Site 1. Thus, all the scenarios have the same flow regime at Site 1.

**Table 9.1 Characteristics of the baseline flow regime at Site 1. Median values are given for the flow indicators.**

| Flow indicators | Units | Baseline |
|---|---|---|
| Mean annual runoff | $m^3/s$ | 177.33 |
| Dry season onset | week | 44.00 |
| Dry season duration | days | 204.00 |
| Min 5d dry season Q | $m^3/s$ | 35.52 |
| Wet season onset | week | 24.00 |
| Wet season duration | days | 112.00 |
| Max 5d wet season Q | $m^3/s$ | 653.44 |
| Flood volume | MCM | 3947.17 |
| Dry season ave daily vol | MCM | 4.68 |
| T1 ave daily vol | MCM | 12.88 |
| Wet season ave daily vol | MCM | 36.06 |
| T2 ave daily vol | MCM | 11.74 |
| T2 recession slope | - | -3.52 |

[2] Site 1 is upstream of dam/weir site

### *9.1.2 Mean percentage changes*

The mean percentage changes (relative to Baseline) for the indicators for each scenario at Site 1 are given in Table 9.2.

**Table 9.2 Site 1: The mean percentage changes (relative to Baseline, which equals 100%) for the indicators for each scenario.** Change representing an improvement in condition relative to baseline is marked in green[3]. Change representing a decline in condition relative to baseline is marked as follows: Orange = change >40-70%; red = change >70%.

| Indicators | | 10_MeanM_NoFP | 10_MinM_NoFP | 30_MinM_NoFP | 20_MeanM_NoFP | 202_W-NoFP | 10_MeanM_FP | 10_MinM_FP | 30_MinM_FP | 20_MeanM_FP | 202_W_FP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Geo-morphology | Bedload inflows | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Suspended Sediment inflow | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Suspended sediment load | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 |
| | Exposed sand and gravel bars | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| | Exposed cobble and boulder bars | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| | Median bed sediment size (armouring) | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 |
| | Area of secondary channels and back waters | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Algae | Algae | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Macro-invertebrates | EPT abundance | -3.9 | -3.9 | -3.9 | -3.9 | -3.9 | -3.9 | -3.9 | -3.9 | -3.9 | -3.9 |
| Fish | Snow trout: *S. richardsonii* | -92.0 | -92.0 | -92.0 | -92.0 | -92.0 | -49.8 | -49.8 | -49.8 | -49.7 | -49.7 |

The results indicate that the fate of the snow trout population upstream of the Upper Trishuli River is largely dependent on the efficacy of the fish passage provided in facilitating movement of these fish from their over-wintering areas downstream of Upper Trishuli-1 HEP to their breeding areas upstream. Provided this passage will allow 50% of the mature migrating fish up past the weir and through the reservoir, and adults and juveniles back down through the reservoir and down past the weir, then the Asla are expected to survive upstream of Upper Trishuli-1 HEP.[4]

### *9.1.3 Overall Integrity*

The Overall Integrity for each of the scenarios at Site 1 is illustrated in Figure 9.1. Given that the trout would survive at Site 1, the impact on overall integrity is expected to be minor provided there is a fish passage that allows for 50% of both upstream and downstream migrants to pass Upper Trishuli HEP.

3 These predictions report the last 10 years of the hydrological record used as the basis for scenarios.
4 But see comment on rainbow trout in Section 11.1

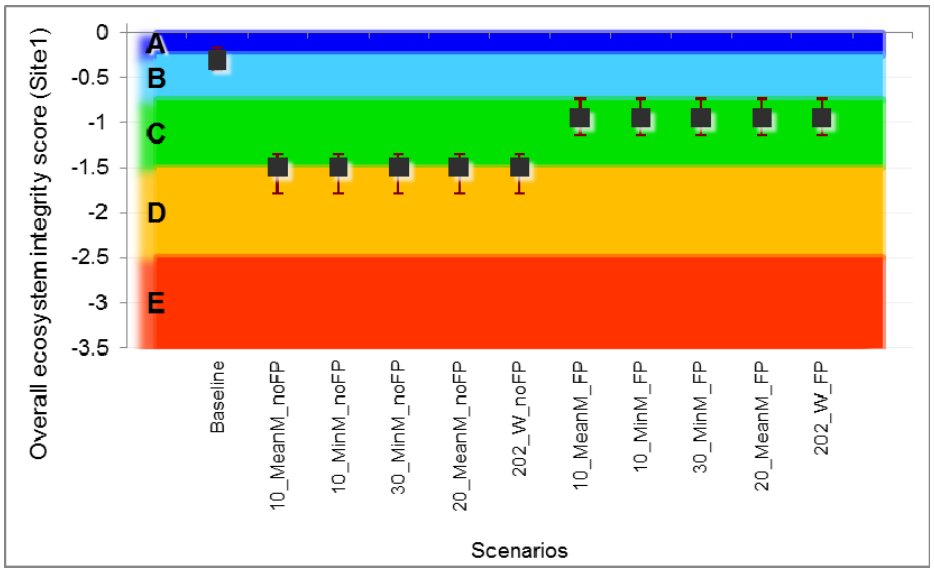



**Figure 9.1 Overall ecosystem integrity scores for the scenarios at Site 1.**

## 9.2 Site 2[5]

### *9.2.1 Characteristics of the flow regime of each scenario at Site 2*

The main characteristics (median values) of the flow regimes associated with each of the scenarios are summarised in Table 9.3.

**Table 9.3 Characteristics of the baseline and scenario flow regimes at Site 2. Median values are given for the flow indicators.**

| | Units | Baseline | 10_MeanM | 10_MinM | 30_MinM | 20_MeanM | 202_W |
|---|---|---|---|---|---|---|---|
| Mean annual runoff | $m^3/s$ | 177.33 | 116.87 | 116.22 | 117.58 | 119.73 | 119.46 |
| Dry season onset | week | 44.00 | 41.00 | 41.00 | 41.00 | 41.00 | 41.00 |
| Dry season duration | days | 204.00 | 243.00 | 243.00 | 243.00 | 243.00 | 243.00 |
| Min 5d dry season Q | $m^3/s$ | 35.52 | 3.88 | 3.88 | 3.88 | 10.60 | 3.88 |
| Wet season onset | week | 24.00 | 25.00 | 25.00 | 25.00 | 25.00 | 25.00 |
| Wet season duration | days | 112.00 | 91.00 | 91.00 | 91.00 | 91.00 | 99.00 |
| Max 5d wet season Q | $m^3/s$ | 653.44 | 577.44 | 577.44 | 577.44 | 577.44 | 577.44 |
| Flood volume | MCM | 3947.17 | 3012.46 | 3012.46 | 3012.46 | 3012.46 | 3147.06 |
| Dry season ave daily vol | MCM | 4.68 | 1.29 | 1.21 | 1.39 | 1.68 | 1.37 |
| T1 ave daily vol | MCM | 12.88 | 15.01 | 15.01 | 15.01 | 15.01 | 15.53 |
| Wet season ave daily vol | MCM | 36.06 | 33.27 | 33.27 | 33.27 | 33.27 | 31.50 |
| T2 ave daily vol | MCM | 11.74 | 11.83 | 11.83 | 11.83 | 11.83 | 11.53 |
| T2 recession slope | - | -3.52 | -6.00 | -6.00 | -6.00 | -6.00 | -9.51 |

[5] Site 2 is in the dewatered zone

### *9.2.2 Mean percentage changes*

The mean percentage changes (relative to Baseline) for the indicators for each scenario at Site 2 are given in Table 9.4.

The values provided in Table 9.4 are for the year round population of *S. richardsonii*, which means that they are fairly severe. This is almost wholly due to the low dry season releases for this 12 km reach of river, which negatively affects habitat availability and food supply. As already reported (Section 4), there was some suggestion at the outset of this study that the trout would have migrated downstream from this section at the onset of winter to avoid the cold temperatures, but that they were in fact recorded here in this and other studies. It is, however, likely that, with the decrease in winter low flows as a result of Upper Trishuli-1 HEP, the snow trout will in fact vacate this reach in winter; i.e. migrate downstream for the winter months, provided such migration is possible, i.e., is not blocked by other HEPs.

**Table 9.4 Site 2: The mean percentage changes (relative to Baseline, which equals 100%) for the indicators for each scenario – assuming *S. richardsonii* is resident at Site 2 year-round.** Change representing an improvement in condition relative to baseline is marked in green6. Change representing a decline in condition relative to baseline is marked as follows: Orange = change >40-70%; red = change >70%**.**

| Indicators | | 10_MeanM_NoFP | 10_MinM_NoFP | 30_MinM_NoFP | 20_MeanM_NoFP | 202_W-NoFP | 10_MeanM_FP | 10_MinM_FP | 30_MinM_FP | 20_MeanM_FP | 202_W_FP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Geo-morphology | Bedload inflows | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Suspended Sediment inflow | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Suspended sediment load | -16.2 | -16.2 | -16.2 | -16.2 | -9.6 | -16.2 | -16.2 | -16.2 | -16.2 | -9.6 |
| | Exposed sand and gravel bars | 8.4 | 8.7 | 8.2 | 7.5 | 7.5 | 8.4 | 8.7 | 8.2 | 7.5 | 7.5 |
| | Exposed cobble and boulder bars | 19.1 | 19.4 | 18.8 | 18.0 | 15.5 | 19.1 | 19.4 | 18.8 | 18.0 | 15.5 |
| | Median bed sediment size (armouring) | -10.0 | -10.3 | -9.7 | -8.8 | -9.8 | -10.0 | -10.3 | -9.7 | -8.8 | -9.8 |
| | Area of secondary channels and back waters | -77.0 | -79.4 | -74.9 | -68.7 | -75.4 | -77.0 | -79.4 | -74.9 | -68.7 | -75.4 |
| Algae | Algae | 8.1 | 8.0 | 8.1 | 10.1 | 7.9 | 8.1 | 8.0 | 8.1 | 10.1 | 7.9 |
| Macro-invertebrates | EPT abundance | -49.1 | -49.1 | -49.1 | -41.8 | -44.7 | -49.1 | -49.1 | -49.1 | -41.8 | -44.7 |
| Fish | Snow trout: *S. richardsonii* | -85.2 | -86.0 | -84.6 | -68.3 | -83.9 | -82.0 | -82.8 | -81.4 | -64.3 | -80.7 |

A key factor for Site 2 is that the Upper Trishuli-1 HEP, provided it is operated as indicated by the scenarios, is not expected to impinge of the onset of the wet season (~1 week delay expected; see Table 9.3). This means that it is not expected to seriously disrupt the migration cues for the snow trout, which, as far as is known, are a combination of flow, sediment and

[6] These predictions report the last 10 years of the hydrological record used as the basis for scenarios.

temperature cues (e.g., Jhingran 1991; Welcomme 1985; Sunder 1997). Thus, if fish do migrate out of the Site 2 reach in winter, they should migrate back up in the spring.

Other important findings are:

- increasing the dry season low flow release from Upper Trishuli-1 HEP (i.e., 20_MeanM_FP) will result in a ~14% improvement in the outcome of the snow trout at Site 2;
- reducing the impact on onset and duration of dry season, through provision of T1/W and W/T2 at 202$m^3$/s seasonal cusps (i.e., 202_W_FP) improves the predicted outcome for the snow trout by ~7%.

If the assessment is run assuming that, under baseline conditions, the snow trout migrate away from Site 2 in the cold winter months, then the predicted outcomes are those shown in Table 9.5.

**Table 9.5 Site 2: The mean percentage changes assuming *S. richardsonii* migrates downstream and away from Site 2 in the winter**

| Indicator | | 10_MeanM_NoFP | 10_MinM_NoFP | 30_MinM_NoFP | 20_MeanM_NoFP | 202_W-NoFP | 10_MeanM_FP | 10_MinM_FP | 30_MinM_FP | 20_MeanM_FP | 202_W_FP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fish | Snow trout: *S. richardsonii* | -38.1 | -39.3 | -37.1 | -33.6 | -36.3 | -34.1 | -35.3 | -33.1 | -29.6 | -32.4 |

### *9.2.3 Overall Integrity*

The Overall Integrity for each of the scenarios at Site 2 is illustrated in Figure 9.2. As is the case for Table 9.4, the integrity reflects the fact that the overwintering population of *S. richardsonii* is expected to be impacted by (mainly) the low flow releases from Upper Trishuli-1 HEP.

The summer integrity of this reach would be better (Figure 9.3). That said, the results of the field work done in this study indicate that the snow trout DO reside at Site 2 all year round. However, long term field measurements should be carried out to justify the results obtained from the field study since different literatures mention that S. richardsonii is a mid-distant migratory fish species.

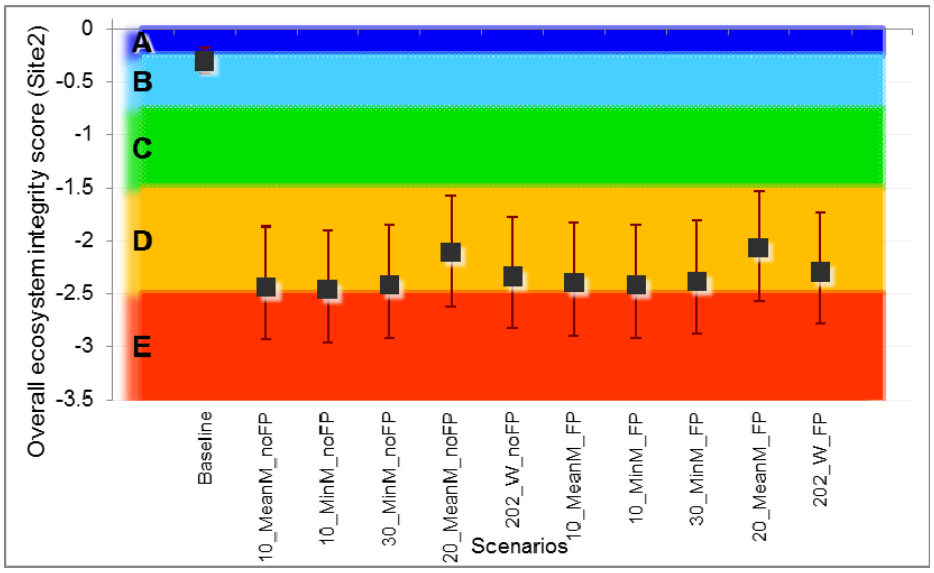



**Figure 9.2 Overall ecosystem integrity scores for the scenarios at Site 2 – assuming *S. richardsonii* is a year-round resident.**

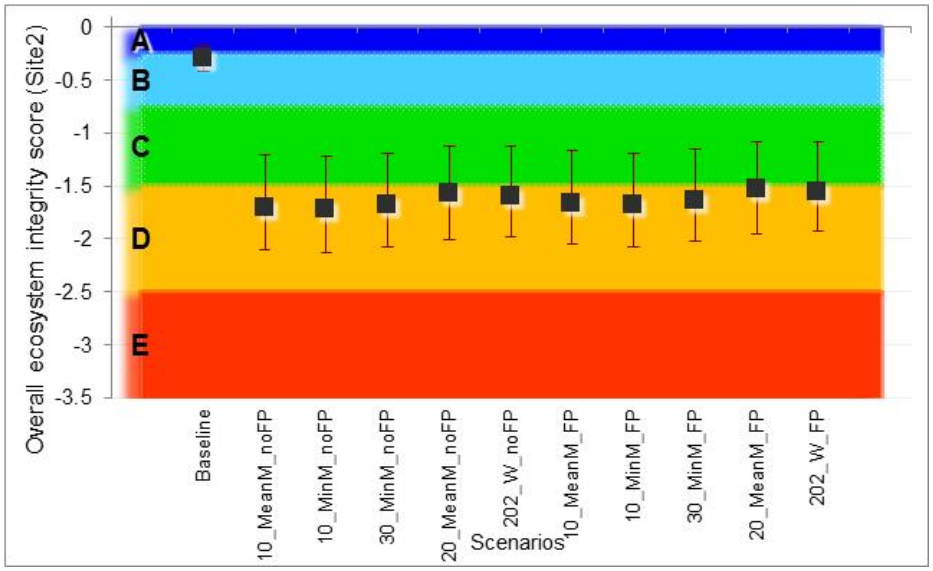



**Figure 9.3 Overall ecosystem integrity scores for the scenarios at Site 2 – assuming *S. richardsonii* is a summer resident.**

## 9.3 Site 3[7]

### *9.3.1 Characteristics of the flow regime of each scenario at Site 3*

The main characteristics (median values) of the flow regimes associated with each of the scenarios are summarised in Table 9.6.

**Table 9.6 Characteristics of the baseline flow regime at Site 3. Median values are given for the flow indicators.**

| Flow indicators | Units | Baseline |
|---|---|---|
| Mean annual runoff | $m^3/s$ | 179.81 |
| Dry season onset | week | 44.00 |
| Dry season duration | days | 204.00 |
| Min 5d dry season Q | m3/s | 36.02 |
| Wet season onset | week | 24.00 |
| Wet season duration | days | 112.00 |
| Max 5d wet season Q | m3/s | 662.58 |
| Flood volume | MCM | 4002.38 |
| Dry season ave daily vol | MCM | 4.74 |
| T1 ave daily vol | MCM | 13.06 |
| Wet season ave daily vol | MCM | 36.57 |
| T2 ave daily vol | MCM | 11.90 |
| T2 recession slope | - | -3.57 |

### *9.3.2 Mean percentage changes*

The mean percentage changes (relative to Baseline) for the indicators for each scenario at Site 3 are given in Table 9.7.

The predicted impacts of Upper Trishuli-1 HEP are small at Site 3, and are mainly related to the barrier effects of Upper Trishuli weir, which are minor at the downstream site.

### *9.3.3 Overall Integrity*

The Overall Integrity for each of the scenarios at Site 3 is illustrated in Figure 9.4. The change in integrity with Upper Trishuli-1 HEP in place is related to that slight impact that the barrier is expected to have on downstream populations. This is expected to be relatively minor because there is breeding habitat downstream of Upper Trishuli-1 HEP.

[7] Site 3 is immediately Downstream of the Powerhouse site

**Table 9.7 Site 3: The mean percentage changes (relative to Baseline, which equals 100%) for the indicators for each scenario.** Change representing an improvement in condition relative to baseline is marked in green[8]. Change representing a decline in condition relative to baseline is marked as follows: Orange = change >40-70%; red = change >70%.

| Indicators | | 10_MeanM_NoFP | 10_MinM_NoFP | 30_MinM_NoFP | 20_MeanM_NoFP | 202_W-NoFP | 10_MeanM_FP | 10_MinM_FP | 30_MinM_FP | 20_MeanM_FP | 202_W_FL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Geo-morphology | Bedload inflows | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Suspended Sediment inflow | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Suspended sediment load | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 |
| | Exposed sand and gravel bars | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| | Exposed cobble and boulder bars | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| | Median bed sediment size (armouring) | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 |
| | Area of secondary channels and back waters | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Algae | Algae | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Macro-invertebrates | EPT abundance | -2.5 | -2.5 | -2.5 | -2.5 | -2.5 | -2.5 | -2.5 | -2.5 | -2.5 | -2.5 |
| Fish | Snow trout: *S. richardsonii* | -18.8 | -18.8 | -18.8 | -18.6 | -18.8 | -13.9 | -13.9 | -13.9 | -13.6 | -13.9 |

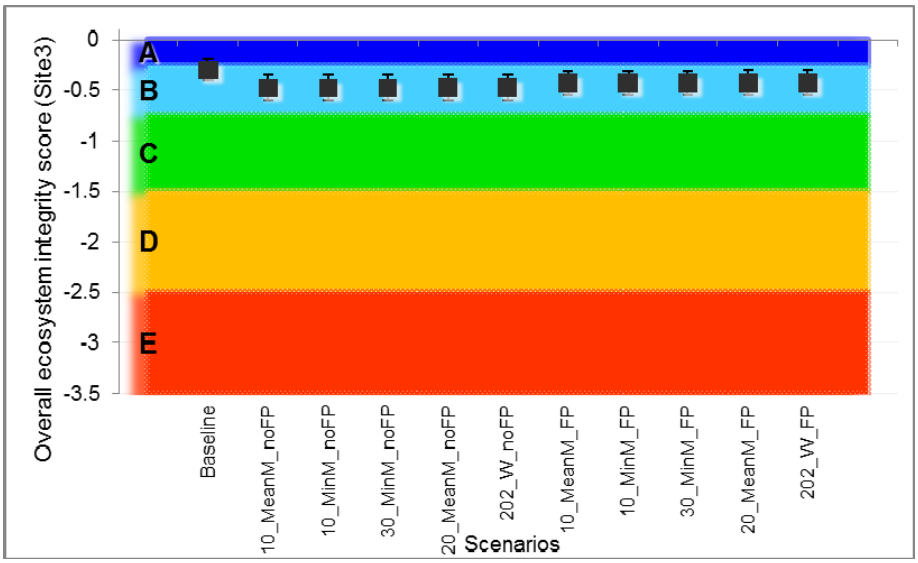



**Figure 9.4 Overall ecosystem integrity scores for the scenarios at Site 3.**

[8] These predictions report the last 10 years of the hydrological record used as the basis for scenarios.

# 10 Energy production and ecosystem Integrity at Site 2

The effect of different levels of EFlows releases on energy production was evaluated for different scenarios with the assumption that a fish passage will be constructed. The scenarios selected for comparison of energy production are: 10_MeanM_FP, 10_MinM_FP, 30_MinM_FP, 20_MeanM_FP and 202_W_FP. The descriptions of these scenarios are given in Table 8.1. The calculated energy production under each is shown in Table 10.1.

**Table 10.1 Energy Production under different EFlows scenarios**

| Eflows Scenarios | Energy Production (GWh) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total | % Change |
| 10_MeanM_FP | 84.5 | 68.9 | 74.8 | 91.0 | 133.6 | 153.8 | 162.7 | 162.8 | 157.5 | 161.3 | 137.8 | 105.0 | **1493.6** | 0.0 |
| 10_MinM_FP | 85.6 | 69.0 | 74.8 | 93.1 | 139.9 | 156.7 | 162.8 | 162.8 | 157.5 | 162.4 | 142.9 | 108.3 | **1515.6** | 1.5 |
| 30_MinM_FP | 84.5 | 68.9 | 74.8 | 77.4 | 129.5 | 153.8 | 162.7 | 162.8 | 157.5 | 161.3 | 137.8 | 105.0 | **1475.9** | -1.2 |
| 20_MeanM_FP | 71.2 | 55.8 | 60.4 | 77.4 | 129.5 | 153.8 | 162.7 | 162.8 | 157.5 | 161.3 | 134.1 | 94.0 | **1420.4** | -4.9 |
| 202_W_FP | 84.5 | 68.9 | 74.8 | 77.4 | 129.5 | 131.0 | 154.1 | 161.5 | 136.2 | 161.3 | 137.8 | 105.0 | **1422.1** | -4.8 |

The headloss data were not available from the Client, and a fixed amount of headloss for different flow conditions, i.e., 3% of the gross head, was assumed. This is not true in reality because headloss varies with the change in discharge passing through different project components from headworks to the powerhouse, but is sufficiently correct to allow for comparison between scenarios.

Table 10.1 shows that the 10_MinM_FP scenario (legally binding criteria) allows for generation of about 1.5% of annual energy than the 10_MeanM_FP scenario (the Client's commitment in the EIA report). Similarly, relative to 10_MinM_FP, 30_MinM_FP 20_MeanM_FP and 202_W_FP scenarios result in about 1.2%, 4.9% and 4.1% less annual energy, respectively.

Energy production decreases in the order of increasing EFlow releases (Figure 10.1 and Figure 10.2). Figure 10.2 shows the relationship between energy production and overall (median of the sites) ecosystem Integrity for the five scenarios.

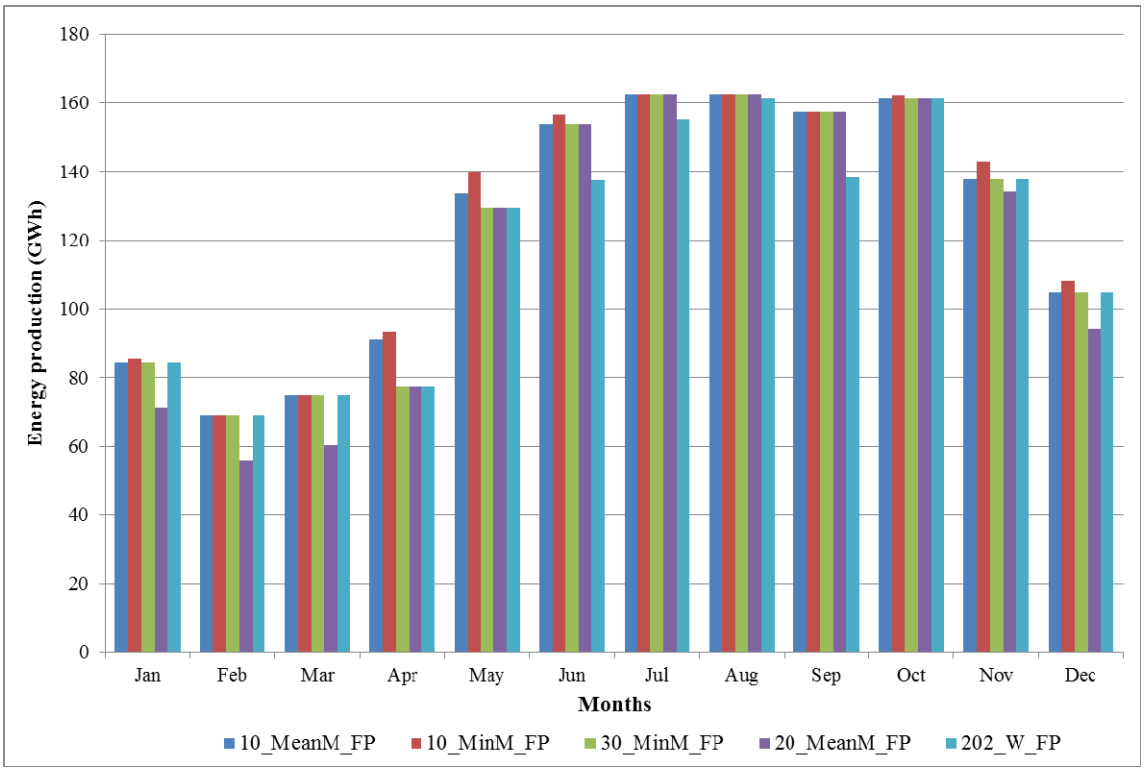



**Figure 10.1 Energy production under different EFlows scenarios**

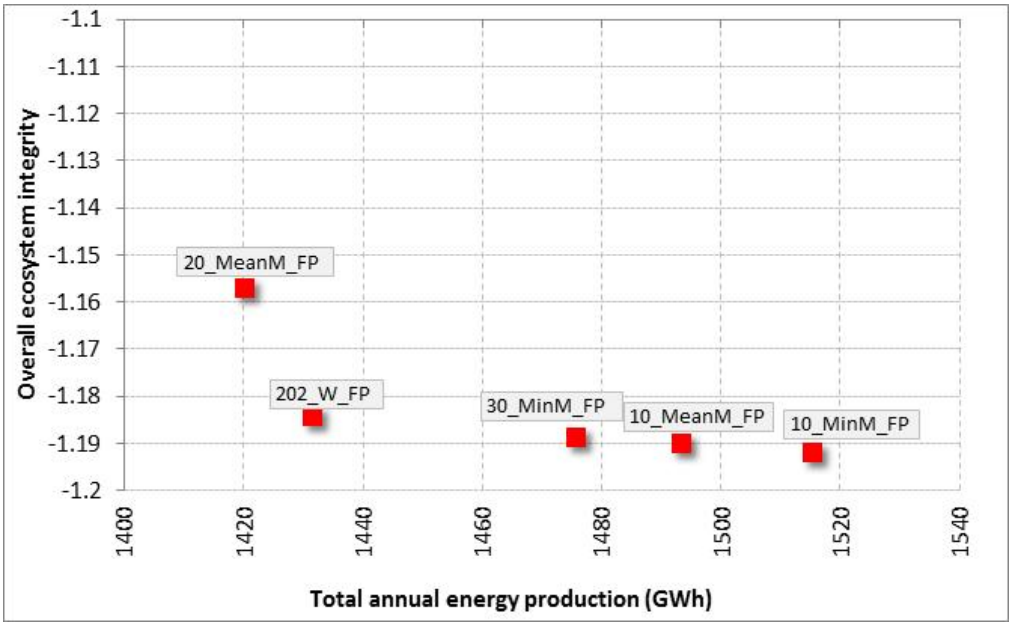



**Figure 10.2 Ecosystem Integrity (median of the Sites) vs energy production**

# 11 Additional Considerations

## 11.1 The effect of rainbow trout

It is important to highlight that the potential impacts of the exotic rainbow trout on snow trout have not been considered in this study, and could be severe. Rainbow trout are known to favour cold clear waters, and prey on snow trout. It is possible that the conditions created by Upper Trishuli-1 HEP and other HEPs in the Trishuli River will favour rainbow trout that escape from aquaculture farms in the area to the detriment of snow trout.

## 11.2 The effect of downstream and tributary HEPs

The results presented here assume that *S. richardsonii* will be able to migrate down the Trishuli River downstream of Upper Trishuli-1 HEP, and upstream in the tributary between Sites 2 and 3 (i.e., the Mailun River). If this is not the case, then the outcome for the trout will be significantly worse. A study on the cumulative impacts of all the HEPs planned for the Trishuli watershed is currently being undertaken by NWEDC and collaborators.

## 11.3 Contributions from Tributaries

A recent study on discharge measurement of tributaries of the UT-1 HEP in the dewatered zone conducted by S.A.N. Engineering Solutions Pvt. Ltd. (unpublished report) indicates that tributaries contribute to the main river flow in the dewatered zone. The contribution is, however, small relative to the main river flow and it is not considered during the EFlows modelling. The Fisheries Migration Research Field Visit Report by Halvard Kassa (March 2015) reveals low fish densities in the main river and high in the tributaries. The report concluded *"The data sampled in February/March give indications of a relatively small fish population in the main river with low fish densities compared to high fish densities in the tributaries. More data from other parts of the year are needed. Data so far are weak."* Therefore, flow available in the tributaries during the lean season (March, April and May) is likely to favour fish migration and breeding and the severe impacts on *S. richardsonii* are expected to be reduced with increase in EFlows of the main river though to a lesser extent.

## 11.4 Fish Passage

The fish passage modelled here allowed for an approximately 50% success rate. A fish passage in Nepal (Khimti Khola), which has particularly favourable design features, has achieved a higher success rate than this (Halvard Kaasa, unpublished presentation). Some of the findings of the Khimti Khola Fish Passage are also reported in the Environmental Monitoring Report published by Himal Power Limited in November, 2006. A fish passage for UT-1 is currently being designed by Halvard Kaasa, who is following good international practice.

## 11.5 *S. richardsonii* migration patterns

It was anticipated that the snow trout would not be resident immediately downstream of Upper Trishuli-1 HEP in the winter months, and therefore would not be impacted by the low flow releases from the weir, but this could not be proven in the time available for the study. It is, however, highly likely that the trout would migrate away from this reach in winter once Upper Trishuli-1 HEP is in place, particularly if low flow releases remain at design levels. More research is needed on the migration pattern of *S. richardsonii* in the Upper Trishuli River, particularly for the larger fish.

# 12 Conclusions and Next Steps

As represented by the indicators used in this study, Upper Trishuli-1 HEP is likely to affect the aquatic ecology of the Trishuli River. However, provided adequate provision is made for successful upstream and downstream passage of snow trout past the HEP, then the bulk of its impact should be within the 12-km dewatered stretch of the river.

Five EFlows scenarios were evaluated at three EFlows sites ([1] upstream of dam site; [2] downstream of the powerhouse site and; [3] in the dewatered section of the river). Upstream and downstream of UT-1, the ecological integrity and fish populations will not be impacted much, and the main impacts will be on the overwintering fish populations in the 12-km dewatered stretch. Inclusion of an effective fish passage will assist in maintaining the *S. richardsonii* migration within the watershed and ensure solid populations upstream and downstream of the project area.

The results of the EFlows assessment not surprisingly conclude that the best EFlows scenario for the *S. richardsonii* is the release of more water during the winter (low flow) months. However, power generation will be negatively impacted with the release of more water. Given the conditions of the Power Development Agreement between NWEDC and the Government of Nepal, and the financial situation of the project, it is highly unlikely that the project will be financially viable with this level of power loss. Furthermore, NWEDC has committed to a higher EFlows (10 % of baseline mean monthly flow) than is legally required by the Hydropower Development Policy, 2001. NWEDC has also exhibited commitment to biodiversity management for UT-1 through extensive baseline data collection, inclusion of a fish ladder that will meet international standards, a cumulative impacts assessment and this EFlows assessment.

Thus, the impacts on *S. richardsonii* within the 12 km dewatered zone will be mitigated by ensuring that migration is relatively unimpeded and that fish populations persist in the area. Apart from increased EFlows, the mitigation measures could include provision of a functional and efficient fish passage, fish hatcheries, and effective monitoring mechanism and adaptive management. Once decided upon, the agreed mitigation measures will be detailed in an Environmental Flow Management Plan.

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# Appendix A. **OVERVIEW OF DRIFT**

This appendix is a generic overview of DRIFT and as such may use examples from areas other than the Upper Trishuli River. The Upper Trishuli EFlows assessment was completed using Drift2-v2.97.exe.

DRIFT is a process and data-management DSS, allowing data and knowledge to be used to their best advantage in a structured way. Within DRIFT, discipline specialists use their own discipline-specific methods to derive the links between river flow and river condition. The central rationale of DRIFT is that different aspects of the flow or sediment regime of a river elicit different responses from the riverine ecosystem. Thus, removal of part or all of a particular element of the flow or sediment regime will affect the riverine ecosystem differently than will removal of some other element.

In DRIFT, the long-term daily-flow time-series is partitioned into parts of the flow regime that are thought to play different roles in sculpting and maintaining the river ecosystem, such as the onset of important flow seasons, which may affect breeding cycles, or the magnitude of the annual flood, which may inundate a floodplain. This makes it easier for ecologists to predict how changes in the flow regime could affect the ecosystem. The 'parts' of the flow regime used in DRIFT are called flow indicators. The indicators used for the Upper Trishuli River are presented in Section 5.

The variability of the flow regime in timing and magnitude, both in its natural state and in any future scenario, is captured automatically through algorithms within the hydrological module of the DSS that identify the nature of the flow indicators year-by-year. Thus, the 47 annual values of each flow indicator are provided for the 47 years of flow record. This means the specialists can consider a response to a condition for a particular time-step rather than thinking of an averaged response over several years. They can also use data from a particular year or season to calibrate time-series responses.

The study process was structured as follows:

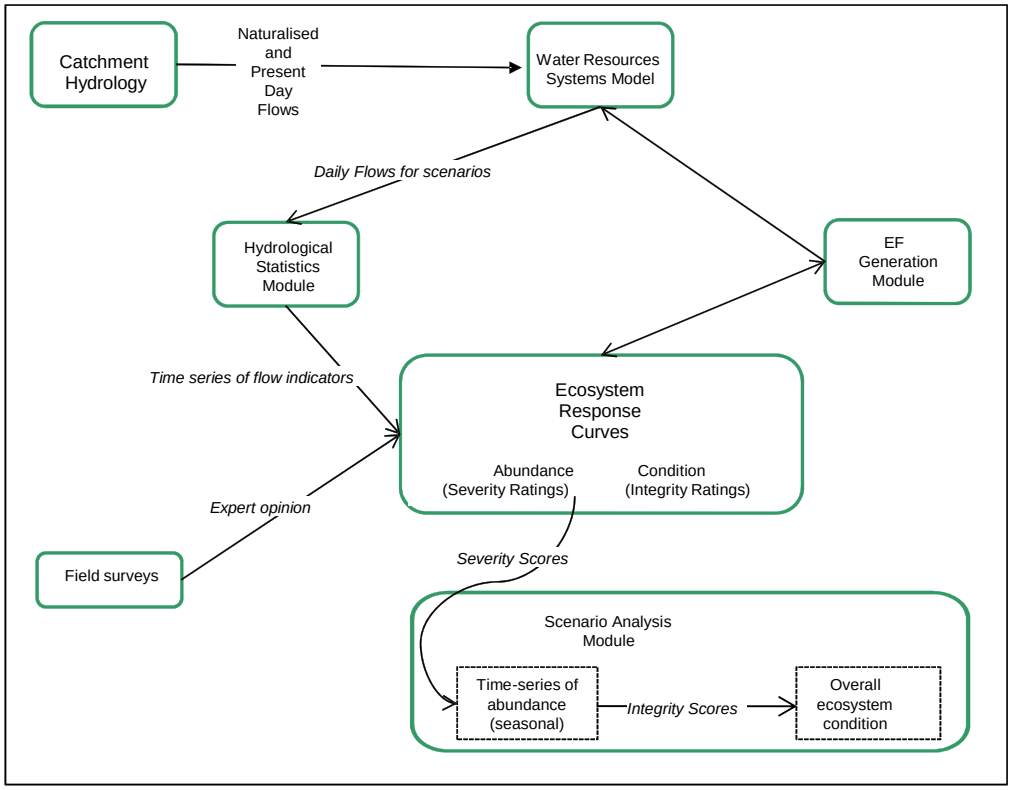
1. The study focused on five focus areas in the Upper Trishuli River (Section 1.2.1).
2. The flow changes were converted to ecologically-relevant summary statistics that highlighted:
    i. Changes in magnitude.
    ii. Changes in duration.
    iii. Changes in timing of seasons (e.g., delayed onset of wet season).
    iv. Changes within day ranges in discharge (i.e., for peaking power releases).
3. Specialists provided opinion on the consequences of these changes in the form of Response Curves. The disciplines represented were:
    i. Geomorphology
    ii. Macro invertebrates
    iii. Fish

Each specialist provided a list of ecosystem attributes that they believe could change with flow change. These are called ecosystem indicators.

4. The database was used to evaluate changes in these indicators for each scenario listed in Section 8.
5. The outputs of the DRIFT database are written up in Section 9.

The basic sequence of activities in the DRIFT DSS can be summarised as follows (Appendix Figure 1):

1. Collect data for the study at the river.
2. Augment with expert knowledge for similar river systems and a global understanding of river functioning.
3. Model current catchment hydrology and scenarios of future changes.
4. Calculate annual flow indicator time-series for all scenarios.
5. Construct relationships for the expected response of individual ecosystem indicators to changes in aspects of the flow regime (Response Curves). The Response Curves show the extent of change (i.e. severity of change – on a scale of 0 (no change) to 5 (very high change)) from baseline that would be expected from an ecosystem indicator in response to specific changes in flow.
6. Use Response Curves to predict time-series of abundance changes in each ecosystem indicator as a response to flow and consequent other changes.
7. Calculate Integrity for each indicator by assigning a direction of change, i.e., whether an increase in abundance will be expected to move the indicator away from the natural ecosystem condition or the opposite, and from this calculate discipline and site level Integrity.




**Appendix Figure 1 Flow chart of DRIFT process**

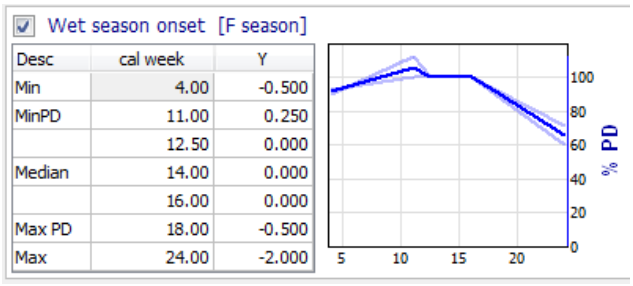
## A.1. RESPONSE CURVES[9]

Response Curves depict the relationship between a biophysical indicator and a driving variable (e.g., flow). In this EFlows assessment, Response Curves linked an indicator to any other

[9] The bulk of this section is taken from Joubert *et al*., 2009.

indicator deemed to be driving change. The aim is not try to capture every conceivable link, but rather to restrict the linkages to those that are most meaningful and can be used to predict the bulk of the likely responses to a change in the flow or sediment regimes of the river.

A Response Curve for the relationship between relative fish (e.g., Alwan Snow Trout) abundance (given as a severity rating – see Section A.2 for an explanation of the scoring system used) and a flow category, in this case, onset of the wet season, is shown in Appendix Figure 2. In this figure, an early or late start to the wet season would lead to decreased abundance.




**Appendix Figure 2 Example of a Response Curve – in this case of the relationship between the calendar week when the wet season begins and the abundance of Alwan Snow Trout.**

The units on the x-axis depend on the driving variable under consideration. For instance, in the case of wet season onset (Appendix Figure 2), these are weeks of the year.

The y-axis may refer to abundance as in Appendix Figure 2, but also to other measures such as concentration or area, depending on the indicator. Response curves are constructed using severity ratings (Section A.2).

The number of Response Curves constructed for an EFlows assessment depends on the level of detail at which a flow assessment is done. In the NJHEP assessment, for example, the specialists collectively completed 57 Response Curves for Site 2. These were used to evaluate scenarios by taking the value of the flow indicator for any one scenario and reading off the resultant values for the biophysical indicators from their respective Response Curves. Once this had been done the database combined these values to predict the overall change in each biophysical indicator and in the overall ecosystem under each scenario.

### *A.1.1. Construction of the Response Curves*

The Response Curves used in this project were constructed based on response curves constructed for the Neelum River, Pakistan. The Response Curves and explanations for their shape are contained in the DRIFT DSS, and in Section 7.

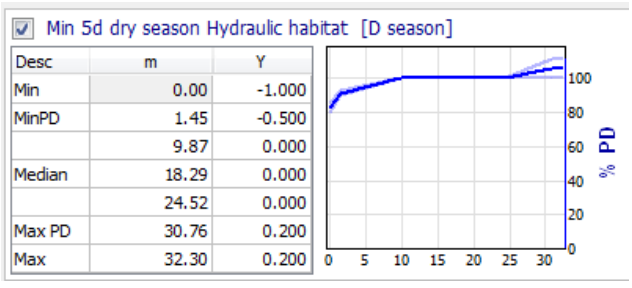
### *A.1.2. Response Curves and cumulative change*

The time-series approach means that the Response Curves are used to predict the likely seasonal change in an ecosystem indicator in response to the flow/sediment conditions experienced in that, or possibly preceding, seasons. For instance, the kind of questions and discussion typically

addressed to facilitate setting the Response Curves the effect of changes in dry season discharge on Alwan Snow Trout are:

- "If the dry season discharge declines from baseline values, what will be the consequences for the abundance of Alwan Snow Trout?"
  - Do Alwan Snow Trout use the main river in the dry season?
  - Do Alwan Snow Trout abundances change noticeably over the climatic range covered in the baseline, i.e., are they noticeably more abundant in wet years than in dry years, or vice versa?
  - What kinds of habitat do adult Alwan Snow Trout use in the main river?
  - Do Alwan Snow Trout breed in the dry season?
  - Do they breed in the main river or in the tributaries?
  - Where do Alwan Snow Trout lay their eggs?
  - What sorts of habitat do fry, fingerlings and juvenile trout use in the main river?
  - At what discharge(s) does the favored habitat(s) disappear?
  - What is the consequence of these habitats not being available for one season?
  - If discharge reaches zero for one season, are there pools that the trout will be able to survive in?
  - Can the Alwan Snow Trout survive for a dry season in pools?
  - Is water temperature a concern, i.e., would the river freezing be an issue for Alwan Snow Trout if discharge decreased?
  - What do Alwan Snow Trout adults/juveniles/fingerlings/fry eat?
  - How will the food base be affected by changes in dry season low flows?
  - Etc.

Often, a species such as Alwan Snow Trout will be expected to survive even an extremely-dry dry season, with possibly only minor changes (5-10%) in overall abundance, resulting in a Response Curve similar to that shown in Appendix Figure 3, which predicts a 20-40% seasonal decline in trout abundance if dry season flows drop to zero, even though the lowest 5-day minimum ever recorded at the Line of Control under baseline is 11.78 $m^3/s$. If, however, the flows drop to this level in the dry season year after year, then the cumulative effect on trout populations is likely to be far greater. The time-series enable the DSS to capture this cumulative effect.




**Appendix Figure 3 Response curve for Alwan Snow Trout response to changes in minimum 5-day dry season discharge.**

## A.2. SCORING SYSTEM

Into the foreseeable future, predictions of river change will be based on limited knowledge. Most river scientists, particularly when using sparse data, are thus reluctant to quantify predictions: it is relatively easy to predict the nature and direction of ecosystem change, but more difficult to predict its timing and intensity. To calculate the implications of loss of resources to subsistence and other users in order to facilitate discussion and trade-offs, it is nevertheless necessary to quantify these predictions as accurately as possible.

To aid this, two types of information are generated for each biophysical indicator, *viz*.:

- Severity ratings, which describe increase/decreases for an indicator in response to changes in the flow indicators, and;
- Integrity ratings, which indicate whether the predicted change is a move towards or away from the natural ecosystem condition, i.e., how the change influences overall ecosystem condition.

The severity ratings are used to construct the Response Curves. The Integrity ratings are used to predict changes in overall ecosystem condition/health.

### *A.2.1. Severity ratings*

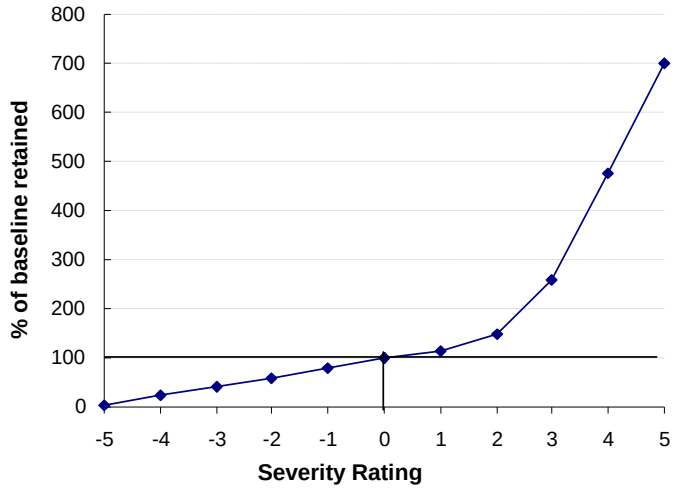
The severity ratings are on a continuous scale from -5 (large reduction) to +5 (very large change; Brown *et al*., 2008; Appendix Table 1), where the + or – denotes an increase or decrease in abundance or extent. These ratings are converted to percentages using the relationships provided in Appendix Table 1. The scale accommodates uncertainty, as each rating encompasses a range of percentages; however, greater uncertainty can also be expressed through providing a range of severity ratings (i.e. a range of ranges) for any one predicted change (after King *et al.*, 2003).

**Appendix Table 1 DRIFT severity ratings and their associated abundances and losses – a negative score means a loss in abundance relative to baseline, a positive means a gain.**

| Severity rating | Severity | % abundance change |
|---|---|---|
| 5 | Critically severe | 501% gain to ∞ up to pest proportions |
| 4 | Severe | 251-500% gain |
| 3 | Moderate | 68-250% gain |
| 2 | Low | 26-67% gain |
| 1 | Negligible | 1-25% gain |
| 0 | None | no change |
| -1 | Negligible | 80-100% retained |
| -2 | Low | 60-79% retained |
| -3 | Moderate | 40-59% retained |
| -4 | Severe | 20-39% retained |
| -5 | Critically severe | 0-19% retained includes local extinction |

Note that the percentages applied to severity ratings associated with gains in abundance are strongly non-linear[10] and that negative and positive percentage changes are not symmetrical (Appendix Figure 4; King *et al*. 2003).

For each year of the hydrological record, and for each ecosystem indicator, the severity rating corresponding to the value of a driving indicator is read off its Response Curve and converted to a percentage change. The severity ratings for each driving indicator are then combined to produce an overall change in abundance for each season, which combined provide an indication of how abundance, area or concentration of an indicator is expected to change under the given flow conditions over time, relative to the changes that would have been expected under baseline conditions in the catchment.




**Appendix Figure 4 The relationship between severity ratings and percentage abundance lost or retained as used in DRIFT and adopted for the DSS. (Baseline is always = 100%).**

*A.2.2. Integrity ratings*

Integrity ratings are on a scale from 0 to -5.

The integrity ratings are calculated by assigning a positive or negative sign to changes in abundance depending on whether an increase in abundance is a move towards natural or away. The integrity ratings for each indicator are then combined to provide a discipline level Integrity score. Discipline level integrity scores are in turn combined to provide an overall site level Integrity Score, which is used to place a flow scenario within a classification of overall river condition, using the South African Eco-classification categories A to F (Appendix Table 2; Kleynhans 1996; Kleynhans 1999; Brown and Joubert 2003).

The ecological condition of a river is defined as its ability to support and maintain a balanced, integrated composition of physico-chemical and habitat characteristics, as well as biotic components on a temporal and spatial scale that are comparable to the natural characteristics of

[10] The non-linearity is necessary because the scores have to be able to show that a critically-severe loss equates to local extinction whilst a critically severe gain equates to proliferation to pest proportions.

ecosystems of the region. As an example, if the baseline ecological status (BES) of a river is a B-category, and there is a decrease in a fish species which is a move away from natural, this will cause the integrity score to be more negative, representing movement in the direction of categories C to F.

**Appendix Table 2 Definitions of the Baseline Ecological State (BES) categories (after Kleynhans 1996).**

| Ecological category | Corresponding DRIFT Overall Integrity Score | Description of the habitat condition |
|---|---|---|
| A | >-0.25 | Unmodified. Still in a natural condition. |
| B | >-0.75 | Slightly modified. A small change in natural habitats and biota has taken place but the ecosystem functions are essentially unchanged. |
| C | >-1.5 | Moderately modified. Loss and change of natural habitat and biota has occurred, but the basic ecosystem functions are still predominantly unchanged. |
| D | >-2.5 | Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred. |
| E | >-3.5 | Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive. |
| F | <-3.5 | Critically / Extremely modified. The system has been critically modified with an almost complete loss of natural habitat and biota. In the worst instances, basic ecosystem functions have completely altered and the changes are irreversible. |

Overall Integrity Scores are calculated for the ecosystem as a whole, i.e., the combined effect of changes in the indicators at each site. The results can be plotted as overall Integrity Score (y-axis) vs. percentage or volume of MAR (x-axis) or, where there are relatively few points, as a plot of Integrity Scores per site, which allows for easy comparison between sites. The categories represent points along a continuum, thus the 'divisions' between the categories are only guides as to the general position at which the ecological condition might be expected to shift from one category to the next. Furthermore, the rules for the integrity categories were developed on rivers outside of the Republic of Congo, and have not been tested on the Upper Trishuli River. They provide an indication of the relative categories associated with each scenario and should not be misconstrued as an absolute prediction of future condition.

## A.3. IDENTIFICATION OF ECOLOGICALLY-RELEVANT ELEMENTS OF THE FLOW REGIME

One of the main assumptions underlying the DRIFT EFlows process is that it is possible to identify ecologically-relevant elements of the flow regime and isolate them within the historical hydrological record. Thus, one of the first steps in the DRIFT process is to identify these ecologically-important flow indicators. To do this, the flow provided for the river in question is used.

The seasons used in DRIFT are:

- Dry season
- Transitional season 1
- Flood season
- Transitional season 2

The rules for defining the seasons are provided in Appendix Table 3. Due to the moving nature of the seasons, start and end dates are defined for every year of the hydrological time-series.

**Appendix Table 3 Rules for defining the end of the four ecological seasons**

| Season | How the end of the season was defined |
|---|---|
| Dry Season | A multiple of the minimum dry season discharge |
| Transition 1 | A multiple of the minimum dry season discharge |
| Flood Season | A multiple of the mean annual discharge |
| Transition 2 | A multiple of the mean annual discharge, together with the recession rate calculated over a number of days |

## A.4. MAJOR ASSUMPTIONS AND LIMITATIONS OF DRIFT

Predicting the effect of flow changes on rivers is difficult because the actual trajectory and magnitude of the change is additionally dependent on so many other variables, such as climate, sediment supply and human use of the system. Thus, several assumptions underlie the predictions. Should any of these assumptions prove to be invalid, the actual changes may not match the predicted changes. This does not necessarily make the predictions themselves incorrect or invalid, but simply means that the surrounding set of circumstances that support the predictions has changed.

The following important major assumptions apply:

- The baseline hydrology closely approximates the actual flow conditions in the river over the period of record.
- Different parts of the flow regime sustain the river ecosystem in different ways. Changing one part of the flow regime will change the river in a different way than will changing another part.
- It is possible to identify ecologically-relevant elements of the flow regime and isolate them within the historical hydrological record (see Section A.3)
- 2016 conditions were used as a Baseline for predicting change, and change was expressed as a percentage move towards or away from the BES.
- Predicted changes in ecological status are relative to the BES (2016).
- Predictions are based on a 47-year horizon.

The main limitation is the paucity of data. This is a universal problem, as ecosystems are complex and we will probably never have complete certainty of their present and possible future characteristics. Instead it is essential to push ahead cautiously and aid decision-making, using best available information. The alternative is that water resource development decisions are made without consideration of the consequences for the supporting ecosystems, eventually probably making management of sustainability impossible. Data paucity is addressed in the DRIFT process by accessing every kind of knowledge available - general scientific understanding, international scientific literature, local wisdom and specific data from the river under consideration or from similar ones – and capturing these in a structured process that is transparent, with the DSS inputs and outputs checked and approved at every step. The Response

Curves used (and the reasoning used to construct them) are available for scrutiny within the DSS and they, as well as the DRIFT DSS, can be updated as new information becomes available.

A second aspect of the paucity of data is that it is neither known what the river was like in its pristine condition nor exactly how abundant each ecosystem aspect (sand bars, fish, etc.) was then or is now. To address this, all DRIFT predictions are made relative to the baseline situation (there will be a little more, or a lot less, than today, and so on).

These inherent uncertainties also mean that the trends and relative position of the scenarios are more reliable predictors of the impacts of the scenarios than are their absolute values. Also, DRIFT is designed to predict overall condition, and focusing on one indicator to the exclusion of others is not recommended.

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*Appendix F*
*Climate Change Risk Assessment*

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# Upper Trishuli-1 Hydropower Facility

Climate Change Risk Assessment

Final Report

Cloudwater, LLC

23 November 2016

# Contents

## List of Figures

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## Acronyms and Abbreviations

| | |
|---|---|
| APHRODITE | Asian Precipitation - Highly Resolved Observation Data Integration Towards Evaluation |
| CMIP3 | Coupled Model Intercomparison Project Phase 3 |
| CMIP5 | Coupled Model Intercomparison Project Phase 5 |
| DHM | Nepal Department of Hydrology and Meteorology |
| GCM | General (Global) Circulation Model |
| GPCC | Global Precipitation Climatology Centre |
| HYMOD_DS | Hydrologic Model for Distributed System with Glacier Module |
| IFC | International Finance Corporation |
| IPCC | Intergovernmental Panel on Climate Change |
| MGHPCC | Massachusetts Green High-Performance Computing Center |
| NWEDC | Nepal Water and Energy Development Company |
| RGI | Randolph Glacier Inventory |
| SNOW-17 | Snow Accumulation and Ablation Model adapted for HYMOD_DS |
| UT-1 | Upper Trishuli 1 hydropower facility |

# 1. **Problem Description and Risk Context**

## *1.1 Introduction*

This document describes the methods and initial results for the comprehensive climate change risk assessment of the Upper Trishuli-1 hydropower project. The methods described here represent the most advanced approach for assessing climate change risks and its uncertainty. The approach uses a risk assessment framework that accounts for risks and uncertainty associated with climate change and observational uncertainty that characterizes development in the Himalaya.

The focus of this analysis is to identify possible risks to the UT-1 design that may arise due to climate change. Risk screening will consist of literature review, data analysis, and original modeling and risk analysis using the decision-scaling methodology. In addition, where plausible risks are identified, adaptation options will be proposed and reviewed. Adaptation is discussed in Chapter 3 of this report. The primary risks to be addressed include:

- Reductions in streamflow, especially low flow season
- Extreme streamflows, including floods
- Changes to rain, snow and snow melt
- Changes in streamflow and effects on sedimentation and landslides
- Disease risks

The priority risks associated with climate change are: (1) increases in extreme streamflows that could jeopardize the physical integrity of the headworks; and (2) decreases in low season flows that could jeopardize the success of the project. Thus of primary importance is understanding the hydrologic response of the system to climate change. This section presents early findings of hydrologic modeling aspects of the risk assessment, and presents no hydropower, economic, or other results from the water system model. Results from the system model will be forthcoming in subsequent versions of the climate change risk assessment and risk management reports.

Other non-climate factors (e.g., economic, political, demographic) are not modeled probabilistically (i.e., using the stress test approach), but are described based on information collection and literature review. These potential impacts include: 1) potential irrigation development upstream of the dam site; 2) potential ecosystem services alteration as addressed in Yonzon (2010); 3) dam structure safety; and 4) public health (as concerns are identified). The expectation is that at this stage of analysis the concerns are likely to be adequately addressed through the information investigation and summarized in the final report. Hydro Lab, based in Kathmandu, has provided background and input on the dam safety and structural failure related concerns. HydroLab has expertise in dam structure, physical modeling and sedimentation, and have provided data and information as needed. We do not anticipate the need for physical modeling of sedimentation processes within this analysis.

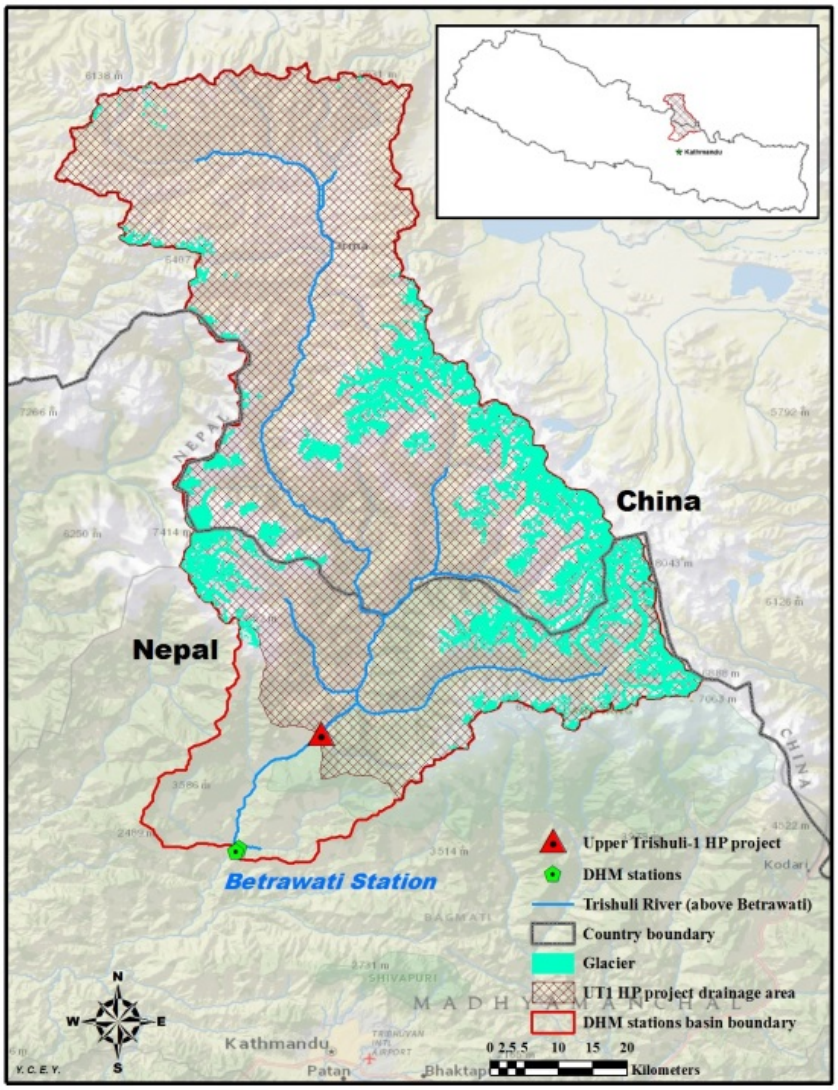


*Figure 1. The Upper Trishuli Basin includes territory in Nepal and China. The Betrawati station is the source of hydrologic data. The UT-1 project site is indicated by the red triangle.*

### *1.2 The Upper Trishuli-1 Hydropower Project*

The Upper Trishuli-1 Hydropower Project (UT-1) is a proposed hydropower project at the upstream of Trishuli River in Nepal (Figure 1). It is a run-of-the-river project with average gross head of 342 meters (NWEDC, 2014). The nearest Department of Hydrology and Meteorology (DHM) station is Betrawati with drainage area of 4850 $km^2$ (apprx. 38% in Nepal). Drainage area for the dam site is about 4157 $km^2$ (1251 $km^2$ in Nepal). Based on the Randolph Glacier Inventory (RGI version 3.2) database, the total area covered by glaciers is about 642 $km^2$ (above Betrawati). Sharma (1993) explained that the lowest streamflow occurs in March, which indicates the beginning of the melting season for snow and glacier. Snow and glacier meltwater continue to contribute significantly to streamflow through May and into June.

There are up to 14 projects planned for the Upper Trishuli River, representing 838 MW of hydropower capacity, a number greater than the total current hydropower capacity of Nepal. The UT-1 project is the largest project among these 14. Since it is a run-of-the-river project, the amount of power it generates will be sensitive to changes in the volume and timing of streamflow. Both climate change and changes due to socio-economic shifts are possible sources of change to streamflow, though current upstream development levels are relatively small in the watershed. To the best of our knowledge, there is no major development planned in the undeveloped Chinese part of the basin (Jilong County), and there is little current or planned irrigation in the Nepalese part of the basin. Therefore, the potential effects of climate change, including possible effects on sedimentation rates and extreme flows, are the major concerns for decision-making.

### *1.2 Hydrological and Meteorological Data*

Hydrologic and meteorological data were collected from a variety of sources. Meteorological data such as precipitation and temperature are primary inputs to the hydrologic model. Gridded daily temperature and precipitation products with a spatial resolution of 0.25º are available for the period 1961-2007 from the Asian Precipitation Highly Resolved Observational Data Integration Towards Evaluation (APHRODITE) dataset (Yatagai et al., 2012). The APHRODITE daily temperature data are directly used in the modeling process. However, our preliminarily data analysis confirmed the downward bias in APHRODITE precipitation previously reported by Palazzi et al. (2013). Therefore, for precipitation input to the hydrologic model the precipitation product from the Global Precipitation Climatology Centre (GPCC) dataset (Schneider et al., 2014) was downscaled both spatially (from 0.5º to 0.25º) and temporally (from monthly to daily) using the APHRODITE's spatial and temporal pattern.

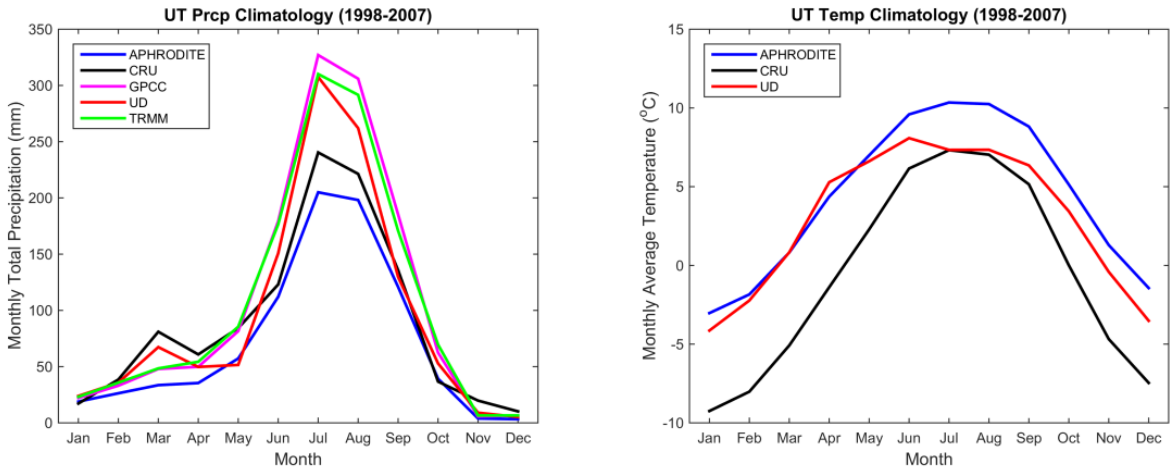


*Figure 2. Comparison of precipitation and temperature data from multiple sources. The differences between datasets reflect the difficulties associated with estimating meteorological data in locations with sparse observations and challenging terrain.*

Hydrologic data were collected for the two DHM stations located within the basin (Table 1). Finally, climate change projections provided by the current and previous generations of

climate modeling intercomparison projects were utilized to explore feasible climate conditions in the future.

*Table 1 Two DHM station at the Upper Trishuli River.*

| Station NO | River | Location | Lat (deg) | Lon (deg) | Elev (m) | Drain area ($km^2$) | Start year | End year |
|---|---|---|---|---|---|---|---|---|
| **446.8** | Phalankhukhola | Betrawati | 27.97 | 85.19 | 630 | 162 | 1971 | 1995 |
| **447** | Trishuli | Betrawati | 27.97 | 85.18 | 600 | 4110 | 1977 | 2006 |

### *1.3 Background on Climate Change in the Himalaya*

This section provides a brief description of climate change within a regional context based on the latest peer reviewed scientific literature. The "Greater Himalaya" is defined as the region including the Hindu-Kush-Karakorum mountains and the Himalayan mountains. More than 1.3 billion people rely on the water originated from the Greater Himalaya. Among the challenges facing South Asia, water resources management for sustainable water supply, agricultural production and energy generation in the region's great river basins are most pressing, due to the complex climatic/hydrologic regime (snow/glacier and monsoon) vulnerable to climate change and the potential for both inter- and intra-basin political conflict.

The first step in exploring the regional climate change impact is to identify possible trends in the historical climate data. In the Indus Basin, for example, a tendency was found that the winter is warming and the summer is cooling (Flowler and Archer, 2006; Ahmad et al., 2012; Bocchiola and Diolaiuti, 2013), though there is not a general agreement on the magnitude of the precipitation change. Though previously studies have not identified a statistically significant historical trend in annual precipitation, winter precipitation may be increasing (Archer and Fowler, 2004; Ahmad et al., 2012; Bocchiola and Diolaiuti, 2013). For example, Khattak et al. (2011) and Sharif et al. (2013) explain that streamflow in the upper Indus Basin is predominantly influenced by winter precipitation, and that increasing trends in winter steamflow and decreasing trends in summer streamflow have been observed.

Jain and Kumar (2012) analyzed the precipitation data for all of India and reported that precipitation in the Ganges basin exhibits no significant trend, and that precipitation in the Brahmaputra basin is decreasing. Both the upper Ganges (India-Nepal) and lower Ganges (India-Bangladesh) show decreasing trends in precipitation extremes (Adel, 2002; Duncan et al., 2013). Following on the precipitation result, other studies suggest that the streamflow in the monsoon season also has a decreasing trend (Sharma and Shakya, 2006).

In the upper Brahmaputra Basin, there is a general agreement on the presence of an increasing trend in both temperature (especially in winter) and precipitation (especially in spring) (Ge et al., 2004; Yao, 2008; Xu et al., 2009), which results in a slightly increasing trend in streamflow (Liu et al., 2007; Gao et al., 2008; Zhang et al., 2010). However, Tsao et al. (2005) observed no streamflow change in the major rivers originating from the

Qinghai-Tibetan Plateau, and Deka et al. (2013) pointed to a decreasing historical precipitation in the lower Brahmaputra basin.

The uncertainty in the historical trend is amplified in the future projections (see Figure 3). The latest generation of climate projections of the Intergovernmental Panel on Climate Change (IPCC) is called the Coupled Model Intercomparison Project Phase 5 (CMIP5). The CMIP5 ensemble shows a very large uncertainty in climate-change-related risks to the Greater Himalaya region. In the Greater Himalaya in general, uncertainty has increased since the previous generation of IPCC emission scenarios (the Coupled Model Intercomparison Project Phase 3, CMIP3); however, this is not the case in the Upper Trishuli basin (as shown in Figure 3). This uncertainty might be mainly due to the poor ability of the General Circulation Models (GCMs, also known as Global Climate Models) to represent both the snow/glacier effects and monsoon mechanism. As a result, a number of studies have attempted to discern and summarize the climate change impacts on the Greater Himalaya region. Immerzeel et al. (2010) concluded that huge differences exist between Himalayan basins in the extent to which climate change is predicted to affect water availability and food security. This is mostly attributable to differences in snow/glacier melt contribution to the streamflow. A summary of component contribution to streamflow by Savoskul et al. (2013) concluded that though glacier and snow melt contribute only small fractions (7% and 3%, respectively) to annual runoff in the Ganges and the Brahmaputra rivers, the glacier and snow melt contribution to streamflow in the Indus basin is on the range of 35-40%. The nonrenewable component in the total glacier runoff has increased from 16-30% to 26-46% since 1961 throughout the Greater Himalaya region, suggesting that glaciers are melting down in most (if not all) basins. Miller et al. (2012) explained that climate change may increase rainfall in the future, leading to increased flows in the Ganges and Brahmaputra, but with greater variability. The expectation of reduced snow/glacier runoff with increased precipitation variability makes it difficult to estimate future water availability in the Indus. According to Kulkarni et al. (2013), large-scale modeling results indicate that rainfall may be 40–50% more variable in the Central and Eastern Himalaya at the end of this century.

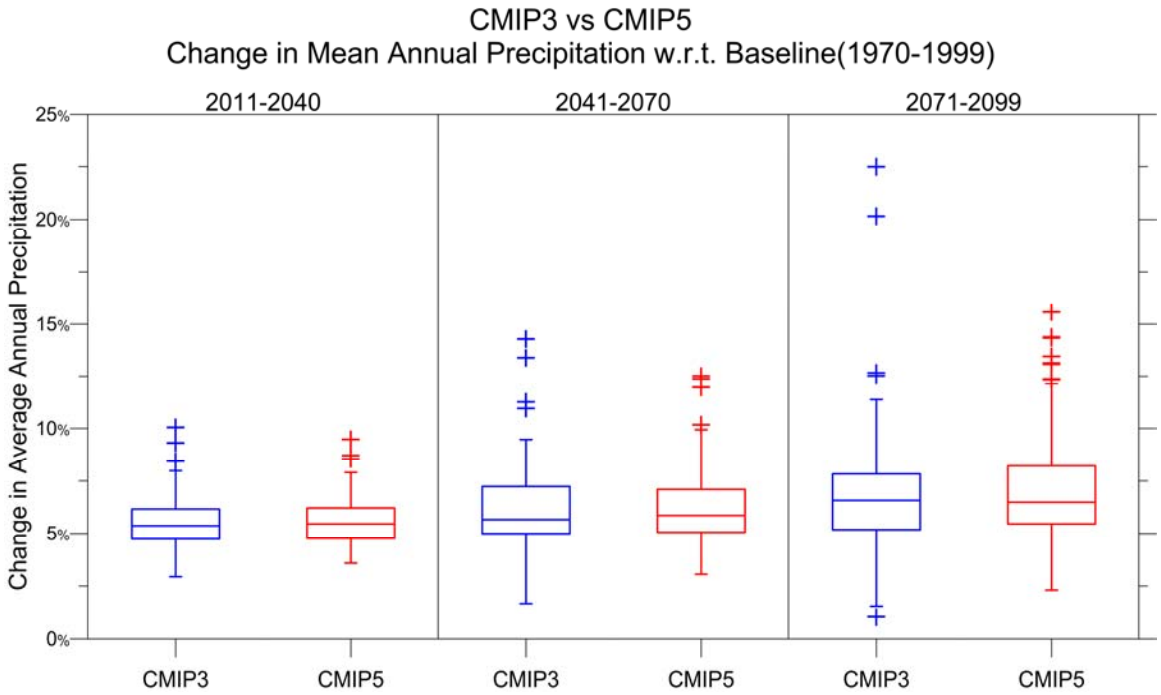


*Figure 3. Change in mean annual precipitation with respect to baseline (1970-1999).*

Specific to the Central Himalaya (including Nepal), Sharmar (1993) summarized the role of meltwater in major rivers of Nepal and reported that the snow-fed rivers show a rise in streamflow during the pre-monsoon period (April to mid-June) with meltwater contribution exceeding 30% in May. The role of meltwater becomes less important as compared to the role of groundwater and rainfall after May. Shrestha and Aryal (2011) explained that among the large rivers in Nepal, Karnali and Sapta Koshi show a decreasing trend, and Narayani (Kali Gandaki) shows an increasing trend. However, due to the short record and high inter-annual variability in discharge data, these observed trends in river discharge are not statistically significant. Regarding climate change impacts, Lutz et al. (2014) showed an increase in streamflow through 2050 caused primarily by an increase in precipitation in the upper Ganges. Likewise, Shrestha and Aryal (2011) projected an increasing trend in streamflow in the Kali Gandaki-Narayani river system, and argued that the catastrophic water shortages forecasted by some experts are unlikely to happen for many decades (if at all). However, the increases in precipitation and streamflow variability and the great uncertainties about future glacier meltwater availability that accompany projections of increasing streamflow indicate that the hydropower sector in Nepal continues to carry greater climate change risk than most other sectors (Bhusal, 2014). Greater unreliability of dry season flows, in particular, poses potential risks to hydroelectric energy production in the dry season when electricity prices are highest.

## 2. Methods

The decision scaling approach to climate change risk assessment applied to UT-1 requires four modeling subsystems: 1) a weather generator (algorithm for generating timeseries of potential future climate); 2) a hydrologic model (to translate climate timeseries into

timeseries of streamflow); 3) a water resources system model (to translate streamflow timeseries into timeseries of hydropower production and other water system performance metrics of interest); and 4) procedures for analyzing and describing the risks to the water system (such as statistical tools and graphical concepts). An example schematic of the modeling system is provided in Figure 4. The individual components are described below.

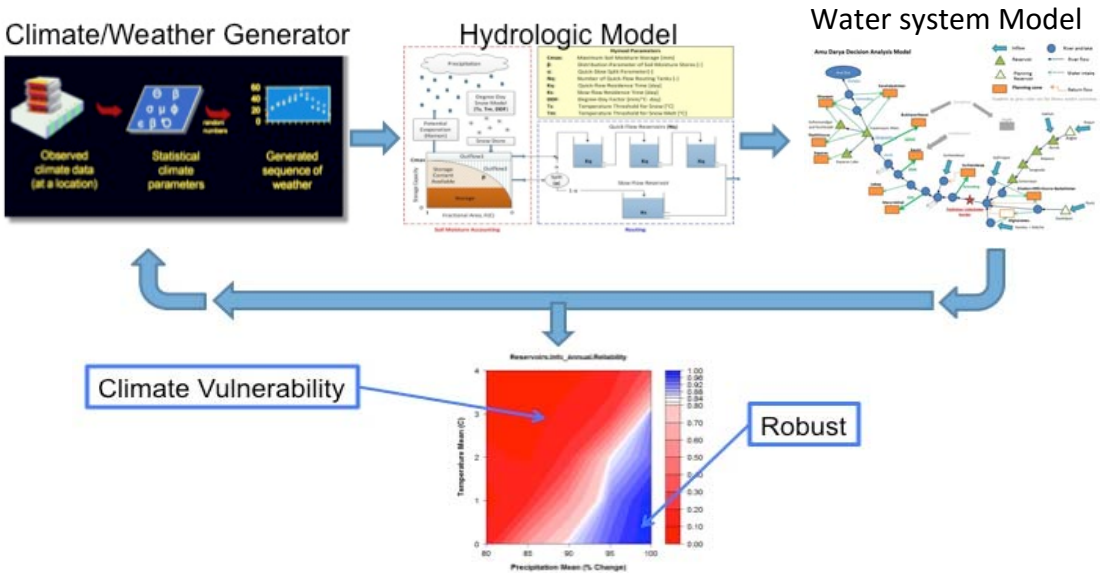


*Figure 4. Schematic diagram of the decision scaling framework as applied in this study. The figure at the bottom represents a climate response function, which indicates project performance over the range of plausible climate change.*

This section includes description of the glacial-hydrologic model, with calibration and validation results, the water resources system model design, and the approach for climate change stress-testing. In addition to the technical approaches described here, the work is underpinned by literature reviews, personal interviews and other non-modeling research methods. Non-modeling research methods are not described in detail here.

### *2.1 Distributed Glacio-hydrologic Model*

The distributed glacio-hydrologic model applied for this analysis is the HYMOD_DS. The HYMOD_DS is the modeling system created by the University of Massachusetts Hydrosystems Research Group and applied by Cloudwater, LLC, to mountainous regions with sparse data. The model is designed for parallel processing on supercomputers, allowing calibration by the Massachusetts Green High-Performance Computing Center (MGHPCC), a major advantage over other modeling methods. The HYMOD_DS is particularly suited for the UT-1 project. The prototype of the model was built for a World Bank supported study of the Kabul Basin (Wi et al., 2015) and the Brahmaputra Basin (Yang et al., 2014b). The original HYMOD model (Boyle, 2001) is a lumped parameter, rainfall excess model composed of a soil moisture accounting module. Wi et al. (2015)

introduced a routing module, which allows runoff from each cell to be hydrologically traced to the basin outlet, creating a spatially-distributed version of the model. In addition, a temperature-based snow/glacier module was developed to explicitly model the dynamics of melting snowpack and glaciers, with resulting contributions to streamflow. The model structure of the HYMOD_DS modeling system is described in detail in Wi et al. (2015).

The snow/glacier module is critical for the UT-1 project, as preliminary data analysis indicates that streamflow in the basin heavily influenced by snow/glacier melt. In this application, we have modified the SNOW-17 snow accumulation and ablation model (Anderson, 2006) as an alternative to our current temperature based snow module. The SNOW-17 is a temperature index model that determines the energy exchanges across the snow-air interface. To consider the variation in the amount of snow accumulation and ablation and the timing of melt at different elevations of mountainous regions, we divide UT-1 watershed into several elevation zones and apply SNOW-17 in distributed fashion. A similar concept for the glacier module is developed and the glacier geometry, ice flow, and total glacier mass balance are modeled by elevation zone with a temperature-energy index equation. The conceptual figure of this advanced glacio-hydrologic distributed model is given in Figure 5. The initial analysis described in this report is based on the current version of the model.

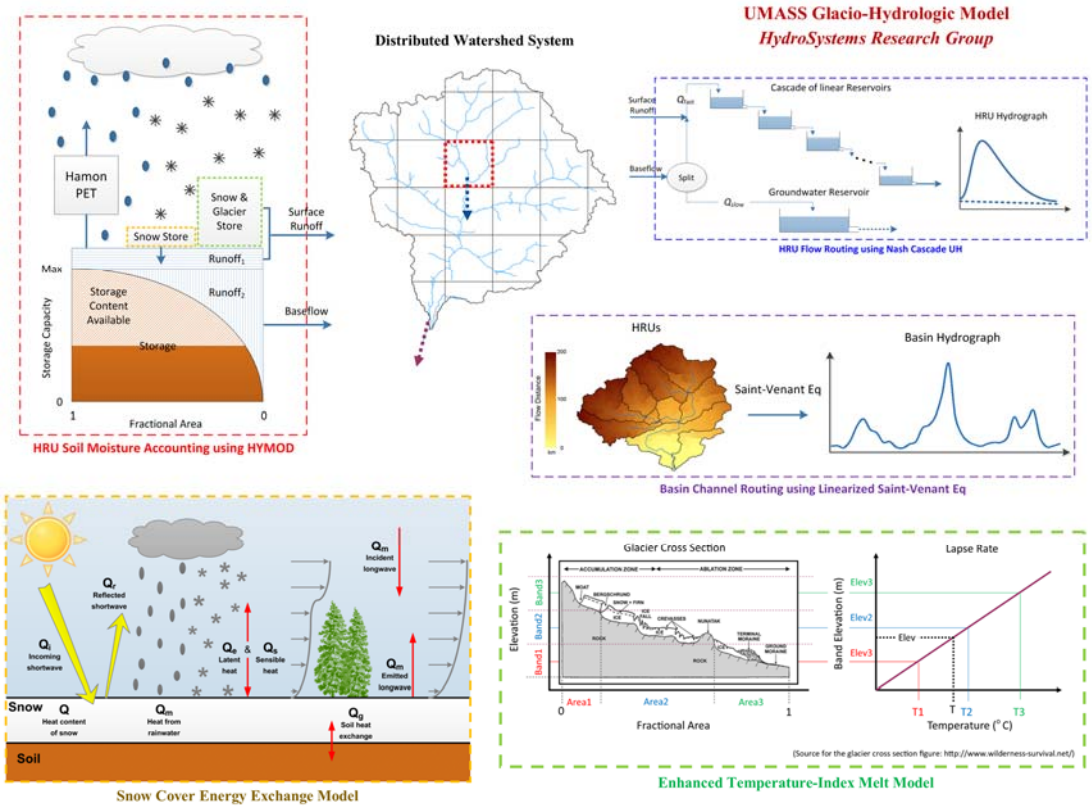


*Figure 5. Advanced glacio-hydrologic distributed model by UMass Hydrosystems Research Group.*

The hydrologic modeling system used to evaluate streamflow responses to climate change based on direct physically modeling. This includes changes to extreme hydrologic events (e.g., floods) as well as low season flow rates. With the enhanced snow/glacial module specifically designed for rivers originating from the Himalayan region, the results are a best available estimate of changes to streamflow as a result of plausible future temperature and precipitation conditions at the project site. Figure 6 shows the high resolution digital elevation model (DEM) used as input to the hydrologic model.

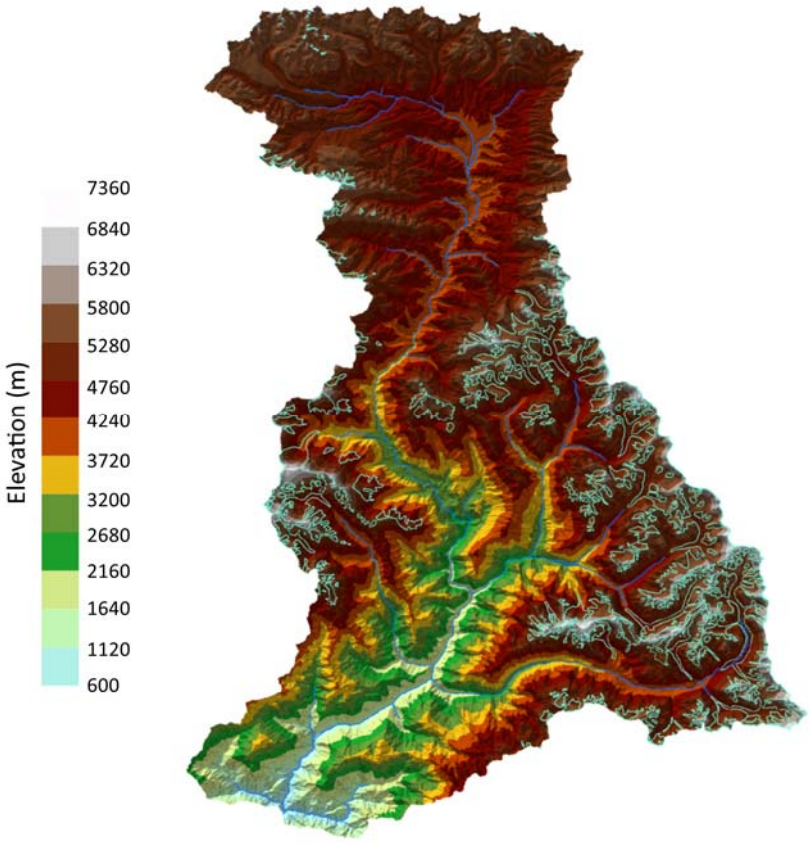


*Figure 6. Digital elevation map of the Upper Trishuli Basin.*

The model has been calibrated to daily streamflow data at the Betraswati basin. The thirty-eight year record was divided into a calibration and evaluation period. As shown in Figure 7, the calibration results were excellent, with a Nash-Sutcliff Efficiency statistic of 0.88 during the calibration period and 0.90 during the evaluation period. Based on the quality of the calibration and validation results, high confidence can be taken in the model's applicability in the basin.

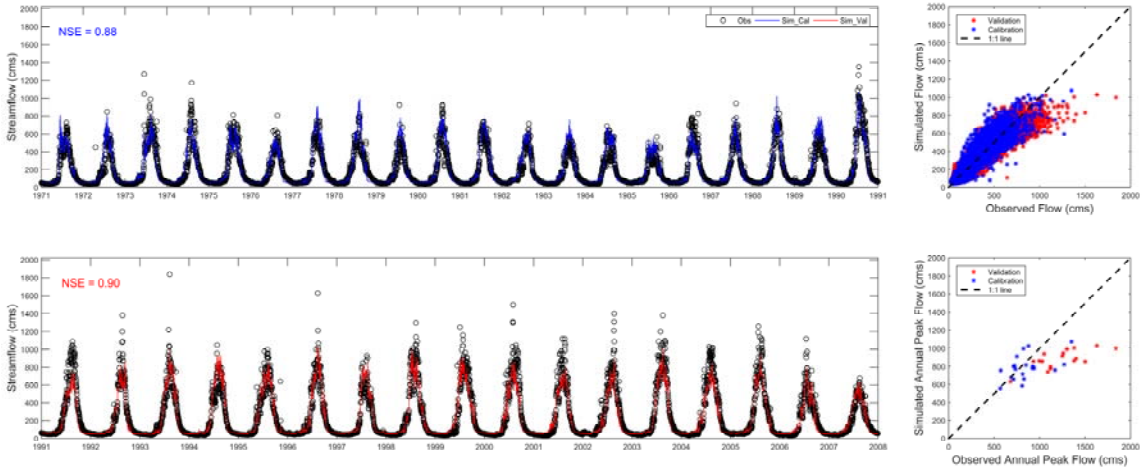


*Figure 7. Streamflow from the HYMOD_DS compared to observed data. Blue circles represent the calibration period and red circles represent the results for the evaluation period. Results are generally excellent although some higher extreme flows were not captured.*

Figure 8 shows the monthly average hydrograph for inflows to the UT-1 project site, including the contribution of different aspects of the hydrosphere. As expected, the hydrograph exhibits classic monsoonal and mountain hydrology, with a distinct summer peak and winter low flow period. As almost all precipitation occurs during the summer monsoon months, the low flow period is made up primarily of baseflow (groundwater or subsurface flow). Streamflow in summer months consists of meltwater from snow and glaciers due to warmer temperatures, in addition to rainfall from the monsoon. Understanding the contributions of the components of the hydrosphere allows the development of expectations regarding changes in streamflow patterns with climate change.

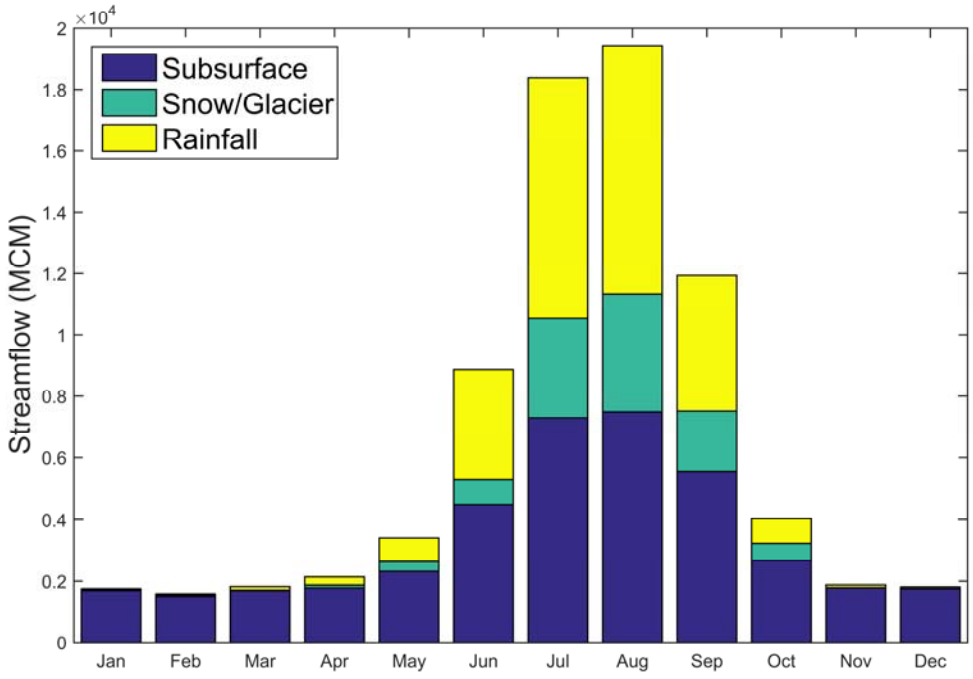


*Figure 8. Annual hydrograph of streamflow in the Upper Trishuli Basin showing contributions from subsurface (blue), snow and glacial melt (green), and rainfall (yellow).*

### *2.2. Water Resources System Model*

In order to translate changes in streamflow into impacts on hydropower generation and downstream flow conditions, a water resources system model has been developed. Typically, water systems models are either constructed as simulation models, with reservoir operations following prescribed rules, or as optimization models, with reservoir operations guided by an objective function (e.g., maximization of hydropower generation subject to constraints). The model developed as part of this analysis is of the simulation type.

The water resources systems model is quite simple in this case of run-of-river hydropower with no storage or reservoir operations to be considered. For this purpose a simple system model was developed in R, the mathematical modeling language. The water resources system model computes hydropower generation and its profits under different inflow conditions, which are provided by the hydrologic model. The model could be expanded to consider downstream water requirements (agricultural, domestics and/or ecological purposes) and demonstrate tradeoffs between alternative water uses, although this is not considered needed at the moment (see Section 3.4 “Effect of changes in upstream water demand”).

Figure 9 shows the streamflow exceedance probability for the bias-corrected Betrawati[1] stream gage, just downstream of the proposed site of the UT-1. Average daily streamflow values in $m^3/s$ were ordered and assigned exceedance probability using Weibull plotting position. The values presented are in close agreement with those presented by the client in reference to the prefeasibility study, in which the design flow was estimated to be 76 $m^3/s$ (which in the analysis presented here has been estimated as the Q50 flow with a value of 77 $m^3/s$).

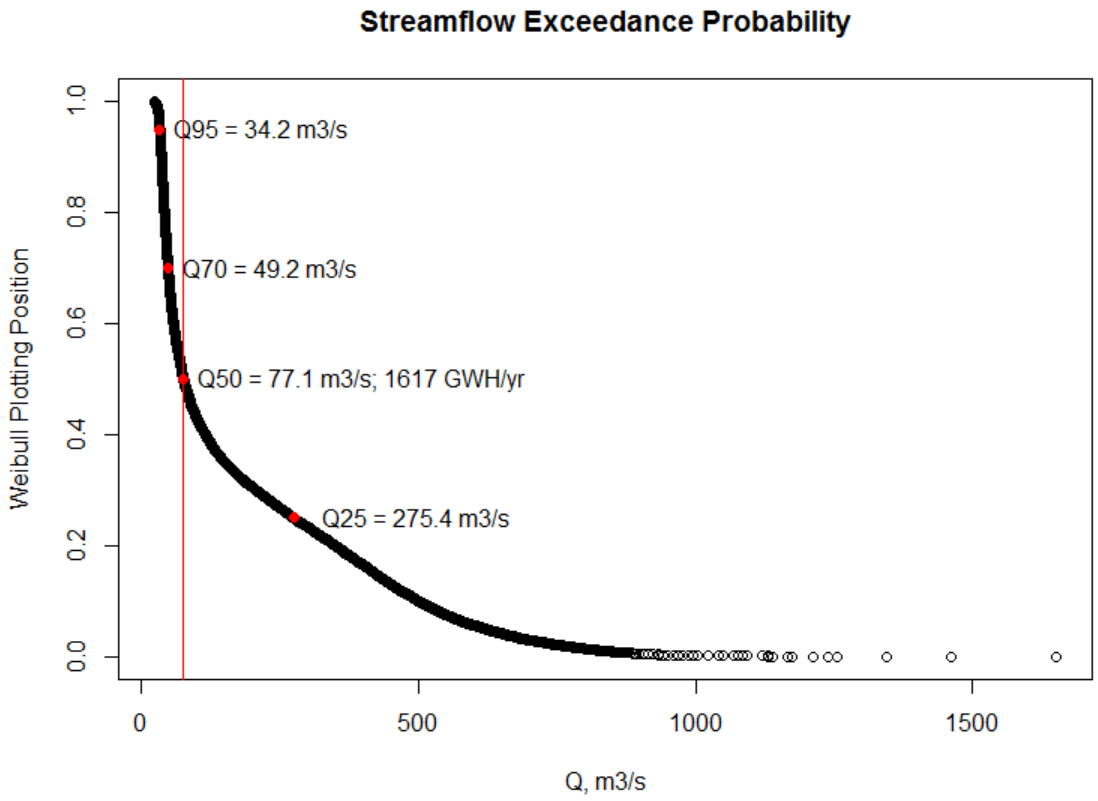


*Figure 9. Bias-corrected Betrawati streamflow exceedance probability (Jan 1967-Dec 2010). Red vertical line indicates design flow of 76 $m^3/s$.*

The streamflow data in Figure 9 were then converted to GWhr/day using equation (1), which is a simple planning relationship:

$$\frac{GWhr}{day} = 0.002725 \cdot Q\left[\frac{MCM}{day}\right] \cdot H[m] \cdot e \qquad (1)$$

with net head, $H$ = 332 meters, and the efficiency of the conversion of mechanical energy

[1] As shown in Figure 1, Betrawati station is downstream of the proposed location of the intake for the UT-1 hydropower plant. The catchment area of Betrawati station is 4850 $km^2$, and the catchment area of the UT-1 facility is 4350.9 $km^2$. Daily flow values from the Betrawati station were therefore multiplied by the ratio 0.8971 (4350.9/4850) in better represent the amount of streamflow available at the upstream UT-1 site.

into electrical energy, $e$ = 0.9. Equation (1) is derived from the fundamental physics describing the translation of potential energy into kinetic energy. A cubic meter of water, weighing $10^3$ kg, falling a distance of one meter, acquires 9.81 x $10^3$ joules (Newton-meters) of kinetic energy. A Watt is a unit of power, equal to a Joule of energy expended per second. Equation 1 expands the example of a single cubic meter of water falling a single meter to the case of many millions of cubic meters of water falling many meters each day. The coefficient 0.002725 is an aggregate unit conversion. Detailed explanation of the derivation and utility of (1) is available in *Loucks and van Beek* [2005].

The potential (un-capped) hydroelectric power exceedance probability is presented in Figure 10. The horizontal red line in Figure 10 shows the GWH50 (daily hydropower with exceedance probability of 50%) for the 216MW facility based on the prefeasibility study (Q50 = 76 $m^3/s$; $GWH50_{cap}$ = 4.2 GWh/day). It nearly passes through, but is somewhat less than, the red dot for GWH50 = 4.4 calculated using data available for this analysis.

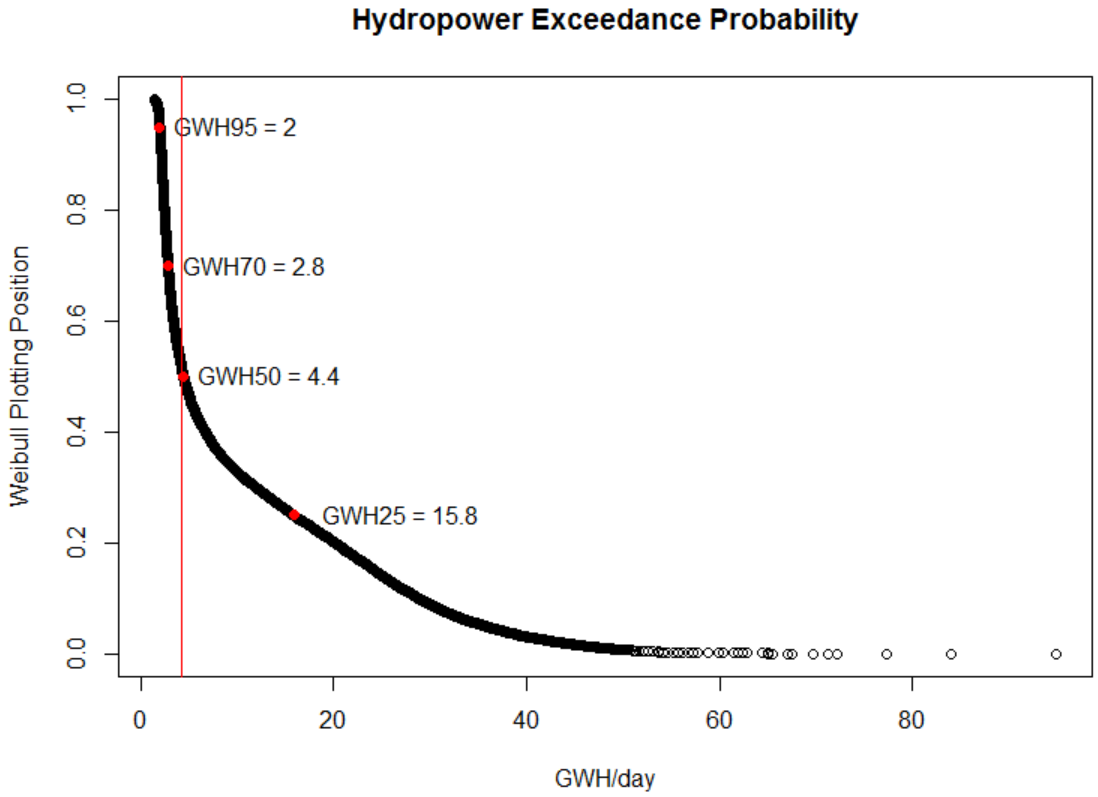


*Figure 10. Theoretical potential (uncapped) hydropower exceedance probability. Red dots are calculated exceedance probabilities of uncapped hydropower production. Red line is production presented in UT-1 project documents.*

Figure 11 provides perspective on the capacity of the 216 MW facility relative to the seasonal peak flows of hydropower potential at the site of the UT-1. The time series of hydropower production in Figure 11 is calculated by applying (1) to the time series of bias-corrected streamflow at Betrawati. The horizontal red line in Figure 11 locates the capacity of the 216 MW facility. Hydropower production potential in excess of the red line would

not be generated with a 216 MW facility.

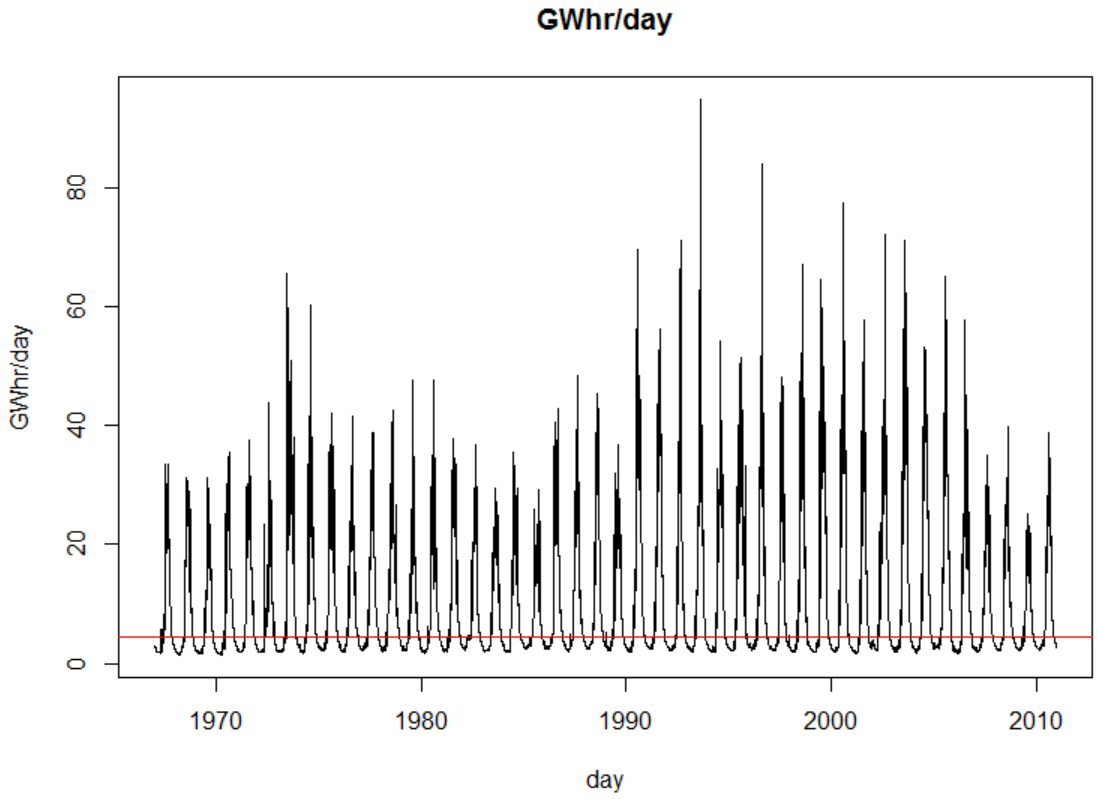


*Figure 11. UT-1, 216 MW PROR @ $Q_{50}$, max daily GWhr/day generation relative to daily timeseries of GWhr potential (red line).*

The NPV was calculated using (2):

$$NPV = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} - C_0 \quad (2)$$

where:

$C_t$ = net cash inflow during the period.

$C_0$ = initial investment

$r$ = discount rate

$t$ = number of time periods (in our case, months)

Table 2 summarizes the design parameters used by the hydropower model to estimate system performance. Most values are provided by the client, or taken from the project documents. A subset of the values (O&M cost, discount rate, and turbine efficiency) were estimated using engineering judgment and previous experience in the region (esp., the Upper Arun Hydropower Project).

*Table 2 UT-1 Hydropower project design parameters.*

| Parameter | Value |
|---|---|
| **Catchment Area** | 4350.9 $km^2$ |
| **Design Discharge** | 76 $m^3/s$ |
| **Net Head*** | 332 m |
| **Installed Capacity** | 216 MW |
| **Total Annual Energy Production** | 1532 GWh |
| **Capital Cost** | $580M |
| **Annual O&M Cost**** | $2 \cdot (125000 \cdot (kWhr\_cap/1000/24)^{0.65})$ |
| **Discount Rate** | 5% |
| **Electricity Selling Price** | Dry season (Nov-Mar) 0.084 $US/kWh<br>Wet season (Apr-Oct) 0.045 $US/kWh |
| **Project Lifetime** | 30 years (+ 5 yr construction time) |
| **Plant Load Factor** | 0.817 |
| **Turbine Efficiency** | 0.90 |

**Gross head is 340.89-343.66 m. Project documents do not present net head. The Upper Arun Hydropower Project included gross head of 509 m and net head of 492 m, with a head "loss" of 17 m. Given the smaller size of the UT-1 facility, 10 meters of head loss was assumed here.*

***The O&M cost equation is an empirical relationship based on the experience of Jim Gordon, a World Bank-sponsored hydropower expert and preferred by hydropower project planners in the World Bank. The original empirical relationship has no coefficient of 2. The coefficient of 2 was added as a factor of safety given the additional costs of operating a hydropower facility in Nepal. The units on the kWhr_cap number are in units of kWh per day of operation. In this case $kWhr\_cap=5.184x10^6$ and $kWhr\_cap/1000/24 = 216$ MW installed capacity. The units on the O&M cost equation are $2015/year.*

### *2.3. Climate Stress Test*

Cloudwater uses a climate stress test as the analytical engine for identifying vulnerabilities of designs or plans and better understanding the performance of a design across a wide range of possible futures. The stress test approach has been described in multiple peer-reviewed journal publications. The process was developed based on research funded by the U.S. National Science Foundation (NSF), National Oceanographic and Atmospheric Agency (NOAA), the Department of Defense (DOD), and the World Bank. The climate stress test is tailored to each study location. In the case of UT-1, the objectives are to better understand how possible climate changes could affect the performance of the investment, whether any vulnerabilities identified require adaptation, and if so, how effective the possible adaptation actions might be.

The climate stress test is an exhaustive exploration of the effects of climate changes and changes in other key factors on the performance of the system. The climate stress test is conducted using a stochastic climate/weather generator that varies weather conditions, linked to a specified climate state, to find the climate states that are problematic for a specific design. The climate/weather generator is used to create time series of daily weather data for a specified time frame (e.g., 50 years) over a specified spatial area that is consistent with a specified climate change. The climate/weather generator is designed such that the mean climate conditions can be changed and then new weather sequences generated that represent the changed climate conditions. In this way, an ensemble of weather time series

is created that will test the sensitivity of the system to changes in mean climate conditions (e.g., changes in mean precipitation and temperature) and variability effects (the natural variability of day to day weather and longer spells due to the earth's climate system). The climate stress test allows efficient and exhaustive sampling of the system's responses to all climate changes. It does not depend on climate projections or "downscaling" methods, and thus avoids all the uncertainties that they introduce, including choice of emissions scenarios, GCMs, downscaling, etc., because the climate stress test explores sensitivity to climate change (rather than sensitivity to a particular climate model's projection of the future).

The schematic diagram of the modeling chain presented in Figure 4 was adapted to the specific application of the UT-1 project. The stochastic climate/weather generator creates a timeseries of weather variables that are used as inputs to the hydrologic model. The hydrologic model in turn produces the streamflow that results from the weather trace. The streamflow is then used by the water resources system model to estimate the performance of the system, including the hydroelectricity production and the downstream flows.

The result of the climate stress test is a dataset of project outcomes and the associated values of uncertain factors that cause those outcomes to occur. This dataset is then used to identify the combinations of factors that lead to unwanted outcomes. Note that outcomes will be primarily in the form of cost-benefit analysis results, although other outcomes, such as firm energy level, etc., will also be considered. These combinations of uncertain factors represent scenarios, and since they emerge from the output of the analysis (rather than being used as inputs) they are described as *ex post* scenarios. Since they are scenarios that cause unwanted outcomes, we define them as risk scenarios. Specific data mining tools are used for the definition of ex post scenarios, including cluster algorithms such as the Patient Rule Induction Method (PRIM). With the risk scenarios identified, two additional analyses can be conducted. First, the relative probability of the scenarios can be estimated to provide a relative ranking of risks and level of concern associated with each. Second, if risks appear that are of relatively high concern, adaptations can be assessed to lower the level of concern.

## 3. Preliminary Assessment of Climate Risks

The focus of this analysis is to identify possible risks to the UT-1 design that may arise due to climate change. The primary risks to be addressed include:

- Reductions in streamflow, especially low flow season
- Extreme streamflows, including floods
- Changes to rain, snow and snow melt
- Changes in streamflow and effects on sedimentation and landslides
- Disease risks

This section presents modeling results on the risks posed by each of the above.

### *3.1 Hydrologic Response*

This analysis has focused on understanding and describing the hydrologic response of the UT-1 contributing area to changes in climate. Figure 12 summarizes the response of mean total annual, dry season, and wet season streamflow to all plausible changes in climate (percent changes to mean annual streamflow are shown in Figure 13). The contours show the value of mean annual streamflow for the climate changes indicated on the x- and y-axes, with blue showing increases in streamflow and red indicating decreases in streamflow. The circles superimposed on Figure 13 indicate the mean climate changes that are projected by downscaled GCMs for this location. The uncertainty in the GCM projections for this basin are illustrated in boxplots in Figure 3.

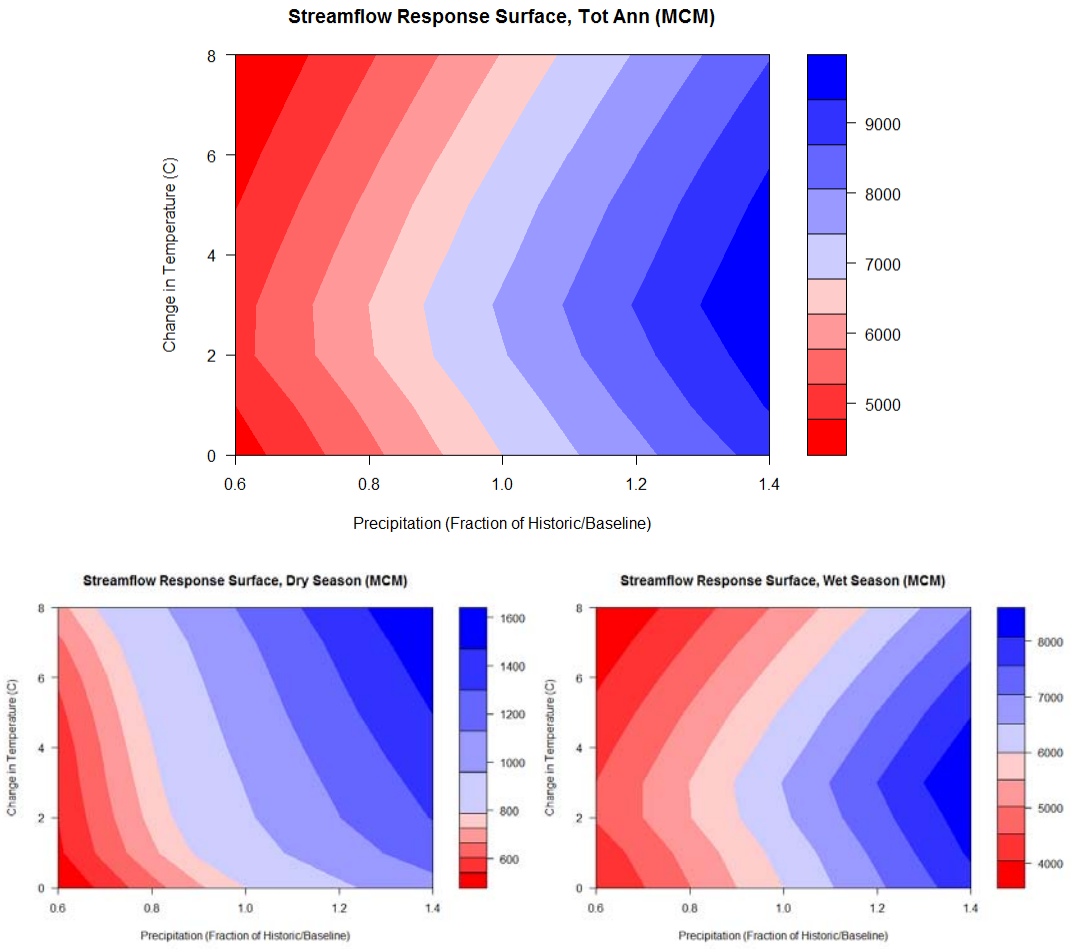


*Figure 12. Climate response function of mean annual streamflow in response to changes in precipitation (x-axis) and temperature (y-axis). Streamflow units are MCM/yr (or MCM/season). Blue contours show increases in streamflow and red contours show decreases.*

Figure 12 illustrates the 30 year long-term average annual, dry season, and wet season streamflow at Betrawati station, subjected to a range of climate conditions. Precipitation has the dominant effect on streamflow, as demonstrated by the largely vertical contour lines. Streamflow shows a more or less monotonic response to changes in precipitation,

i.e., increases in precipitation result in increases in streamflow and decreases in precipitation result in decreases in streamflow.

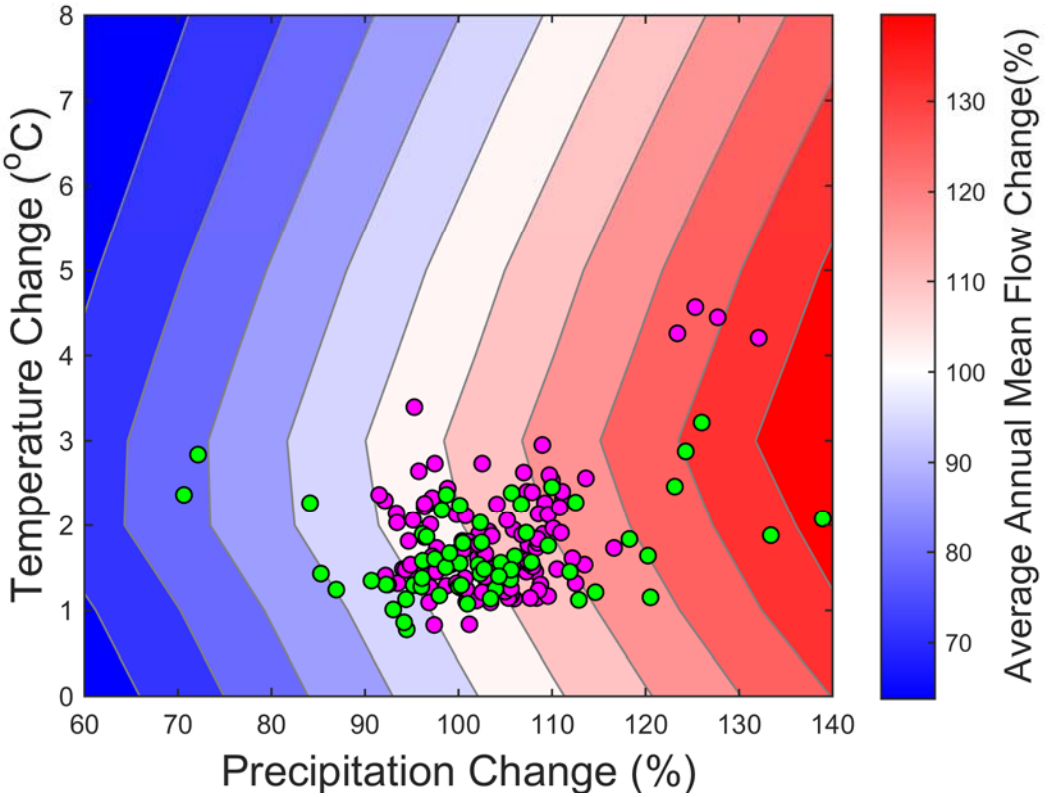


*Figure 13. Change in average annual mean flow (% of baseline/historic). Green dots are all CMIP3 climate change scenarios. Purple dots are all CMIP5 climate change scenarios.*

Temperature effects are smaller but more interesting. Over the course of the 30-year simulation, a critical inflection point in the flow pattern occurred at an increase in temperature of approximately 3 degrees C. When the system was simulated with temperature increases less than 3 degrees C, the "increased" temperature exhibited a positive effect on streamflow resulting from greater quantities of meltwater contribution from snow/glacier. However, with temperature increases larger than 3 degree C, the streamflow gains are reversed as increasing rates of evapotranspiration and diminishing returns from a shrinking (receding) glacier decreased the total rate of flow (see Figure 14). This phenomenon is especially evident in the wet-season response, as most of the meltwater is contributed after March, the final month of the dry season.

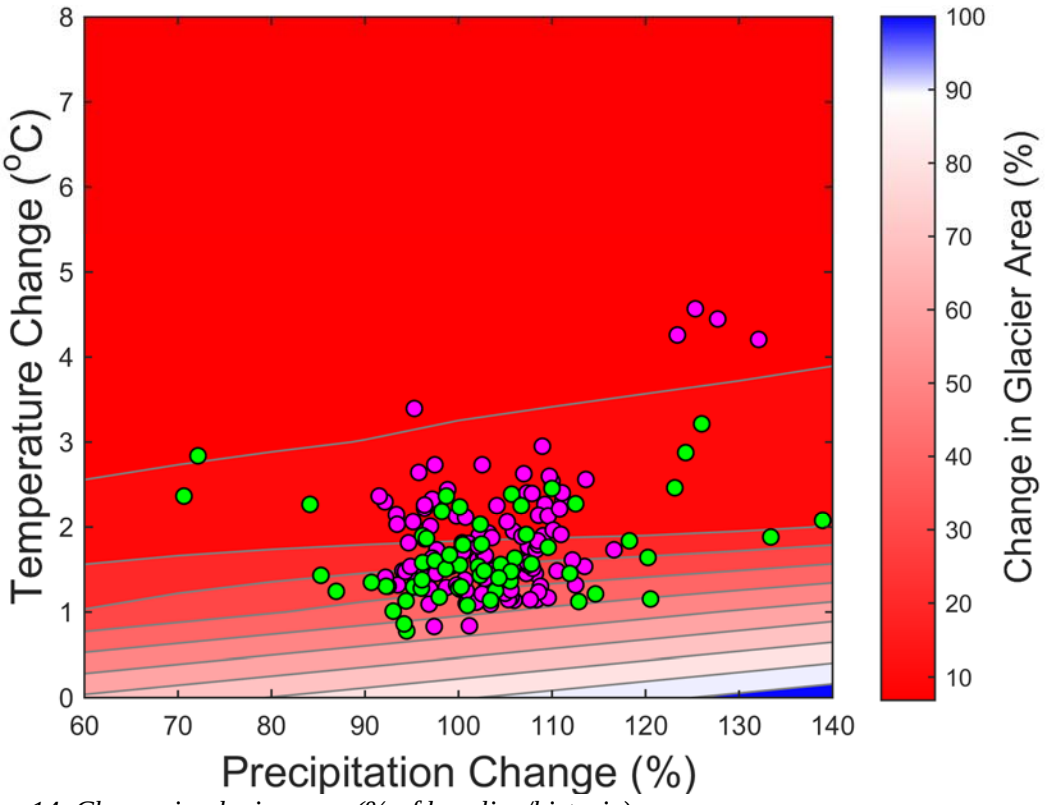


*Figure 14. Change in glacier area (% of baseline/historic).*

Figure 14 shows percentage change of glacier volume under a range of temperature and precipitation changes. The analysis is based on glacier coverage map data obtained from the Randolph Glacier Inventory version 3.2 (RGI 3.2, Pfeffer et al., 2014), and glacier volume was estimated using the multivariate glacier area-volume scaling relationships proposed by Grinsted (2013). Temperature is the dominated factor in the recession of the glacier area, as evidenced by the largely horizontal contour lines. Figure 14 explains the 3 degree inflection point in the streamflow response surfaces of Figure 12 and Figure 13. Because a 3 degree C temperature increase throughout the 30-year simulation reduces the glacier volume to less than 20% (relative to the initial volume), the remaining glacier area/volume is insufficient to continue to sustain streamflow at historic levels.

Climate projections from the CMIP 3 ensemble present a greater degree of uncertainty in precipitation, but less uncertainty (smaller spread) in forecasted temperature. The CMIP 5 ensemble shows mostly positive precipitation change (with less spread than CMIP3), and a temperature increase of approximately 2 degrees C. The result is substantial uncertainty in future streamflow conditions.

The climate change projections show a range of changes in precipitation from a 10% reduction in precipitation to a 20% increase in precipitation, with a few projections showing even larger increases. Projected temperature increases generally range from 1 to 3 degrees C. Because these projections have not been evaluated for their ability to

reproduce the climate in this region, they cannot be interpreted as particularly meaningful. In addition, the ensemble of climate projections is a relatively arbitrary sampling (which is typical of climate modeling) and so caution must be exercised when interpreting the location of the circles.

It is worth noting that no clear risks to the project are identified within the range of the projections, except possibly in terms of larger high flow values in the future. The range of projections in Figure 13 almost all show increases or no change in streamflow. There does not appear to be a large risk associated with reductions in streamflow that would affect the economic performance of the project. Nonetheless, the question of reduced future streamflow is explored in greater detail later in this section.

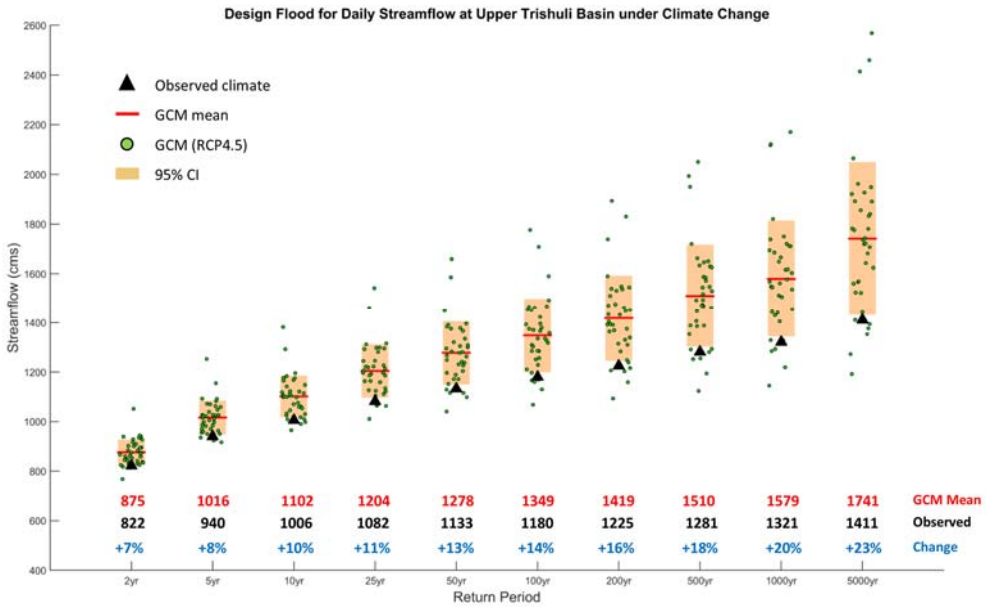


*Figure 15. Design flood for daily streamflow under climate change.*

The results of the streamflow response surfaces imply greater risk of increased streamflow in the 30-year lifetime of the hydropower facility (potentially with increased frequency and severity of floods that could damage the structure) than decreased streamflow. In order to examine these risks, we developed design flood estimates by fitting annual maximum streamflow series to the Log Pearson Type III distribution (the standard for the flood frequency analysis adopted by the US Army Corps Bulletin 17B). The black triangles in Figure 15 are modeling results, and therefore not a perfect reproduction of return periods for historical observations. The design flood estimates based on observed streamflow are provided in Figure 16. Due to an underestimation bias in the model representation of high flows (owing mostly to un-reconcilable data inadequacies), the absolute values in Figure 15 are not good indicators for evaluation. Nonetheless, the analysis of the percent change between modeled streamflow based on historical observations of climate and modeled streamflow based on projected future climate from GCMs is useful. The percentage change in the magnitude of flood increases approximately linearly with return periods of up to 500 years under CMIP 5 RCP 4.5. More extreme return periods (e.g., 1000, 5000 years) exhibit

nonlinear responses relative to the historic. The conclusion to examination of Figures 15 and 16 is that the 5000-year flood may increase in magnitude by between 20% and 25%. This greater magnitude of the 5000-year flood has been accounted for in the engineering design, as explained in Chapter 5.

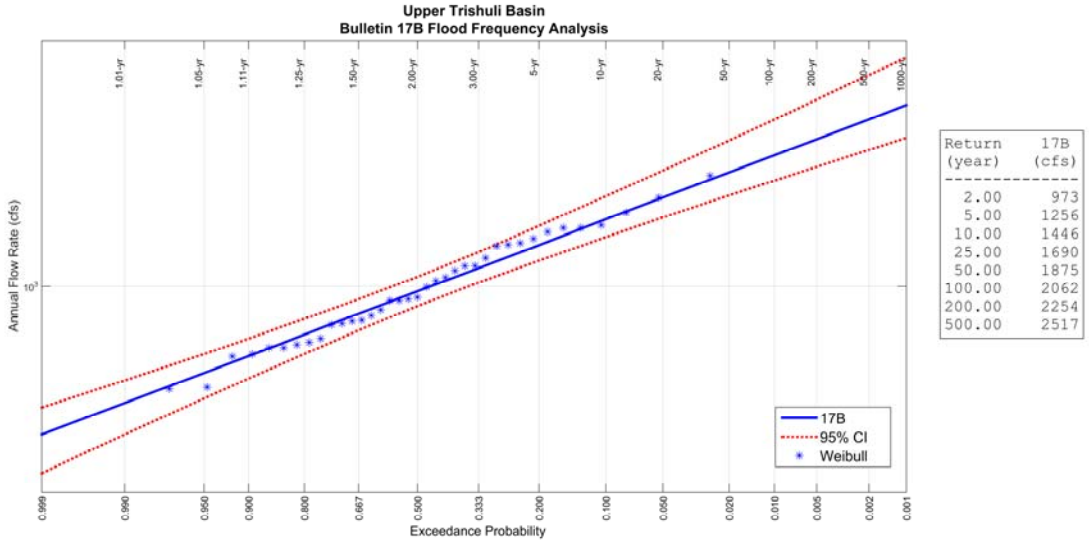


*Figure 16. Flood frequency analysis (after Bulletin 17B).*

Returning to the analysis of potential changes to low season flow, Figure 17 shows hydrographs for increases in temperature of 2, 4, 6 degrees C compared to current conditions. As can be seen, the warming climate causes a significant increase in dry season streamflow, likely due to melting of glaciers and the immediate runoff of additional winter rainfall (that historically fell as snowfall).

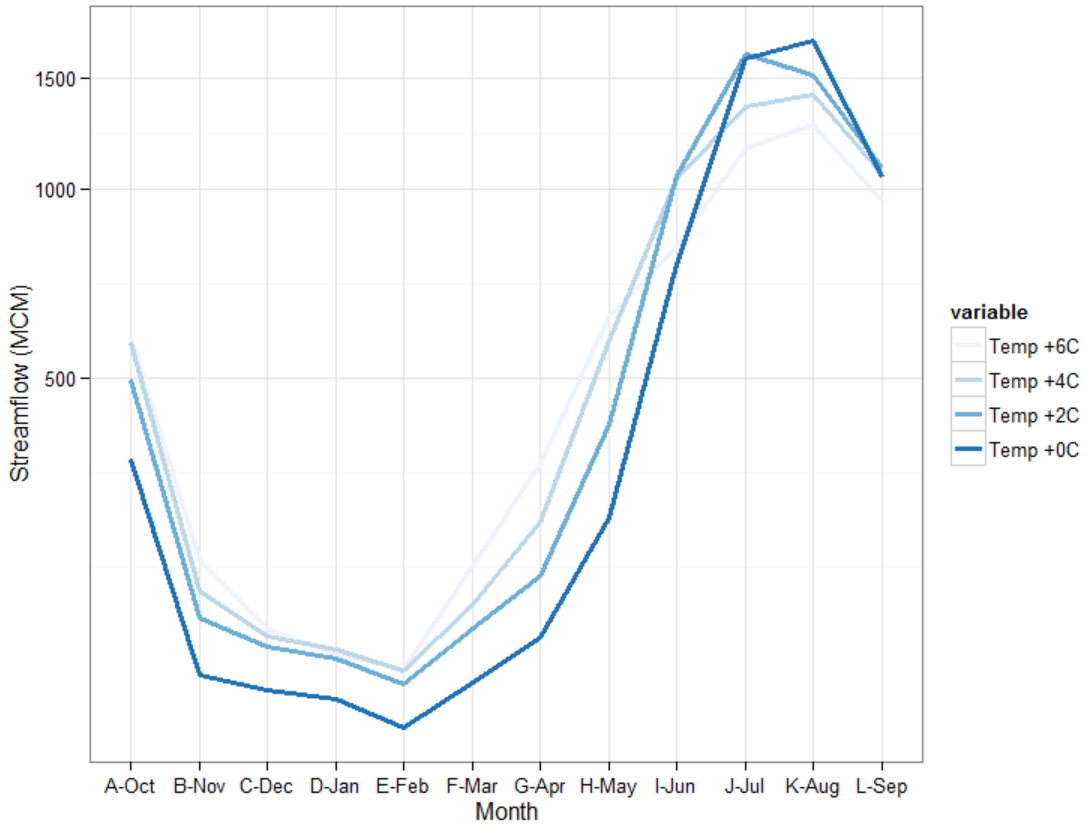


*Figure 17. Shift in Seasonality due to climate change.*

Figure 18 shows the number of days with flow less than the plant discharge (76 $m^3/s$) (a minimum requirement for generating hydropower in the full capacity) under various climate change conditions. The result indicates that there is a small chance to have increased number of days not meeting the plant discharge under the climate change conditions; i.e., precipitation decrease by 20% or more with temperature increase less than 2ºC only causes increase in the number of days below 76 $m^3/s$. Both precipitation and temperature are factors that substantially influence the changes in this metric. Precipitation increase by 10% greatly reduce the number of days below 76 $m^3/s$, even with moderate increases in temperature (e.g., increases less than 1ºC). According to the future projections of precipitation and temperature from both the CMIP 3 and 5 (purple and green dots in Figure 18, respectively), future scenarios that this system is safe from the threatening with more frequent occurrences of low flow becomes more persuasive. Since the average number of days from observed streamflow is about 160 days, the change corresponding to 12 %, which is the biggest change under GCM climate change scenario, indicates that the average number of days below 76 $m^3/s$ throughout a year is approximately 20 days.

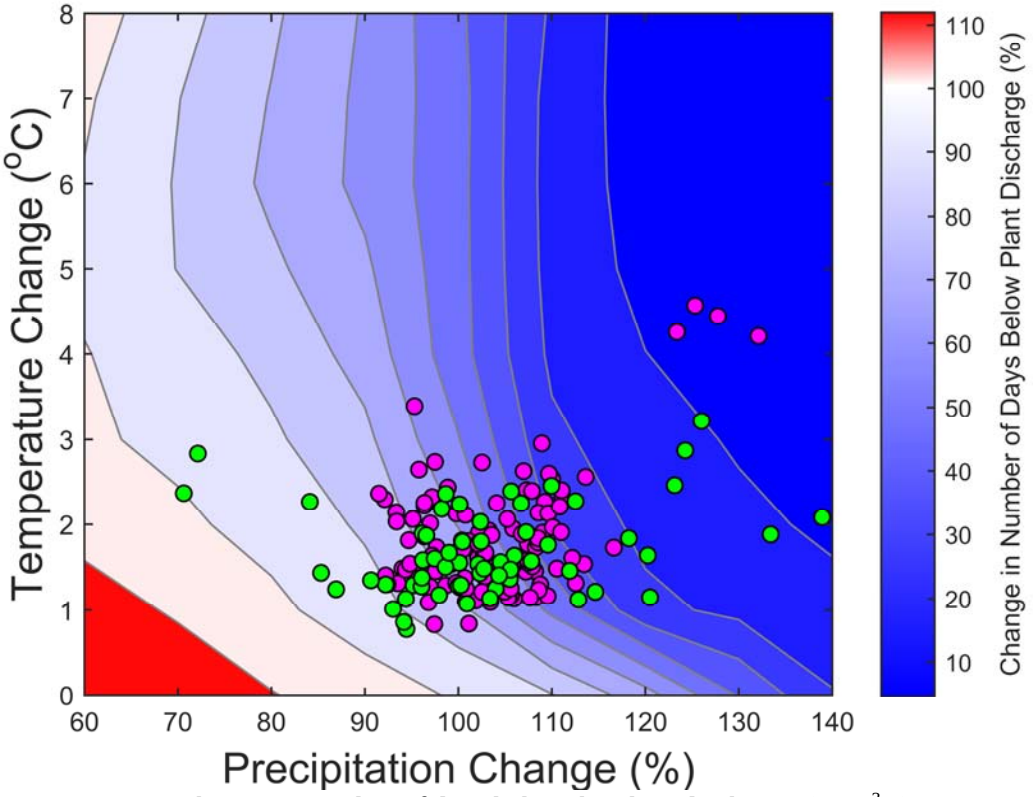


*Figure 18 Percent change in number of days below the plant discharge (76 $m^3/s$).*

For the concern of the environmental flow requirement, Figure 19 shows the results of a frequency analysis for annual minimum 7-day low flow using the Log Pearson Type III probability density function. The CMIP5 GCMs with RCP 4.5 emission scenario project an increase in the 7-day minimum flow in the future. Analysis of the percent change between modeled streamflow based on historical observations of climate and modeled streamflow based on projected future climate from GCMs is also made for the design 7-day low streamflow. The percentage change in the magnitude of design low flow increases approximately linearly with return periods of up to 5000 years under CMIP 5 RCP 4.5 scenarios.

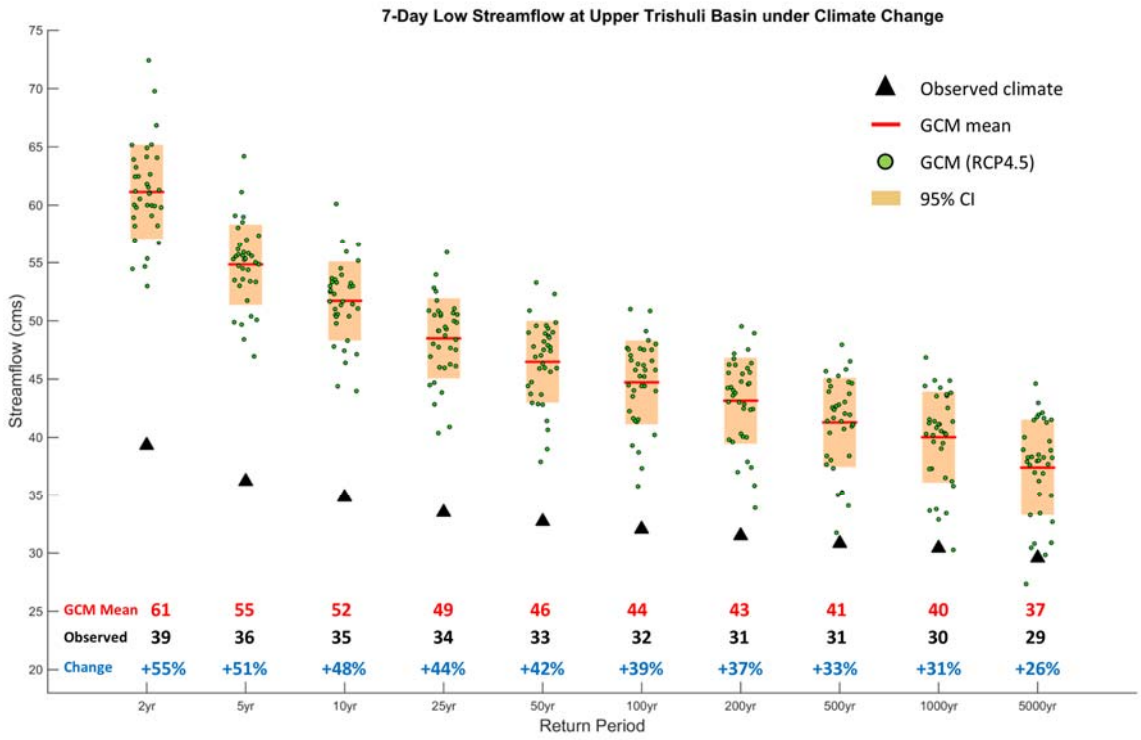


*Figure 19 Frequency analysis with the Log-Pearson Type III for 7-day low streamflow at UT-1 basin under climate change.*

These results, in combination with Figure 17, suggest that the level of concern associated with reductions in low season flow can be low.

### *3.2 Response of Hydropower Production*

The hydropower response generally follows the streamflow response, as shown in Figure 20. With up to 2 degrees in warming, the high-value dry season electricity production is expected to increase from approximately 470 GWhr to approximately 550 GWhr. With 2 degrees of warming, total annual hydropower production increases from approximately 1515 GWhr to approximately 1640 GWhr, and with 3 degrees of warming the increase is to 1665 GWhr. The larger percent increase is in the dry season.

Care should be taken not to falsely associate colors in the 3 plots of Figure 20. Each color scheme is unique to the time period described, and relative to the respective mean.

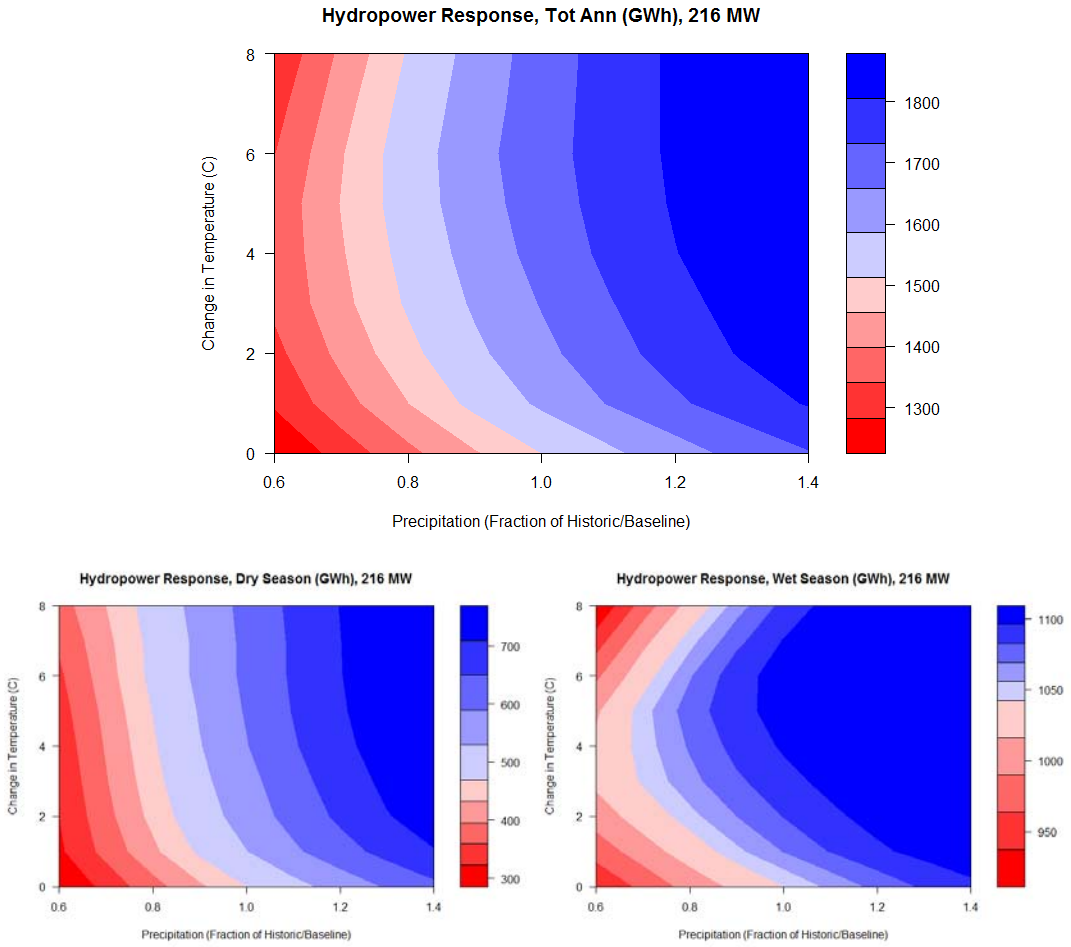


*Figure 20 Hydropower generation climate response surface.*

### *3.3 Response of Economic Performance*

The range of possible economic performance under climate change is presented in Figure 21. Under baseline conditions (no change in precipitation or temperature), the NPV over the 30-year design lifetime of the project was estimated to be approximately $365M. Within the range of climate change explored, the NPV remained positive, increasing in "favorable" future climates to over $700M, and decreasing in "unfavorable" future climates to approximately $125M. More likely, with a 2 degree increase in temperature and a negligible change in mean annual precipitation, the increase in NPV would be to $475M. A 3 degree increase in temperature with negligible change in precipitation would result in an NPV of $500M.

The findings of Figure 21 are sensitive to assumptions regarding discount rate, capital/O&M cost, and electricity price, as summarized in Table 2. It is also assumed that all electricity produced is sold, meaning that we only model the supply-side of the energy markets. This assumption is contingent in large part on energy-trading agreements between India and Nepal, and should be approached with caution.

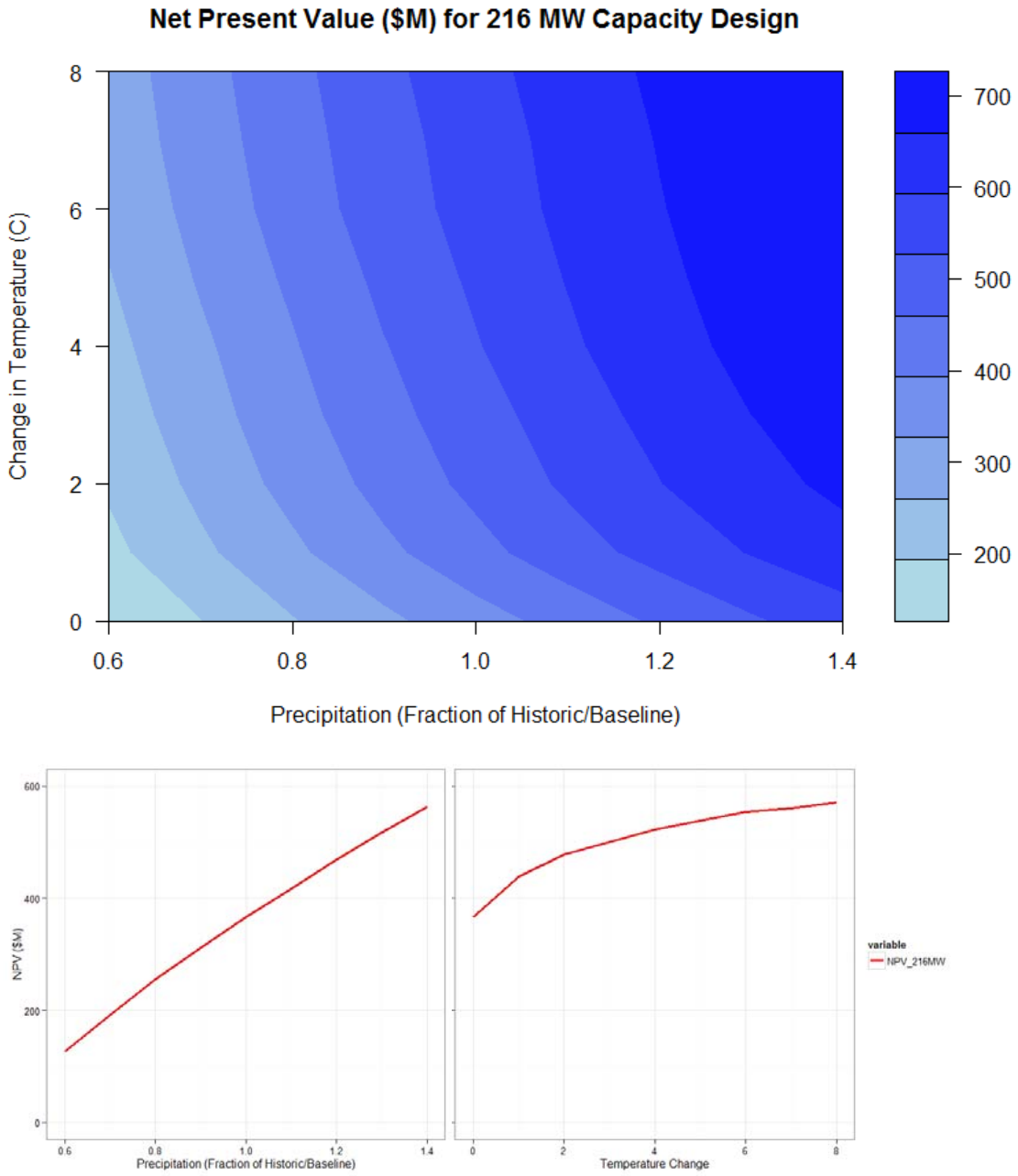


*Figure 21 Range of possible economic performance of UT-1 hydropower plant under climate change.*

### *3.4 Effect of Changes in Upstream Water Demand*

One of the major concerns for a PROR dam is inflow changes due to upstream development. The changing volume and timing of upstream inflow caused by the upstream human development might affect the designed hydropower generation of the UT-1 project. In this section, we comment the effect of changing upstream water demand on streamflow.

The following figures show the current dominant land use/land cover (Figure 22a) and percentage of cropland inside the UT-1 basin (Figure 22b) according to FAO Global Land Cover SHARE database. Most of the crop lands are located downstream of the dam site and only 3.1% of the upstream land has crop activities. These figures indicate that under the current conditions, upstream water demand is not a major factor. Because domestic water use is relative small, no evidence of industrial water uses exist, and agricultural water uses is also understood to be limited based on the small percentage of cropland.

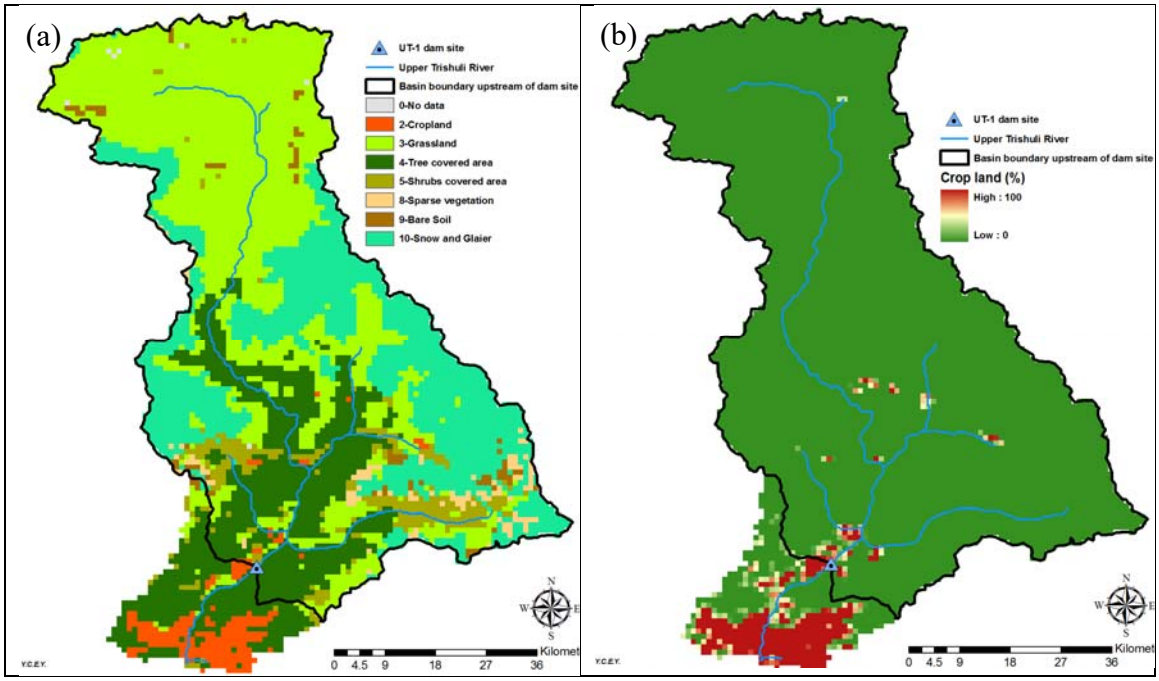


*Figure 22 (a) Dominant land cover for the UT-1 basin; (b) Crop land percentage for the UT-1 project. Maps are created from FAO Global Land Cover SHARE database.*

There is no evidence of any future industrial development upstream of the dam site. Due to the topography constraint, a dramatic population growth in the near future is unlikely. Therefore, no significant changes in industrial and domestic water uses are anticipated.

We evaluate potential agricultural water uses changes by comparing with other mountain agricultural developments plans in Nepal. High Value Agriculture Project in Hill and Mountain Areas (HVAP) is a joint project between Ministry of Agricultural Development and International Fund for Agricultural Development (IFAD) and focuses on the western districts of Nepal (e.g., Achham, Jumla, Salyan). The purpose of this project is to integrate the rural poor in high value agriculture and non-timber forestry products and the goal is to reduce poverty and vulnerability of people in the hill and mountain areas. Project components include: 1) making a marketing arrangement for producers and consumers; 2) providing service support for the market; and 3) providing technical support for the project management. Only a small part of the HVAP is to build infrastructure (road) to physically connect to a small number of more remote communities. No expansion of cropland has been proposed. We assume that if similar projects take place in the UT-1 basin, no

significant change will be made on the current cropland. Therefore, no significant future agricultural water uses changes is projected in the UT-1 basin. The details of HVAP can be found on the official website http://www.hvap.gov.np/index.php.

In sum, based on our analysis, the effect of changing upstream water demand on UT-1 project is negligible.

### *3.5 Possible Disease Effects*

According to a 2005 World Health Organization (WHO) report: "The effect of irrigation and large dams on the burden of malaria on global and regional scale" quantified the risk of public health caused by water project development and operation. Following the same concept, we evaluated the effect of additional surface (inundation) area causes by the weir construction and further link that with additional risk of the burden of malaria. According to Table 1.6-1 of the "Hydrologic Analysis" of the UT-1 design documents, we plotted the water level-surface area rating curve under natural condition and after weir construction. We also calculated the difference of surface area between these two curves in Figure 23. The maximal additional surface area that cause by weir was calculated to be 4,439 $m^2$ (when water level is 1243 meters above mean sea level, masl).

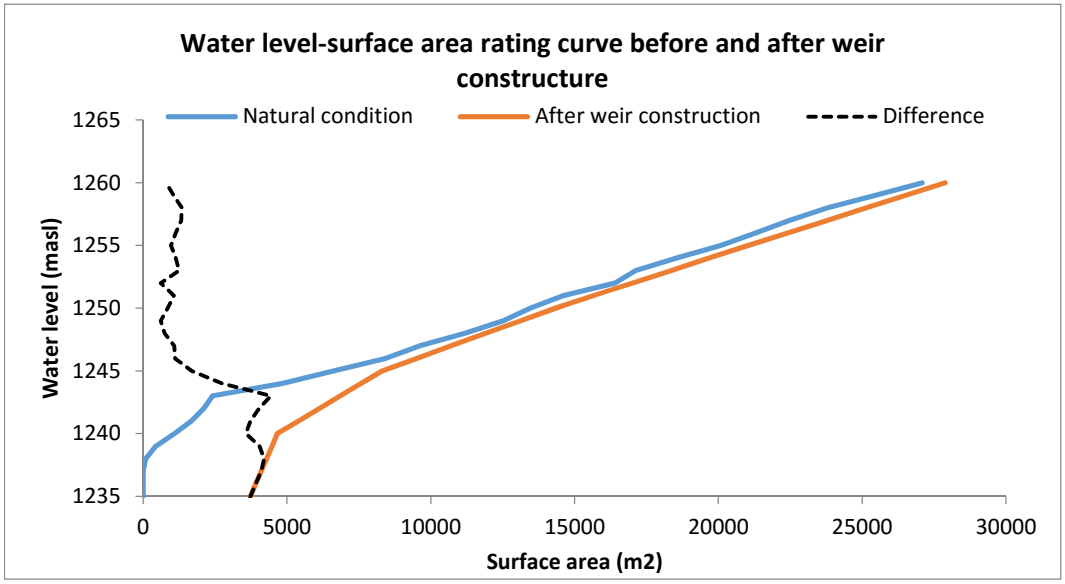


*Figure 23 Rating curve for water level and surface area of the UT-1 project under current and after weir construction condition.*

Following the WHO 2005 report, we estimated mosquitoes' flight range change due to the weir construction. Figure 24 shows how the estimation was made. In Figure 24, the green polygon is the original surface area under natural condition and the blue polygon is the additional surface area causes by the weir. In reality, this blue part has an irregular shape and is difficult to estimate the width of it without the original digital elevation map (DEM) data used by the design document. In this study, we followed the WHO 2005 report and used a rectangular shape as a proxy. The width of the weir is 30.85 m and under the extreme condition the longest length of the blue part is 143.9 m (4,439/30.85). According to Boyd

(1949), the typical fight range of mosquitoes is 2,000 m. So the additional surface area cause by the weir will only increase maximal 7% (143.9/2,000) of mosquitoes' flight range. Given the sparse population located in this range, we conclude the possible disease risk cause by the UT-1 project is low.

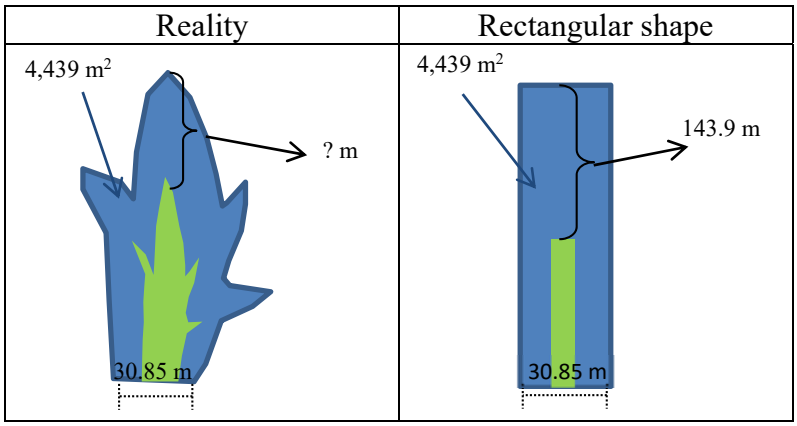


*Figure 24 Estimation of area at risk of malaria near dam.*

### *3.6 Structural Stability and Dam Break*

A comprehensive analysis of dam structural stability and dam safety is beyond the scope of this climate change analysis, as the topic involves structural engineering, geology and seismology. In this study, we only evaluate the dam safety issue from the hydrological perspective by comparing designed capacity of weir and the peak flow under climate change impact.

According to the UT-1 dam design documents, the capacity of weir discharges is 3,563 $m^3/s$ (corresponding to return period 5,000 years) and 3,276 $m^3/s$ (corresponding to return period 2,000 years) when one gate malfunctions. We compare these two values with the frequency analysis presented in a previous section and use Figure 25 to explain the result. In Figure 25, the black triangle is the result from long-term historical streamflow data. The values are the same as Table 1.3.1-5 in the "Hydrologic Analysis" of the UT-1 project design document. Since we used two probability distributions, Gumbel and Log Pearson Type III in our frequency analysis under climate change, we have two changing percentage values for each return period. We used these two changing percentage values, multiplied them by the historical values based on the frequency analysis (black triangles) and plotted them as orange box in Figure 25. Two horizontal lines were added to represent design capacities for 3,563 $m^3/s$ (red) and 3,276 $m^3/s$ (purple).

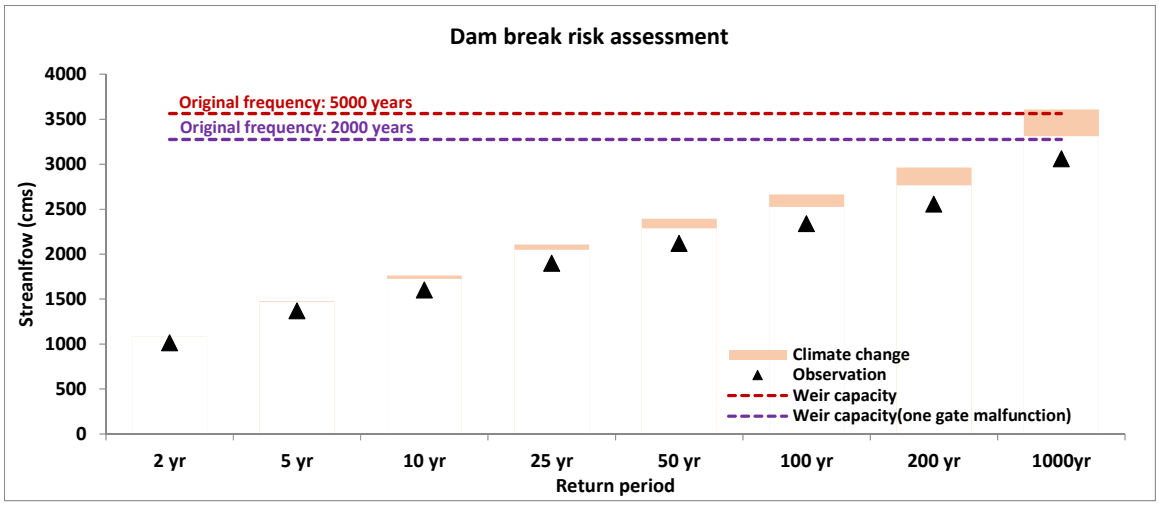


*Figure 25 Compare weir designed capacity of UT-1 project with flood frequency under climate change impact.*

The impact of climate change is expected to increase streamflow volume for a given return period or reduce return period for a given streamflow volume. For example, under the historical climate, 2,300 $m^3/s$ is a 100-year flood. The same volume of streamflow becomes a 50-year flood under climate change impact. Therefore, climate change impact does post a threat on weir capacity design. However, the original design can be seen as "overcapacity" since it uses 5,000 and 2,000 year return period as design standard. This is addressed in Chapter 5.

## 4. Possible Adaptation to Address Climate Risks

The previous section discussed some of the vulnerabilities that were identified during the preliminary analysis. The next step in the analysis is the assessment of the risks associated with those vulnerabilities, and the consideration of possible adaptations to reduce risks. Risks are estimated by assigning probabilities to the conditions that cause vulnerabilities. For each of the risk scenarios defined above, a probability estimate is assigned to that scenario based on available information. Since the probabilities are necessarily subjective, the term "level of concern" is used to clarify the purpose of the probabilities. Level of concern is estimated based on three factors: 1) theoretical basis for the climate change (i.e. atmospheric science); 2) observations of the climate change (i.e. historical trend); and 3) modeling projections of the climate change (i.e., GCM results). The level of concern is higher when the three factors are in agreement regarding a particular change. An example is warming temperatures, where there is a clear theoretical basis for why temperatures are warming, the observed record shows temperatures increasing, and climate change projections indicate further increases. Probability estimates may also be applied to other uncertain factors if reasonable means of estimating them are available.

Table 3 summarizes the results of the preliminary risk assessment. In general, the risks of climate change to UT-1 can be described as low. The project is designed conservatively in terms of the expected flows needed for hydroelectricity generation. The sedimentation

basin, weir and spillway, which may be considered the most potentially vulnerable aspects of the design, have been designed conservatively. The climate stress test analysis revealed that low flows are largely insensitive to plausible changes in climate.

*Table 3 Preliminary assessment of risks.*

| Risk | Cause of Concern | Level of Concern |
|---|---|---|
| **Flood** | • Climate change may cause extreme streamflow to increase in volume or frequency<br>• Climate stress test indicates that climate warming could increase extreme design flows by about 20%<br>• Spillway is designed for 5000 year flood which is quite conservative<br>• Design based on Gumbel extreme value distribution; other distributions would yield a much higher flood magnitude for the 5000 year flood (e.g., log Pearson Type III)<br>• Increasing weir/spillway capacity may be considered | Low |
| **Sedimentation** | • Climate change may increase sedimentation rates due to increases in the intensity of precipitation<br>• Sedimentation rates are already high<br>• Sedimentation basin has been designed quite conservatively<br>• May consider operational approaches to managing sedimentation events | Low |
| **Missed opportunity** | • Failure to capitalize (regret) on potentially increasing flows by not increasing the capacity of the headworks and turbines | Not modeled at this stage |
| **Reduced low flow** | • Climate change may cause a decrease in streamflow during the low flow season<br>• Low flow season streamflow is vital to energy production needs in Nepal<br>• Climate stress test revealed that low flow season flows are largely insensitive to climate warming<br>• Precipitation changes may cause increase in low season flows<br>• No clear indication that low flows are a concern | Very Low |
| **Structural stability and dam break** | • To be determined | Low, based only on risk of increased precipitation-based flood |
| **Disease** | • To be determined | Low, based on mosquito analysis |

The potential for climate change to effect high flows deserved close attention, and possible adaptation. Increasing precipitation and increasing intensity of precipitation are both generally consistent with the expectations for a warming climate. Both could contribute to

increases in flood flows and increases in sedimentation. Thus the adaptation analysis focused on addressing these possible concerns.

## 5. Proposed Adaptation Subsidy

The weir and spillway is currently designed for the 5000 year recurrence interval flood event. The spillway is designed to safely pass flows that exceed the capacity of the headworks and weir. This is a conservative design and exceeds the design capacity of the downstream structure. There is a great deal of uncertainty associated with estimating the level of a 5000 year event, since such events are very rare, an in fact, never yet experienced in the flow record. As a result, the flow level associated with such a design event is sensitive to the extreme value distribution (i.e., statistical model) used to estimate the event. The analysis of the hydrologic contractor showed a range of 3,428 $cm^3/s$ to 5,411 $m^3/s$ for the 5000 year event based on the choice of extreme value distribution. The selected design event was 3,563 $m^3/s$, which is the low end of the aforementioned range. The largest design flow value was based on the log Pearson Type III extreme value distribution, which is the distribution preferred by the US Army Corps of Engineers.

The sedimentation basin performs the role of reducing streamflow velocity such that suspended solids can settle to the bottom in the basin rather than in other locations which would reduce the capacity of the headworks or damage turbines. The sedimentation design is quite conservative and is likely to handle possible increased sedimentation due to climate change. Nonetheless, low cost adaptation may be considered to address the large degree of uncertainty associated with possible future climate changes.

Table 4 summarizes elements of the proposed design already accounting for climate change above and beyond "business as usual" safety factors. The primary functions of the climate-robust design elements are river diversion, design modifications to account for the increased likelihood of glacier lake outburst floods (GLOFs) in a warmer future, and an extra-capacity de-sanding basin to account for the risk of increased turbidity due to greater precipitation variability in the future. The total value of the climate-robust design elements is approximately $55M, and is eligible for blended finance under IFC regulations. Table 4 is preliminary, and represents no promises of the IFC at this stage.

*Table 4 Blended finance for UT-1 investments in climate change robustness.*

| | Component | Units | Event | Cost with provision for climate change | Cost business as usual | Diff. | Remarks |
|---|---|---|---|---|---|---|---|
| **1** | River diversion works (The design flood proposed for the diversion scheme is the 2 year return period wet season event with a magnitude of 1,012 m3/s.) | | | 18,900,000 | | | |
| **2** | Design flood for weir 5,000 year (3,563 m3/sec) to withstand GLOF* | | GLOF | 21,300,000 | | | |
| **3** | Dam foundation to cope with the 5,000 year flood to withstand GLOF | | GLOF | | | | |
| **4** | Large gates to release extreme discharges (10,000 year ?) and sediments; A gated concrete intake weir containing 3 spillway bays; 3 radial gates 11.0 m wide x 16.5 m high | | | | | | 1 extra gate supplied for safety factor |
| **5** | Addition of Gravel Trap, Tranquilizing basin & Undersluice | | | | | | |
| **6** | Desanding basins (The concentration varies from a minimum of 35 mg/l in January to a maximum in July of 1798 mg/l.) ** | | | 14,300,000 | | | |
| **7** | Intake designed to operate with the reservoir completely filled with sediments, meaning that even with a sediment load significantly larger than anticipated the intake should be able to cointinue to operate as designed | | | | | | |
| **8** | An access is provided to facilitate heavy equipment access to the area of the intake for clean out during the low-flow period, in case of severe sediment loading *** | | | | | | |
| **9** | Cost of hydraulic model tests to address climate change concerns | | | 250,000 | 0 | | |
| **10** | Cost of hiring Cloudwater to conduct climate change analysis | LS | Both monsoon and low flows | 150,000 | 0 | | |
| **11** | Real time sediment monitoring | | | 150,000 | 0 | | |
| **12** | Early warning systems | LS | | | | | |

| | | | | |
|---|---|---|---|---|
| **13** | Underground powerhouse avoiding the risks of a major GLOF flooding vs. Surface powerhouse | | | |
| **14** | Turbines coating | | | |
| **15** | Provide extra spillway capacity on the left bank | | | to be modeled and costed |
| **16** | Generation foregone due to flushing based on real time sediment monitoring | GWh | Monsoon sediments reaching above 5,000 ppm | |

*In business as usual the option could have been 3,276 $m^3/s$ (2,000 year frequency) $m^3/s$ (2,000 year frequency)
**Basin length to exclude particles less than 0.2 mm from passing through the turbines
***The bridge over the weir which supports the spillway gantry crane and as a maintenance access for the weir has been designed as precast concrete box elements tied together transversally by post-tensioned tendons.

An optimization exercise was carried out by the designers to determine the size and the number of the flushing channel/culverts and the gradient of the flushing tunnel. The flushing plan adopted for the Project will be to close off one desander at a time leaving two units operating. It has been estimated that the loss of generation time will be 5% annually. The flushing cycles for the desander vary according to the month of the year. For January to April and November and December flushing will take place once per month for the remaining months the following frequencies have been estimated: May – 4 times; June- 9 times; July 19 times; August – 13 times; September – 8 times; October – 3 times.

## 6. Conclusions and Recommendations

This report has analyzed in depth the climate change related risks to the UT-1 hydropower project and concluded the associated risks to the structure and performance of the proposed UT-1 hydropower facility to be low, as summarized in Chapter 4. Conclusions are limited by the available data on historical climate in the basin and region, and in statements regarding likelihood, the conclusions are limited by the quality of the best available GCM projections. Economic performance projections are further subject to uncertainties in electricity markets, discount rates, O&M costs, and transmission infrastructure, among other things. Chapter 5 has presented climate-robust design modifications already incorporated into the UT-1 proposal. The design modifications presented in Chapter 5 address most of the concerns raised in Chapter 4, and as such are eligible for blended financing by the IFC.

**Appendix: Cost Estimate for Items 1, 2 and 3 by Hydro Lab, Nepal**

Item 1: Real Time Sediment Monitoring System
Item 2: Stream-flow Monitoring and Early Warning System
Item 3: Sediment guided operation system

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*Appendix G*
*Fish Ladder Expert Review*

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# Margenex International

January 16, 2018

Dr. Leeanne Alonso
4618 Duncan Drive
Annandale, VA 22003

Re: Fish ladder for Upper Trishuli-1 HPP

Dear Dr. Alonso:

Thank you for the opportunity to review the report entitled "Principles for Design of Fish ladder for UT-1 HPP" by Halvard Kaasa, a civil engineer and fish scientist for Sweco Norway AS. I have reviewed this report in detail, with focus on the fish ladder design.

This report gives comments and recommendations for technical solutions to keep river connectivity when the Upper Trishuli-1 Hydropower project (UT-1) is in operation. The dominant species in the UT-1 area of Trishuli River is the Asala (*Shizothorax richardsonii*), a species of Snow Trout that migrates upstream and downstream for breeding, feeding and rearing purposes on a seasonal basis. The total height of the fish ladder will be approximately 30 m. The exact height will be decided when the design of the fish ladder entrance pool is settled. To meet the requirements for migration of Snow Trout, the total number of pools will be close to 100.

The report provides adequate details of the conditions for the fish ladder design, considering the characteristics of the target fish species, flows through the fish ladder, and available space in the geophysical setting. The report lays out details of the crucial lower entrance of the ladder and explains, with appropriate figures, the design of each of the ten pools at the lower end, as well at the set up for the water of attraction. The latter is key to enticing fish to enter the facility.

Regarding the design of the proposed fish ladder, I like the alternating weir notches in each of the pools. The maximum water level drop of just under 12 inches, coupled with the 8 inch square drain openings near the bottom of each pool, should allow adequate upstream passage of adult Snow Trout during low flows of March and April. In my experience in Washington State, a very conservative weir drop is 9 inches is desired to accommodate small salmonids (mainly Cutthroat Trout, which would be analogous to

adult Snow Trout, in this case), but most Pacific NW professionals would say that 12 inches should be satisfactory. I am also fine with the lower entrance pool and upper exit pool schemes.

The report provides a reasoned description of upstream fish migration challenges not related to the proposed fish ladder, and notes considerations for downstream fish migration, including current in the intake pond, the pool downstream of the weir, and tunnel entrapment. It also outlines the types of data that should be obtained in order to properly manage the fish ladder.

My main concerns mirror what has been stated in the report:

- The conditions in the pool outside the fish ladder entrance is crucial for the functionality of the fish ladder; and

- The water level in the pool of the fish ladder entrance will, by existing design, fluctuate between 1229.1 m (5 $m^3/s$) to 1,231.5 m (154.4 $m^3/s$). Fluctuations of up to 2.4 m (8.9 ft) might lead to challenges concerning fish migration.

In conclusion, it is my opinion that there is reasonable likelihood this fish ladder will function to meet the project objective of allowing Asala connectivity above and below the hydropower project, based on the approach described in the Sweco Norway AS report.

I would like to see the details of how they plan to carry out monitoring to quantify fish use of the ladder, such as conventional tagging, sonic tagging or observations. If the latter, I recommend two to four fish viewing windows, evenly spaced along the ladder, for quantifying upstream migration.

I look forward to working with you on this project in the future. Please contact me if you have any questions.

Sincerely,

Margenex International

S/S Mark G. Pedersen

Mark G. Pedersen, M.S. FP-C.
President
and Senior Fisheries Consultant to the IFC