Sindh Solar Energy Project

Environmental and Social Management Framework

February 2018

Contents

List of Tables

List of Figures

List of Acronyms

ACS	Additional Chief Secretary
AEDB	Alternative Energy Development Board
AH	Affected Household
AI	Access to Information
ARAP	Abbreviated Resettlement Action Plan
BISP	Benazir Income Support Program
BoQ	Bill of Quantities
CAS	Compulsory Acquisition Surcharge
CBN	Cost of Basic Needs
CEMP	Construction Environmental Management Plan
CITES	Convention on International Trade in Endangered Species
CPPA-G	Central Power Purchasing Agency
DISCO	Distribution Company
DMS	Detailed Measurement Survey
EA	Environmental Assessment
ECA	Employment of Child Act
ECoP	Environmental Code of Practice
EHS	Environment, Health, and Safety
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EPC	Engineering, Procurement, and Construction
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
GCA	Gross Command Area
GHG	Greenhouse Gas
GoP	Government of Pakistan
GoS	Government of Sindh
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GSP	Geological Survey of Pakistan
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
IBIS	Indus Basin Irrigation System
IDA	International Development Association
IEE	Initial Environmental Examination
IFC	International Finance Corporation
ILO	International Labor Organization
IP	Indigenous People
IUCN	International Union for Conservation of Nature
KP	Khyber Pakhtunkhwa
LAA	Land Acquisition Act
LAC	Land Acquisition Collector
LoI	Letter of Intent

LVC	Land Valuation Committee
M&E	Monitoring and Evaluation
MEA	Multilateral Environmental Agreement
MFD	Maximizing Financing for Development
MSDS	Material Safety Data Sheet
NCS	National Conservation Strategy
NEP	National Environmental Policy
NEPRA	National Electric Power Regulatory Authority
NEQS	National Environmental Quality Standards
NGO	Nongovernmental Organization
O&M	Operation and Maintenance
OHS	Occupational Health and Safety
OM	Operations Manual
OP	Operational Policy
P&DD	Planning and Development Department
PAP	Project-Affected Person
PCR	Physical Cultural Resources
PD	Project Director
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environment Protection Council
PEPO	Pakistan Environmental Protection Ordinance
PMU	Project Management Unit
PPP	Public-Private Partnership
PSC	Project Steering Committee
PV	Photo-voltaic
QASPL	Quaid-e-Azam Solar Park Limited
QPR	Quarterly Progress Report
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SED	Sindh Energy Department
SEPA	Sindh Environmental Protection Agency
SEPC	Sindh Environmental Protection Council
SHS	Solar Home System
SIA	Social Impact Assessment
SMEDA	Small and Medium Enterprises Development Authority
SSEP	Sindh Solar Energy Project
SSP	Solar Service Provider
SSSD	Sindh Strategy for Sustainable Development
STI	Sexually Transmitted Infection
SWD	Sindh Wildlife Department
T&D	Transmission and Distribution
TA	Technical Assistance
ToR	Terms of Reference
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNCLOS	United Nation Convention on Laws on Seas

UNFCCC	UN Framework Convention on Climate Change
WAPDA	Water and Power Development Authority
WB	World Bank
WBG	World Bank Group
WHO	World Health Organization
WWF	World Wildlife Fund

Measuring Units

BCM	Billion cubic meters
GW	Gigawatt
ha	Hectare
km	Kilometer
KWh	Kilowatt-hour
m	Meter
mm	Millimeter
MAF	Million acre feet
MW	Megawatt
W	Watt

Glossary of Terms

Asset Inventory	A complete count and description of all properties and or assets that may be affected due to the project.
Cut-off-Date	The date of start of census for all land and non-land related entitlements. It is the date for announcement of Section 4 notification under the Land Acquisition Act of 1894 under which any person entering the project area after the cut-off date is not eligible to receive the agreed upon entitlements. The Bank accepts the date of the baseline survey as the cutoff date for eligibility.
Economic Displacement	A loss of productive assets or usage rights or livelihood capacities caused by the project.
Economic Rehabilitation	Economic rehabilitation implies the measures taken for income restoration or economic recovery, so that the affected population can improve or at least restore its previous standard of living.
Eligibility	The criteria for qualification to receive benefits under a resettlement program.
Encroachers/ squatters	People who do not have legal title, and have trespassed onto private/community land to which they are not authorized. If such people arrived before the entitlements cut-off date, they are eligible for compensation for any structures, crops or land improvements that they will lose.
Entitlement	Range of measures comprising compensation, income restoration, transfer assistance, income substitution, and relocation, which are due to displaced persons, depending on the nature of their losses, to restore their economic and social base.
Involuntary Resettlement	Land and/or asset loss which results in a reduction of livelihood level. These losses have to be compensated for so that no person is worse off than he/she was before the loss of land and/or assets.
Jirga	Jirga refers to a traditional assembly of local elders, usually men, nominated to resolve community concerns/disputes.
Kharif	Summer cropping season of the year (15^{th} April to 15^{th} September).
Livelihood restoration	Specific activities intended at supporting displaced peoples' efforts to restore their livelihoods to pre-project levels. Livelihood restoration is distinguished from compensation. Livelihood restoration measures typically include a combination of cash or other allowances and support activities such as training, agricultural assistance or

	business enhancement. Livelihood restoration is often referred to as economic rehabilitation.
Market Value	It is broadly defined as the price which a willing vendor would reasonably expect to obtain from a willing purchaser. It is the value to the seller of the property in its actual condition at the time of expropriation with all its existing advantages and with all its possibilities excluding any advantage due to the carrying out of a scheme for which the property is compulsorily acquired.
Patwari	An official of the District Administration from District Revenue Office deputed at village level that is responsible for all land and revenue related matters.
Project Affected Household	All members of a household residing under one roof and operating as a single economic unit, who are adversely affected by the Project or any of its components; may consist of a single nuclear family or an extended family group.
Project Affected Person (PAPs)	Any person or household adversely affected by any project related change or changes in use of land, water or other natural resources, or the person/s who loses his/her/their asset or property movable or fixed, in full or in part including land, with or without displacement, after the commencement and during execution of a project.
Rabi	Winter cropping season of the year (15 September to 15th April).
Rehabilitation	Compensatory measures provided under the WB Policy Framework on Involuntary Resettlement other than payment of the replacement cost of acquired assets.
Relocation	The physical resettlement of project affected persons (PAPs) from his/ her pre-project place of residence.
Replacement value/ Replacement cost[1]	"Replacement cost" is the method of valuation of assets that helps determine the amount sufficient to replace lost assets and cover transaction costs. In applying this method of valuation, depreciation of structures and assets should not be taken into account. The current market value of the asset plus transaction costs (e.g. taxes, stamp duties, legal and notarization fees, registration fees, travel costs and any other such costs as may be incurred as a result of the transaction or transfer of property). This compensation should be made in goods or resources that are of equivalent or greater value and that are culturally appropriate. i) Agricultural land: the market value of land of equal productive use or potential located in the vicinity of the

[1] Further guidance is available in OP 4.12 and its annexes.

	affected land, plus the cost of preparation to levels similar to or better than those of the affected land, and transaction costs such as registration and transfer taxes. ii) Residential land: the market value of land of equivalent area and use, with similar or improved infrastructure and services preferably located in the vicinity of the affected land, plus transaction costs such as registration and transfer taxes. iii) Houses and other structures: the cost of purchasing or building a new structure, with an area and quality similar to or better than those of the affected structure, or of repairing a partially affected structure, including labor and contractors' fees and transaction costs such as registration and transfer taxes.
Resettlement Action Plan	A resettlement action plan is a planning document that describes what will be done to address the direct social and economic impacts associated with involuntary resettlement.
Resettlement Allowance	Cash paid to cover resettlement related expenses other than losses of immoveable assets. An allowance is distinguished from compensation, which reimburses the loss of an immoveable asset.
Resettlement Compensation	Payment in cash or in kind for an asset or resource acquired or affected by the project.
Resettlement Entitlements	Resettlement entitlements with respect to a particular eligibility category are the sum total of compensation and other forms of assistance provided to displaced persons in the respective eligibility category.
Substantial/Significant Resettlement Impacts	Two hundred or more people physically displaced or losing more than 10 percent of their productive assets (income generating).
Tehsil	Tehsil is a sub-district (i.e., the layer of administration below a district).
Vulnerable Household	Households that might suffer disproportionately or face the risk of being marginalized from the effects of resettlement and include: (i) female headed households; (ii) disabled-headed households; (iii) child-headed households; iv) households falling under the generally accepted indicator for poverty; (v) elderly-headed households with no means of support and landlessness; (vi) households without security of tenure; and (vii) ethnic minorities and indigenous people. Other groups may also qualify as "vulnerable" in the light of disadvantaged circumstances.

Executive Summary

The Government of Sindh (GoS) has prepared this Environmental and Social Management Framework (ESMF) to address the potential environmental, resettlement, and social impacts associated with the Sindh Solar Energy Project (SSEP), in line with the national and provincial regulatory as well as World Bank (WB) safeguard requirements.

Project Overview

The Project aims to support the deployment of solar power in Sindh Province spanning three market segments: utility-scale, distributed generation, and at the household level. Public funding shall be used to leverage private sector investment and/or expertise in the three segments, with an emphasis on long-term sustainability, developing domestic solar photo-voltaic (PV) experience, and the emergence of self-sustaining markets. Under Project, the WB is seeking to provide an International Development Association (IDA) credit to the GoS for the following: Component 1) Utility-Scale Solar: a series of Solar Parks to leverage private sector development of up to 400 MW of solar PV through the use of competitive bidding, starting with an initial 50 MW pilot project; Component 2) Distributed Solar: installation of 20 MW of distributed solar PV on the rooftops and other available space on and around public sector buildings in Karachi and Hyderabad; Component 3) Solar Home Systems (SHSs): scaling up of the provision of SHS by commercial Solar Solution Providers (SSPs) in areas with low access to electricity, reaching 200,000 households (equivalent to 1.2 million people); and Component 4) Technical Assistance and Capacity Building: a range of capacity building and technical assistance (TA) activities to support the design and implementation of the Project.

Although focused on Sindh Province, the Project is explicitly designed to provide national benefits by demonstrating new approaches that can be replicated in other provinces.

Regulatory and Policy Requirements

This ESMF has been prepared to address the requirements defined in the national and provincial regulations, namely the Pakistan Environmental Protection Act (PEPA) of 1997 and the Sindh Environmental Protection Act of 2014. In addition, the ESMF addresses the requirements detailed in the WB operational policies (OPs)addressing environmental and social aspects and considerations.

Environmental and Social Management Framework (ESMF)

This ESMF has been prepared for all sub-projects likely to be implemented under SSEP. The exact nature and locations of these sub-projects are not decided yet, hence the exact scope and scale of environmental and social impacts cannot be determined at this stage. As a result, sub-project specific environmental and social management planning cannot be carried out nor can the associated Environmental and Social Management Plans (ESMPs) be prepared at this stage. Similarly, sub-project specific resettlement impacts are not known at this stage and hence Resettlement Action Plans (RAPs) cannot be prepared at this stage to address these resettlement impacts. Instead, the present ESMF has been prepared to provide a framework to guide the preparation of future ESMPs and RAPs for the sub-projects to be identified and implemented under SSEP.

The objective of this ESMF is to set out the policies, principles, institutional arrangements, schedules, and indicative budget that will take care of anticipated environmental,

resettlement, and other social impacts caused by the Project and associated sub-projects. These arrangements will also ensure that there is a systematic process for the different stages of the implementation of a framework that assures detailed baseline data collection for each sub-project, and site-specific impact assessment, identification of appropriate mitigation measures, participation of affected persons, involvement of relevant institutions and stakeholders, and adherence to WB, Government of Pakistan (GoP), and GoS procedures and requirements. This ESMF thus serves as the framework within which ESMPs and RAPs will be developed when the locations and specific impacts of the sub-projects are known.

Potential Social and Environmental Impacts of the Project

Since the exact locations and nature of the sub-projects to be implemented under SSEP are not known at this stage, hence sub-project and site-specific impact assessment can also not be carried out at this stage, as stated above. However, as part of preparation of this ESMF, an attempt has been made to identify generic environmental and social impacts relating to the Project, as summarized below.

The 50 MW grid-connected solar power plant sub-project under Component 1, for which a site has been provisionally identified near Khanot, Jamshoro District, is likely to cause air, soil, and water contamination; noise generation; blockage of local access routes; damage to existing infrastructure; additional pressure on local resources particularly drinking water; conflict if laborers from other parts of the province/country are employed for the sub-project; privacy of women; loss of livelihood; health and safety risks for the community as well as the construction workers; loss of natural vegetation and habitat; displacement of and disturbance to the wildlife; and water requirements during plant operation. No land acquisition will be needed since the GoS has already acquired the land for the Solar Park however this aspect will be investigated in detail to ensure that the land is free of squatters, encroachers, and/or other claims or encumbrances at the time of start of the sub-project.[2] Most of these potential impacts are however low to moderate in intensity/significance and are reversible and localized in nature, and therefore can easily be mitigated with help of appropriate mitigation and control measures. Other future sub-projects under Component 1 are likely to have similar potential impacts, also low to moderate in intensity/significance.

The Component 2 sub-projects, to be implemented in Karachi and Hyderabad, are likely to cause air, soil, and water contamination; noise generation; blockage of building access routes, damage to the buildings and other infrastructure, health and safety risks for the building occupants as well as for the construction workers, and water requirements during plant operation. In addition, some of these building have historical significance and therefore protected under the provincial law for the protection of cultural heritage. Most of these potential impacts are low to moderate in intensity/significance and are reversible and localized in nature, and therefore can easily be mitigated with help of appropriate mitigation and control measures.

The Component 3 sub-projects are likely to cause only minor environmental and or social impacts including damage to houses, noise, disturbance to the local community including women, waste disposal, and health and safety risks for the community as well as for the

[2] In case the land of sub-project is found to be occupied during the detailed environmental and social assessment (discussed later in the document), a RAP or an Abbreviated Resettlement Action Plan (ARAP) will need to be prepared in accordance with the WB requirements.

construction workers. Most of these impacts are mild in nature and intensity and can therefore be addressed through simple mitigation and precautionary measures.

Component 4 does not involve any investment in infrastructure, and therefore no potential environmental or social impacts are envisaged.

Sub-project Screening Criteria

Once a sub-project under SSEP is identified, a reconnaissance site visit will be carried out. The purpose of this visit will be to initiate the environmental and social assessment of the sub-project, to assess the baseline conditions of the area, to identify the key environmental resources and social features of the area, to identify any environmental and or social sensitivity of the area, and to determine presence of any environmental and or social hotspots in the area. A checklist will be filled for each sub-project based upon the findings and observations of the reconnaissance visit.

The next step would be to screen each sub-project based upon the checklist filled as described above and to categorize the sub-project in accordance with the criteria defined in **Table ES.1**.

Table ES.1. Screening Criteria for Environmental and Social Impacts

Category A Sub-Projects (Full Environmental Impact Assessment [EIA] Required)	Category B Sub-Projects (Initial Environmental Examination [IEE]/ESMP Required; RAP or ARAP required in case of Resettlement Impacts)	Category C Sub-Projects (Mitigation Checklist Required)
Sub-projects: having significant irreversible and widespread impacts; OR involving significant degradation of forestry of sensitive natural habitat; OR requiring an EIA according to national regulations.	Sub-projects potentially causing low to moderate level of negative but reversible and localized impacts (such as the Solar Parks and distributed solar installations planned under Components 1 and 2)	Sub-projects having only minor impacts (such as SHSs planned under Component 3)

If the screening process concludes that the sub-project is likely to have significant and or irreversible negative environmental and or social impacts (Category A sub-project in **Table ES.1**), the sub-project will be excluded from SSEP. If the screening process concludes that the sub-project is likely to have low to moderate level of negative impacts (Category B sub-project in **Table ES.1**), an ESMP will be prepared prior to initiating the sub-project. In case the sub-project is likely to cause resettlement impacts, a RAP or ARAP will also be prepared. For all other sub-projects potentially causing low level of environmental and or social impacts, the only assessment required will be the screening carried out with the help of the checklist mentioned earlier.

Preparing ESMPs

For each sub-project potentially causing low to moderate level of negative impacts, an ESMP will need to be prepared as given in **Table ES.1**. The key steps of ESMP preparation will include: review of the sub-project details; review of secondary literature including the present ESMF; scoping; detailed field data collection on key environmental and social parameters; impact assessment; stakeholder consultations; and ESMP compilation.

Preparation of RAP or ARAP

For each sub-project potentially causing resettlement impacts, a RAP or ARAP will need to be prepared as given in **Table ES.1**. The key steps of RAP/ARAP preparation will include: review of the sub-project details; review of secondary literature including the present ESMF; detailed field data collection on social parameters; census of project-affected persons (PAPs); resettlement impact assessment; estimation of the compensation for each PAP, stakeholder consultations; and RAP/ARAP compilation.

Review of ESMPs, RAPs, ARAPs, and Checklists

The ESMPs, RAPs, ARAPs, and Checklists prepared for various sub-projects will be reviewed by the environmental and social development specialists of the Project. These documents will be shared with the WB also for their review and clearance.

Institutional Arrangements for Environmental and Social Management

The Project will be implemented by the Energy Department, GoS ("Sindh Energy Department", or SED). A Project Steering Committee (PSC) comprising of Additional Chief Secretary (ACS), the Secretary of SED, Secretary of Planning and Development Department (P&DD), and the Director, Alternative Energy Department will supervise the implementation of the Project activities.

A Project Management Unit (PMU) will be established within SED for implementation of the Project. The PMU will support the PSC. The PMU will be adequately staffed with competent professionals. In addition to the technical staff, PMU will include one or more Environmental and Social Development Specialist(s). The PMU will be responsible for implementing the ESMF and also the preparation and implementation of ESMPs and RAPs/ARAPs to be prepared during Project implementation.

SED will engage a consulting firm (ESMP Consultants) to prepare and implement ESMPs, RAPs, and ARAPs for individual sub-projects under SSEP. The ESMP Consultants will maintain close liaison and coordination with PMU and concerned Departments to ensure smooth preparation and implementation of ESMPs, RAPs, and ARAPs. The ESMP Consultants will include specialists from various disciplines including environmental assessment (EA)/management, social development, resettlement, communication and consultation.

SED will also engage monitoring and evaluation (M&E) consultants to monitor the progress of various aspects of the Project, including environmental and social issues arising during Project implementation and to evaluate its impacts after its completion. The M&E Consultants will monitor the implementation of ESMF, ESMPs, RAPs, ARAPs, and Checklists.

SED-commissioned contractors will also be required to employ full time environmental and social development specialists at any construction sites.

Environmental and Social Monitoring

The objective of monitoring ESMF, ESMP, and RAP/ARAP implementation is to ensure that the various elements and tasks specified in these documents are carried out as planned and to identify implementation problems and successes as early as possible so that the implementation arrangements can be adjusted if needed. For this Project, two types of monitoring will be carried out: internal monitoring, and external monitoring. The internal monitoring is to be carried out by the Environmental and Social Development Specialist(s) within the PMU. The external/independent monitoring is to be carried out by the M&E Consultants to be hired by SED for the Project. The results of these monitoring activities will be included in the Project progress reports discussed later.

Capacity Building

Capacity building will be needed to ensure that the ESMF/ESMP/RAP objectives, procedures, and roles and responsibilities of various entities are well understood across the board. To this end, training will be conducted for SED and PMU staff, consultants, and contractors, under Component 4.

The training program will cover various aspects of ESMF, ESMP and RAP/ARAP preparation and implementation, including national regulatory requirements, WB safeguard policies and requirements, steps involved in ESMP and RAP/ARAP preparation, roles and responsibilities of various entities involved in ESMP and RAP/ARAP implementation, public consultation, documentation, and the grievance redress mechanism (GRM) outlined below. Various training modules will be prepared catering to the needs of each entity. The training program will be an on-going activity and will be carried out regularly preferably at SED offices but also in the field. Contractors will also be required to provide relevant training on environmental, social, and occupational health and safety (OHS) aspects to staff and workers.

Grievance Redress Mechanism

A GRM will be established at the Project level to facilitate amicable and timely resolution of complaints and grievances of the stakeholders including local communities regarding the social, resettlement, and environmental aspects of the Project.

Under the GRM, Grievance Redress Committees (GRCs) will be formed at each sub-project site. The Committees will comprise a PMU representative (preferably the Social Development Specialist), a representative of the contractor, and a community representative. A member of the local administration may also be included if deemed necessary/useful. Owing to the nature of the Project, a number of GRCs may be needed during Project implementation.

Under the GRM, community complaint registers will be maintained by the PMU and kept at various site offices. All complaints and grievances will be logged in these registers along with details including date of the complaint, name and address of complainant, and description of complaint. The GRC will then fill additional details in the register including the corrective action needed, timeframe for corrective action to be taken, and person/project entity responsible for taking the corrective action. Once the corrective action is implemented, the complainant will be informed and the GRC will document the associated details in the register including the description of action take, date of action completion, views of the complainant regarding the corrective action, and any residual grievance.

The GRM will be established and operated in a transparent and participatory manner. Complete details of the GRM including its procedures, actions planned, and action taken will be widely disseminated particularly among the local communities. The GRM registers will remain accessible to communities and other stakeholders, and complete information of the corrective actions taken in response to the grievances will be shared with the stakeholders particularly the complainant and related community. The GRM will be gender responsive, culturally appropriate, and readily accessible to the stakeholders at no cost and without retribution.

Documentation and Reporting

The entire process of ESMF implementation as well as ESMP and RAP/ARAP preparation and implementation will need to be properly documented and reported. This will include consultations, surveys and data collection carried out during ESMP and RAP/ARAP preparation, ESMP and RAP/ARAP compilation, and implementation of ESMPs and RAPs/ARAPs including mitigation plans, monitoring plans, training plans, consultation records, GRM record, and minutes of site meetings. The ESMP Consultants will prepare quarterly reports covering the implementation of this ESMF as well as preparation and implementation progress of each ESMP and RAP/ARAP. Similarly, separate reports will be prepared for internal as well as external monitoring discussed earlier.

Budget and Financing

The cost of implementation of this ESMF has been estimated to be **US$1.32 million**. This cost covers engaging environmental and social specialists in the PMU, hiring of ESMP Consultants, social and environmental specialists within the M&E Consultants, and the environmental and social training program. The costs of implementation of sub-project-specific ESMPs and RAPs/ARAPs are not known at this stage and hence not covered here. This cost will be included in the overall Project cost under each Component.

Consultations

Stakeholder consultations (or public consultation) during the environmental, resettlement, and social assessment process of development projects is increasingly considered an important requirement which increases the authenticity and acceptability of assessment itself. Stakeholder consultation/participation during various stages of developmental projects helps improve the decision making and ultimately leads towards sustainable development.

Stakeholder consultation is a two-way process. For stakeholders, the consultation process is an opportunity to obtain project information, to raise issues and concerns, and ask questions. For the project proponents, the consultation process offers an opportunity to understand the stakeholders and their concerns about the project, their needs and aspirations, and also their suggestions that can potentially help shape the project. Listening to stakeholder concerns and feedback can be a valuable source of information that can improve project design and outcomes and help the project proponent to identify and control external risks. It can also form the basis for future collaboration and partnerships.

The GoS through SED organized a two-day consultative workshop in Karachi. A wide range of participants were invited to this workshop including various government departments and agencies, technical experts, communities, academia, and journalists. During the workshop, various details of the proposed Project including its objectives and key elements were shared with the participants and their views and suggestions obtained.

The national/provincial legislation and WB safeguard policies require consultations to be carried out particularly with the affected communities as part of the environmental and social assessment process. The consultations carried out while preparing the present ESMF as well as those planned while preparing sub-project-specific ESMPs and RAPs/ARAPs meet these requirements.

Consultation Framework

Stakeholder consultation and engagement is an ongoing process and will continue throughout Project implementation. Consultations could be scheduled on a regular basis with relevant stakeholders, including but not limited to the concerned government departments, local administration, and the community representatives from targeted areas or sub-project sites.

The overarching goal of consultations and community engagement is to support and facilitate the Project and ESMF/ESMP/RAP/ARAP implementation, to maintain friendly relationships with the communities, to reduce conflicts and opposition, to effectively address grievances, and to increase the Project's acceptability. Stakeholder consultations and participation will take place during Project implementation as presented below.

Table ES.2. Consultation and Participation Framework

Description	Target Stakeholders	Timing	Responsibility
• Stakeholder consultations as part of the preparation of each sub-project-specific ESMPs and RAPs/ARAPs	• Affected communities • Secondary stakeholders	During preparation of each ESMP	ESMP Consultants
• Public awareness campaigns/ scoping sessions to share the ESMPs and RAPs/ARAPs with the communities and other stakeholders. • Location: various places in project area	• Communities within sub-project area, general public; and line departments/ agencies.	Commencing with the preparation of first ESMP; to be continued thereafter	PMU/ ESMP Consultants
• Consultations with the communities during each ESMP and RAP/ARAP implementation • Location: various places in project area	• Communities at/around sub-project area	Before commencement of sub-project activities.	PMU and ESMP Consultants
• Establishment of GRM and GRCs • Location: various places in project area	• Communities at/around sub-project area	Before commencement of sub-project activities.	PMU and ESMP Consultants
• Grievance redress • Location: various places in project area	• PMU staff; consultants; relevant line departments; and communities.	Sub-project implementation Stage	PMU and ESMP Consultants
• Informal consultations and discussions. • Location: various places in project area	• Communities at/around sub-project area	Sub-project implementation Stage	PMU and ESMP Consultants; contractor
• Consultations with the communities during internal monitoring • Location: various places in project area	• Communities at/around sub-project area	Construction Stage	PMU and ESMP Consultants

Description	Target Stakeholders	Timing	Responsibility
• Fortnightly meetings at project sites • Location: Site offices	• PMU staff; consultants; and communities (as needed).	Construction Stage	PMU and ESMP Consultants
• Consultations with the Communities during the Independent Monitoring • Location: various places in project area	• Communities at/around sub-project area	Construction Stage	M&E Consultants
• Consultation workshops to review ESMF/ESMPs/RAPs/ARAPs implementation, any outstanding issues and grievances, views and concerns of communities; and actions needed to address them. • Location: site offices in project area.	• Communities at/around sub-project area; relevant line department; relevant nongovernmental organization (NGOs)	Six-monthly during implementation phase	PMU and ESMP Consultants
• Consultations with the Communities relating to the leftover tasks • Location: various places in project area.	• Communities at/around sub-project area	After completion of sub-projects	PMU and ESMP Consultants
• Consultations with the communities during the site visits by the WB Review Missions. • Location: various places in project area.	• PMU; Communities at/around sub-project area	Construction/ Operation Stage	PMU; WB Mission

Disclosure

The present ESMF will be disclosed through official website of SED and will also be sent to the WB for formal disclosure. The executive summary of ESMF will be translated into Urdu and will be disclosed through the above-mentioned websites. The Urdu version of the ESMF Executive Summary will be made available to communities within the Project area at relevant site offices. Once the sub-project ESMPs and RAPs/ARAPs are prepared and approved, they will be disclosed in a similar manner.

1. Introduction

The Government of Sindh (GoS) intends to implement the Sindh Solar Energy Project (SSEP) in various locations of Sindh Province and seeks World Bank (WB) financing and technical assistance (TA) for this purpose. In line with the national/provincial as well as WB safeguard requirements and to address potentially negative environmental and or social impacts of the Project, the GoS has conducted an initial environmental and social assessment of the proposed activities. As an outcome of this assessment, this Environmental and Social Management Framework (ESMF) has been prepared.

1.1. Project Overview

The Project aims to support the deployment of solar power in Sindh Province spanning three market segments: utility-scale, distributed generation, and at household level. Public funding shall be used to leverage private sector investment and/or expertise in the three

segments, with an emphasis on long-term sustainability, developing domestic solar photo-voltaic (PV) experience, and the emergence of self-sustaining markets. Under the Project, the WB would provide an International Development Association (IDA) credit to finance the following activities:

- **Component 1: Utility-Scale Solar**. A series of Solar Parks to leverage private sector development of up to 400 MW of solar PV through the use of competitive bidding, starting with an initial 50 MW pilot project;
- **Component 2: Distributed Solar**. Installation of 20 MW of distributed solar PV on the rooftops and other available space on and around public sector buildings in Karachi and Hyderabad;
- **Component 3: Solar Home Systems (SHSs)**. Scaling up of the provision of SHS by commercial Solar Solution Providers (SSPs) in areas with low access to electricity, reaching 200,000 households (equivalent to 1.2 million people); and
- **Component 4: Capacity Building and Technical Assistance**. A range of capacity building and TA activities to support the design and implementation of the Project.

Although focused on Sindh Province, the Project is explicitly designed to provide national benefits by demonstrating new approaches that can be replicated in other provinces. The Project will introduce and showcase international best practice with renewable energy auctions, reduce the headline cost of solar deployment, create sustainable business models for potential replication in other provinces, build institutional and private sector capacity, and identify opportunities for future renewable energy deployment that address issues of grid integration. In the context of potential new investment in fossil fuel-fired generation capacity, and lack of conviction over the long-term role and integration of renewable energy, the Project is designed to help steer Pakistan towards a lower carbon path to development.

1.2. Legal and Policy Frameworks relevant to Environmental and Social Aspects

The national and provincial environmental protection laws require proponent of each development project to carry out an environmental and social assessment and seek approval from the relevant environmental protection agency (EPA). In addition, the Land Acquisition Act (LAA) of 1894 addresses the acquisition of private properties for public purposes. These laws are further discussed later in the document.

The WB Operational Policy (OP) on environmental assessment (EA) sets out requirements for carrying out environmental and social assessment of each project requiring Bank financing. This is further discussed later in the document.

This ESMF seeks to address the requirements specified by the above national/provincial laws as well as relevant WB OPs.

1.3. Environmental and Social Management Framework (ESMF)

As the sub-projects under SSEP will be designed and determined during the Project implementation phase, a framework approach is needed to identify the potential impacts and direct implementing agencies to practical ways of avoiding or mitigating them. ESMF primarily prescribes Project arrangements for the preparation, review, approval and

implementation of sub-projects to adequately address Bank safeguards issues. The more specific objectives of ESMF, as given in the terms of reference (ToR), are:

- To establish clear procedures and methodologies for the environmental, resettlement, and social planning, assessment, review, approval and implementation of sub-projects to be financed under the Project;
- To develop methodology for screening of sub-projects under above mentioned components and to recommend appropriate safeguard instruments for mitigating and monitoring of environmental, social, and resettlement risks/impacts associated with each sub-project;
- To determine environmental and socio-economic characteristics and impacts of the Project including baseline conditions;
- To specify appropriate roles and responsibilities of all implementing agencies and outline the necessary reporting procedures for managing and monitoring environmental and social concerns related to sub-projects;
- To determine the training, capacity building and TA needed to successfully implement the provisions of the ESMF;
- To establish the Project funding required to implement the ESMF requirements;
- To ensure disclosure of Project information and undertake public consultation as well as describe grievance redress mechanism (GRM) to address complaints.

As stated earlier, the Project intends to finance a variety of sub-projects covering a wide range of activities that have the potential to cause negative environmental and social impacts. Therefore, OP 4.01 - Environmental Assessment is triggered. However, most of these impacts are likely to be moderate in intensity, reversible, localized and temporary in nature. Therefore, the Project has been classified as environmental category B. The following policies have been triggered:

- OP 4.01: Environmental Assessment
- OP 4.11: Physical Cultural Resources
- OP 4.12: Involuntary Resettlement

The ESMF ToR are given in **Annex A**.

1.4. ESMF Methodology

The ESMF has been prepared employing the standard methodology described below.

1.4.1. Review of the Project Details

At the onset of the study, the Project details were obtained from the concerned departments and studied carefully. Meetings were held with the concerned officials as required. Attempts were made to obtain as much information as available at this stage on the sub-projects. Data gaps were identified where needed and data collection needs specified for the Environmental and Social Management Plans (ESMPs) to be prepared for the individual sub-projects.

1.4.2. Review of Relevant Legislation, Policies, and Guidelines

To determine the policy, legal and institutional environment for the Project, the applicable policies, guidelines and legislations concerning the Project's environmental and social aspects were reviewed. As the Project is to be implemented by the GoS and funded by the WB, the following policies and legislations will be reviewed:

- Policies and legislations of Government of Pakistan (GoP) and GoS.
- The WB Guidelines, Policies and Directives.

The national legislation most relevant to the proposed ESMF includes the Pakistan Environmental Protection Act (PEPA) of 1997 and its subordinate rules and regulations most notably the Review of Environmental Impact Assessment (EIA)/Initial Environmental Examination (IEE) Rules of 2000. The provincial legislation includes the Sindh Environmental Protection Act of 2014. The LAA of 1894 is also relevant where private land is required for any government projects. In addition, the Antiquity Act of 1985 and provincial wildlife protection acts are relevant for the protection of wildlife and their habitat as well as any development works inside any wildlife protected areas such as national parks and wildlife sanctuaries.

The OP 4.01 for EA is the most important safeguard policy for SSEP. The present ESMF has been prepared in accordance with the provisions of this Policy. Other relevant WB safeguard policies include OP 4.04 (Natural Habitat), OP 4.11 (Physical Cultural Resources), and 4.12 (Involuntary Resettlement) provided these are triggered during Project implementation.

During preparation of this ESMF, the above legislations, regulations, and policies were studied in depth to determine their relevance and applicability to the Project, in addition to determining and specifying actions to be taken by the Project proponents and implementing agency to fulfill the associated requirements.

1.4.3. Review of Secondary Literature

Under this task, relevant published and unpublished reports and documents were identified and reviewed. These include among others similar EA reports particularly of donor-funded projects, project documents, ESMFs, environmental monitoring reports, news articles, and research reports. The primary objective of this task was to determine the potentially negative environmental as well as social impacts of projects similar to SSEP and the associated mitigation/management strategies that have been proposed. Secondary data was also collected where applicable to obtain baseline conditions of the Project area and its surroundings.

1.4.4. Scoping

During this phase, key information on the Project was reviewed and interaction between its activities and key environmental resources charted out. A long list of the potential environmental as well as social issues likely to arise as a result of the Project was thus developed. Subsequently, the significant potential impacts were short listed, screening out the non-relevant and or insignificant impacts, based upon their nature and severity. Furthermore, the area of influence of the Project activities was determined to the extent possible at this stage. Thus the sectorial as well as spatial boundaries of the Project were determined for the purpose of the environmental and social assessment. The stakeholder

analysis was also carried out for the consultations carried out during the study discussed below (and during the Project implementation).

1.4.5. Stakeholder Consultations

A two-day consultative workshop was organized in Karachi, in which a wide range of participants were invited including various government departments and agencies, technical experts, communities, academia, and journalists. During the Workshop, various details of the proposed Project including its objectives and key elements were shared with the participants, and their views, concerns and suggestions obtained.

As part of this task, consultation framework was also developed to be implemented during the Project implementation particularly during the environmental and social assessment of individual sub-projects.

1.4.6. Collection of Baseline Data

During this phase, baseline data was collected and compiled, in order to develop an initial baseline of the Project area's physical, biological and socio-economic environment. For this purpose, secondary sources were used to the extent possible as described in **Section 1.4.3** earlier. Subsequent to this, field visits were carried out to the selected sub-project sites known at this stage. During the field visits, mostly anecdotal information was collected at and around the sub-project sites on land use, land form, settlements, water resources, flora and fauna, key environmental and social features, any protected areas, and any environmental and or social sensitivity. No instrument data collection and or laboratory analysis was carried out at this stage; however, need of detailed data collection to be carried out during environmental and social assessment of individual sub-projects was determined.

1.4.7. Impact Assessment

Once the baseline data collection was completed, impact assessment was carried out to identify potentially negative but generic impacts of the proposed activities under the Project. Leopold matrix was used to determine the interaction of proposed Project activities and key environmental and social resources. In addition, risk assessment methodology was employed to characterize each individual impact of the Project as severely, moderately, or mildly significant. Finally, generic mitigation measures were identified to address these potential impacts. Site- and sub-project-specific impact assessment will be carried out as part of the environmental and social assessment of individual sub-projects to be undertaken under SSEP.

In addition to the above, screening criteria was developed to determine the level and extent of environmental and social assessment to be carried out for each individual sub-project under SSEP. Generally, larger sub-projects with significant impacts will require full environmental and social assessment to be carried out, medium size sub-projects with less significant impacts will require ESMP to be prepared, whereas smaller sub-projects with insignificant impacts will require only mitigation checklists to be filled.

1.4.8. ESMF Compilation

During this task, the process and outcome of the tasks described above was compiled in the form of the present ESMF. The structure of the ESMF is described in the section below.

1.5. ESMF Structure

Executive Summary: This provides a general summary of the ESMF contents and key findings, in a vocabulary that is easily understood by the public at large. It concisely covers all aspects of the report.

Introduction: This Chapter describes the ESMF purpose, objectives, principles and methodology. This Chapter introduces the Project proponents, the study team, and provides other relevant information. The layout of ESMF is also described in it to facilitate its reading.

Project Description: This Chapter provides a simplified description of the Project, with an emphasis on component(s) that will finance sub-projects. The Project description includes background and purpose of the Project; components of the Project with emphasis on those components that will finance sub-projects; anticipated types of sub-projects; and types that will be excluded from financing; Project target areas; Project coordination and implementation arrangements including details of institutional arrangements for managing the sub-project cycle; and annual reporting and performance review requirements. This Chapter has been compiled on the basis of information obtained from the Project proponents and WB.

Environmental and Social Management Requirements: This Chapter describes the relevant national/provincial environmental and social legal requirements as indicated in various legislation, regulations and guidelines relevant to the Project and ESMF as well as the WB's safeguard policies applicable to the Project and its sub-projects. The Chapter states how such requirements will be complied during various phases of the Project. It also identifies gaps between national/provincial regulatory requirements and the Bank's safeguard policies. It also lists national institutions that would be involved in reviewing and approving sub-projects and their environmental and social assessments.

Environmental and Socio-Economic Characteristics: This Chapter covers the dimensions of the study area and review relevant physical, biological, land-use, and socioeconomic conditions, including any changes anticipated before the Project commences. Data is relevant to decisions about Project location, design, operation, or mitigatory measures. This Chapter has been compiled on the basis of baseline data collection described in **Section 1.4.6**. The Chapter also describes the detailed baseline data collection needs for the environmental and social assessments of the individual sub-projects.

Assessment during Project Preparation, Approval and Implementation: This Chapter describes the process for ensuring that environmental and social concerns are adequately assessed and addressed through institutional arrangements and procedures for identification, preparation, approval and implementation of sub-projects. This Chapter also lists arrangements for disclosing sub-projects information to comply with the Bank's Policy of Disclosure of Information.

ESMP: This Chapter describes the needs and the requirements of individual safeguards policies applicable to the Project. It also describes the possible and generic adverse effects, planned mitigation measures and how they will be implemented. This Chapter also highlights program for monitoring negative as well as positive effects. It also assigns responsibility for implementing ESMP.

Resettlement Policy Framework (RPF): This Chapter describes the key principles of resettlement planning to be followed during the Project implementation, entitlement

criteria for various types of resettlement impacts, the steps involved in preparation as well as implementation of sub-project-specific Resettlement Action Plans (RAPs)/Abbreviated Resettlement Action Plan (ARAPs), and structure of these documents.

Stakeholder consultations: This Chapter describes the objective, process, and outcome of the stakeholder consultations carried out during the ESMF preparation. Also, discussed in the Chapter are the consultations to be carried out during the environmental and social assessments of individual sub-projects.

TA, Training and Capacity Building: Under this Section, existing institutional capacity of the implementation agency was assessed. At minimum, the institutional assessment covers institutional structure and its ability to address environmental and social management issues, number as well as qualifications, knowledge and experience of the staff, and appropriateness of budgetary resources to carry out job requirements. This Section also provides the environmental and social safeguard training plan for the concerned individuals and institutions.

ESMF Implementation Budget: This Section provides an estimate of the cost of ESMF implementation. The budget includes funds for institutions development activities, training programs for implementation teams and local/national institutions, TA to authorities, costs for preparations of site and component specific ESMPs and other safeguard documents.

Bidding Process: This Section provides guidance on how environmental and social issues will be incorporated into the bidding documents of the Project activities.

2. Project Description

This Chapter presents a simplified description of the Project, consistent with the Combined Project Information Documents / Integrated Safeguards Datasheet (PID/ISDS) published by the WB on its website.

2.1. Background

Despite huge hydropower and renewable energy potential Pakistan's electricity mix is becoming more reliant on imported fossil fuels, which also increases price volatility. The energy sector is the largest contributing sector in Pakistan's greenhouse gas (GHG) emissions profile, representing nearly 46 percent of total emissions. GHG emissions are expected to continue to grow in the near future due to the planned increase in coal-fired generation capacity. Pakistan's Intended Nationally Determined Contribution (INDC) committed to reduce up to 20 percent of its 2030 projected GHG emissions through the following options: (i) increase grid efficiency; (ii) improvement in coal efficiency; and (iii) large-scale and distributed grid connected solar, wind and hydroelectricity. When it comes to solar and wind, the resource potential is very significant, especially in the south and west of the country.

Even with a conducive policy regime for renewable energy, installed solar and wind power capacity remain relatively low at 400 MW and 800 MW respectively. In 2006, the Government released its Policy for Development of Renewable Energy Generation (Renewable Energy Policy) which set out an initial plan for development of renewable energy within the country. The Alternative Energy Development Board (AEDB) was established as an autonomous body with the aim of promoting and facilitating the exploitation of renewable energy projects in Pakistan. Under the Renewable Energy Policy, once the developer has secured all requisite approvals in the development process and has signed an Energy Purchase Agreement with CPPA-G (Central Power Purchasing Agency), K-Electric, or another distribution company (DISCO), it is mandatory for the distribution utility to purchase all of the electricity offered to them by the project. However, progress has been slow, with wind development primarily in Sindh province, and solar PV development primarily in Punjab. Until 2016 National Electric Power Regulatory Authority (NEPRA) provided an "up-front tariff' for solar and wind power, equivalent to a "feed-in tariff", but in 2017 NEPRA announced that future solar and wind projects would be awarded tariffs through competitive bidding. So far no solar or wind capacity auction has yet been launched.

Pakistan still has a sizeable gap in provision of universal electricity access, and within electrified communities there may be significant under-electrification due to load shedding and affordability issues. The electrification rate for Pakistan is estimated by the International Energy Agency (IEA) to be 74% in 2016, meaning 51 million people do not have access to electricity. However, the International Finance Corporation (IFC) estimates that over 144 million people are currently either off-grid or suffering from severe under-electrification (those who working grid connections but do not receive adequate supply). Up to now, efforts to bridge the gap in electricity access have been conducted primarily through grid extension, which is unfeasible in some rural areas due to low population density and high dispersion amongst rural settlements. Efforts to provide off-grid solutions have relied upon small hydropower in the northern provinces, and there have been limited attempts to provide SHSs in the southern provinces. However, government SHS schemes

often suffer from high rates of system failure and abandonment, especially when no long-term operations and maintenance (O&M) is provided. In the absence of a decent electricity service, Pakistani households resort to the use of kerosene, candles, battery-powered torches, gas lights and generators, spending an estimated $2.3 billion annually on alternative lighting products/services.

2.2. Project Objective

The Development Objective is to increase solar power generation and access to electricity in Sindh Province.

2.3. Project Components

The Project aims to support the deployment of solar power in Sindh Province spanning three market segments: utility-scale, distributed generation, and at the household level. Public funding shall be used to leverage private sector investment and/or expertise in the three segments, with an emphasis on long-term sustainability, developing domestic solar PV experience, and the emergence of self-sustaining markets. The Project will introduce and showcase international best practice with renewable energy auctions, reduce the headline cost of solar deployment, create sustainable business models for potential replication in other provinces, build institutional and private sector capacity, and identify opportunities for future renewable energy deployment that address issues of grid integration. The Project is designed to help steer Pakistan towards a lower carbon path to development.

2.3.1. Component 1: Utility-Scale Solar

Component 1 will finance a series of Solar Parks to leverage private sector development of solar PV through the use of competitive bidding, starting with an initial 50 MW project that aims to be the first international solar auction in Pakistan. A 50 MW site will be taken forward as a pilot solar auction in the first phase of the Project. Further Solar Parks in the 50-200 MW range would be subsequently developed to facilitate a total of 400 MW of solar power capacity, following a comprehensive geospatial planning and dispatch analysis.

2.3.2. Component 2: Distributed Solar

Component 2 will finance 20 MW of distributed solar PV on the rooftops and other available space on and around public sector buildings in Sindh. At least 20 MW of capacity would be installed under this component, in a phased manner. Sindh Energy Department (SED) would identify portfolios of candidate sites, and would liaise with other GoS departments to establish a leasing agreement for target institutions. The portfolios would be awarded to private sector solar developers for installation under an Engineering, Procurement, and Construction (EPC) contract that includes performance-based provision for O&M. The Project would initially target sites where no export of electricity is required, but could be expanded to larger sites once an agreement with the DISCO(s) is secured.

2.3.3. Component 3: Solar Home Systems

Component 3 will provide results-based grants to scale up the provision of SHS by commercial SSPs in areas with low access to electricity, reaching at least 200,000 households. To address the persistent challenges with achieving universal electricity access

in Sindh and concerns over O&M and sustainability, grant incentives will be provided by SED to commercial SSPs to provide SHS in prioritized areas. At least 200,000 households (equivalent to 1.2 million people) would be provided with SHS under this component, within geographic areas selected according to pre-defined prioritization criteria. Pre-qualified SSPs would be selected through competitive bidding to serve each area based on the lowest cost offered for a 'starter SHS', and would be provided with a grant for each system installed. The grant scheme would be complemented with a major public awareness-raising campaign and continuous outreach to SSPs.

2.3.4. Component 4: Capacity Building and Technical Assistance

Component 4 consists of a range of capacity building and TA activities to support the design and implementation of the Project. The expenditures funded under Component 4 will include activities such as: (i) training for SED and other GoS entities; (ii) participation in WB capacity building events and liaison with relevant experts; (iii) consultation with key stakeholders and community groups; (iv) data collection center and monitoring and evaluation (M&E) capacity.

2.4. Project Implementation Arrangements

A Project Management Unit (PMU) will be created within SED and will be responsible for Project implementation and supervision. The PMU will have appropriate experts and will be headed by a full-time Project Director (PD) as per WB guidelines, or at the level of a senior government officer. The PMU will be responsible for all aspects of the Project implementation and will be supported by Project Supervision and Contract Management staff and/or consultants as well as M&E staff/consultants as required. Project Supervision & Contract (PSC) management consultants, such as the transaction advisors for Component 1, will be selected through an international competitive bidding process. The PMU's scope of work will include: (i) design and implementation of the Project activities; (ii) data collection and monitoring, (iii) supervision of procurement related activities (iv) preparation of annual work plan for all Project's activities and annual financial requirements, and (iv) supervision and reporting on implementation of ESMPs and RAPs as required. A Project Steering Committee (PSC), chaired by the Secretary of SED, will be established to provide high-level oversight and guidance to the PMU on the Project implementation. To provide citizen engagement at the Project level, the PMU shall explore inviting an 'advocate' for citizens/consumer views and concerns to the PSC.

3. Regulatory and Policy Review

This Chapter provides an overview of the federal and provincial institutional frameworks, federal and provincial environmental policies and guidelines, applicable laws and the WB OPs.

3.1. Institutional Frameworks

The national as well as provincial institutional framework for decision making and policy formulation for environmental and conservation aspects is briefly described below.

3.1.1. Ministry of Climate Change

After the 18th Amendment in the Constitution of Pakistan, the Environment Ministry was devolved to the provinces and a new Ministry of National Disaster Management was created. The GoP renamed the Ministry of National Disaster Management in 2012 as the Ministry of Climate Change to deal with the threats posed by global warming and to protect environment in the country. The National Policy of Climate Change was also approved in the same year. The policy describes the following measures regarding EA:

- Take necessary measures to redesign administrative structures and procedures of Federal and Provincial EPAs and Planning and Development Division to integrate climate change concerns into IEE processes;
- Ensure that IEE/EIA and other mechanisms are strictly observed in all development projects, particularly infrastructure projects, by the concerned agencies.
- The ministry has now been dissolved and transformed into a division under National Disaster Management Authority that would implement the National Policy on Climate Change with coordination of provincial governments.

3.1.2. Pakistan Environmental Protection Council

The apex body, Pakistan Environment Protection Council (PEPC), was first constituted in 1984 under section 3 of the Pakistan Environmental Protection Ordinance (PEPO), 1983, with President of Pakistan as its Chairman. In 1994, an amendment was made in the Ordinance to provide for the Prime Minister or his nominee to be the head of the Council. The Council was reconstituted after enactment of the new law, i.e., PEPA, 1997.

It is headed by the Prime Minister (Chief Executive) of Pakistan. The council is represented by trade and industry, leading nongovernmental organization (NGOs), educational intuitions, experts, journalists and concerned ministries.

The Council is responsible to a) coordinate and supervise enforcement of the provisions of Environmental Protection Act (discussed later in the Chapter; b) approve comprehensive national environmental policies (NEPs) and ensure their implementation within the framework of a National Conservation Strategy (NCS) as may be approved by the Federal Government from time to time; c) approve the National Environmental Quality Standards (NEQS); (d) provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources; and (e) coordinate integration of the principles and concerns of sustainable development into national development plans and policies.

3.1.3. Sindh Environmental Protection Council (SEPC)

The Sindh Environmental Protection Council (SEPC) has been established under section 3 of the Sindh Environmental Protection Act, 2014. The SEPC is headed by the Chief Minister or such other person as the Chief Minister may nominate in this behalf in the province. The functions of the SEPC are:

- To frame its own Rules of Procedure, co-ordinate and supervise the enforcement of the provisions of the Sindh Environmental Protection Act 2014 and other laws relating to the environment in the Province;
- Approve comprehensive provincial environmental and sustainable development policies and ensure their implementation within the framework of a conservation strategy and sustainable development plan as may be approved by Government from time to time;
- Provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources;
- Coordinate integration of the principles and concerns of sustainable development into socio-economic and development policies, plans and programs at the provincial, district and local levels;
- Deal with inter-provincial and federal-provincial issues, and liaise and coordinate with other Provinces through appropriate inter-provincial forums regarding formulation and implementation of standards and policies relating to environmental matters with an inter-provincial impact, provide guidelines for biosafety and for the use of genetically modified organisms; and,
- Assist the Federal Government or Federal Agency in implementation and or administration of various provision of United Nation Convention on Laws on Seas, (UNCLOS) 1980 in coastal waters of the province.

3.1.4. Pakistan Environmental Protection Agency

The Pakistan Environmental Protection Agency (Pak-EPA) headed by a Director General has wide ranging functions given under the PEPA including preparation and co-ordination of NEP for approval by the PEPC, administering and implementing the PEPA and preparation, establishment or revision of the National Environment Quality Standards (NEQS). The Pak-EPA also has the responsibility for reviewing and approving IEE and EIA reports for the following projects:

- Projects on federal land
- Military projects
- Projects involving trans-country or trans-province impacts

The responsibility for the review and approval of all other IEEs and EIAs was delegated to the relevant Provincial EPAs. Vide notification dated 29 June, 2011 the Pak-EPA was assigned to the Capital Administration and Development Division under National Disaster Management Division.

3.1.5. Sindh Environment Protection Agency (SEPA)

The Sindh Environmental Protection Agency (SEPA) was established under PEPA 1997. It is headed by a Director General who exercises powers delegated previously to him by the Pak-EPA and now by the Environmental Department, GoS. For the Sindh components of SSEP, SEPA is the relevant regulatory agency for the review and approval of IEE and EIA reports.

3.1.6. Sindh Wildlife Department

After the dismemberment of One Unit, Sindh pioneered in establishing Wildlife Management Board in 1972, and the Sindh Wildlife Protection Ordinance was also promulgated in the same year. A Chairman, who is normally the Chief Executive of the province heads Sindh Wildlife Management Board constituted in 1972, and members as determined by the Government. During the time of "Board", the services of the wildlife staff were non-pensionable within the autonomous body where no bylaws, recruitment and other rules regarding service structure were ever framed. The provincial government in 1994 decided to regularize the services of the employees and Sindh Wildlife Management Board was converted into a regular Sindh Wildlife Department (SWD) of the GoS. SWD is the main organization responsible for the protection of wildlife and management of protected areas (national parks, wildlife sanctuaries, and game reserves) in Sindh.

3.2. Environmental Policies, Legislations, and Guidelines

3.2.1. National Conservation Strategy (1992)

The Pakistan NCS is the principal policy document for environmental issues in the country. The NCS was developed and approved by the GoP in 1992. The NCS works on a ten-year planning and implementation cycle. It deals with fourteen core areas as follows:

- Maintaining soils in cropland;
- Increasing irrigation efficiency;
- Protecting watersheds;
- Supporting forestry and plantations;
- Restoring rangelands and improving livestock;
- Protecting water bodies and sustaining fisheries;
- Conserving of biodiversity;
- Increasing energy efficiency;
- Developing and deploying material and energy renewable;
- Preventing and abating pollution;
- Managing urban wastes;
- Supporting institutions for common resources;
- Integrating population and environmental programs;
- Preserving the cultural heritage

3.2.2. The National Environmental Policy (2005)

The NEP describes integration of the environment into development planning through the implementation of the EIA process at the scheme level. The NEP is the overarching framework which aims to protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development.

The policy includes guidelines to Federal, Provincial and Local Governments under the following relevant headings:

- Water supply and management
- Air quality and noise
- Waste management
- Forestry
- Biodiversity and protected areas
- Climate change and ozone depletion
- Energy efficiency and renewable
- Multilateral Environmental Agreements (MEAs)

Cross-sectoral guidelines are also included which link the environment to poverty, population, gender, health, trade, local governance and natural disaster management.

3.2.3. Pakistan Environmental Protection Act, 1997

The PEPA, 1997 is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The Act is applicable to a broad range of issues and extends to air, water, industrial liquid effluent, soil, marine, and noise pollution, as well as to the handling of hazardous wastes. As defined in the Act "environment" means: "(a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the inter-relationships between any of the factors in sub-clauses (a) to (f).

Before the 18th amendment in the Constitution of Pakistan, this Act was applicable in the entire country. However, after the Amendment, provinces have promulgated their respective environmental protection legislations.

3.2.4. Sindh Environmental Protection Act (2014)

The first draft of the Sindh Environmental Protection Act was issued in October 2013 during a consultative meeting organized by the International Union for Conservation of Nature (IUCN) Pakistan in collaboration with the SEPA. The Sindh Environmental Protection Bill, 2014 having been passed by the Provincial Assembly of Sindh on 24th February, 2014 and assented to by the Governor of Sindh on 19th March, 2014 is hereby published as an Act of the Legislature of Sindh. This act is almost the same as the PEPA 1997 briefly described above.

The Act is applicable to environmental parameters such as air, water, soil, and noise pollution, as well as to the handling of hazardous wastes. The Act provides the framework for protection and conservation of species, wildlife habitats and biodiversity, conservation

of renewable resources, establishment of standards for the quality of the ambient air, water and land, establishment of Environmental Tribunals, appointment of Environmental Magistrates, IEE and EIA approval. Penalties have been prescribed for those contravene the Act.

The following are the key features of the Act that have a direct bearing on the proposed Project:

- Section 11 (Prohibition of Certain Discharges or Emissions) states that "Subject to the provisions of this Act and the rules and regulations made there under, no person shall discharge or emit, or allow the discharge or emission of, any effluent or waste or air pollutant or noise in an amount, concentration or level which is in excess of the National Environmental Quality Standards (NEQS)".
- Section 12 & 13 (Import and Handling of Hazardous Substances) requires that "Subject to the provisions of this Act, no person shall generate, collect, consign, transport, treat, dispose of, store, handle, or import any hazardous substance except (a) under a license issued by the Federal Agency and in such manner as may be prescribed; or (b) in accordance with the provisions of any other law for the time being in force, or of any international treaty, convention, protocol, code, standard, agreement, or other Instrument to which Pakistan is a party." Enforcement of this clause requires the EPA to issue regulations regarding licensing procedures and to define 'hazardous substance.'
- Section 15 (Regulation of Motor Vehicles): Subject to provision of this clause of the Act and the rules and regulations made there under, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the NEQS, or where the applicable standards established under clause (g) of subsection (1) of Section-6 of the Act.
- Section 17-I (IEE and EIA) requires that "No proponent of a project shall commence construction or operation unless he has filed with the SEPA an IEE or, where the project is likely to cause an adverse environmental effect, an EIA, and has obtained from the SEPA for approval in respect thereof."
- Section 17-2a & b (Review of IEE and EIA): The Federal Agency shall review the EIA report and accord its approval subject to such conditions as it may deem fit to impose, or require that the EIA be re-submitted after such modifications as may be stipulated or rejected, the project as being contrary to environmental objectives.

3.2.5. Guidelines for Sensitive and Critical Areas (1997)

The guidelines identify officially notified protected areas in Pakistan, including critical ecosystems and archaeological sites, and present checklists for EA procedures to be carried out within or near such sites. Environmentally sensitive areas include archaeological sites, game reserves and natural parks, and wildlife sanctuaries.

3.2.6. The Solid Waste Management Policy (2000)

This policy was promulgated by Pak-EPA. The Policy aims to facilitate control on waste by providing principles of good waste management and reducing waste at source.

3.2.7. Sindh Strategy for Sustainable Development (2007)

The Sindh Strategy for Sustainable Development (SSSD) was prepared by the Planning and Development Department (P&DD) of GoS in collaboration with IUCN. The Strategy proposes a ten-year sustainable development agenda for Sindh. Its purpose is to highlight the ecological, economic and social issues of the province and to provide recommendations and strategic actions to address them. The strategy promotes the sustainable use of natural resources to achieve the objectives of poverty alleviation and social development through the participation of the people of Sindh.

3.2.8. Factories Act (1934)

The clauses of the Factories Act relevant to the project are those which concern health, safety and welfare of workers, disposal of solid wastes and effluents, and damage to private and public property. The Factories Act also provides regulations for handling and disposal of toxic and hazardous materials. As construction activity is classified as 'Industry', these regulations will be applicable to the project construction contractors. This Act will be applicable to the contractor(s) to be engaged for sub-project's construction works covered under the proposed SSEP.

3.2.9. Antiquity Act (1975)

The Antiquity Act ensures the protection of cultural resources in Pakistan. This Act is designed to protect antiquities from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in this act as "Ancient products of human activity, historical sites, sites of anthropological or cultural interest and national monuments".

Pakistan Antiquities Act of 1975 ensures the protection of physical cultural resources (PCR) in Pakistan. The Act is designed to protect especially the notified "antiquities" from destruction, theft, negligence, unlawful excavation, trade and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the GoP (Provincial Governments after the introduction of the 18th Amendment to the Constitution of Pakistan) to prohibit excavation in any area which may contain articles of archaeological significance.

The Act describes antiquity as (i) any ancient product of human activity, movable or immovable, illustrative of art, architecture, craft, custom, literature, morals, politics, religion, warfare or science or of any aspect of civilization or culture; (ii) any ancient object or site of historical, ethnographical, anthropological, military or scientific interest; (iii) any national monument; and (iv) any other object or class of such objects declared by the Federal Government, by notification in the official Gazette. The Act also defines 'ancient' as an antiquity which has been in existence for a period of not less than seventy-five years.

The Antiquities Act of 1975 further provides about the fate of Chance Finds, officially termed as "Accidental discovery``. In such a case the chance find is to be reported to the Director-General Provincial Archaeological Department within seven days of its being discovered or found and preserve it for the period thus specified. If, within seven days of his being informed of the discovery of movable antiquity, the Director General decides to take over the antiquity for purpose of custody, preservation and protection, the person discovering or finding it shall hand it over to the Director General or a person authorized by him in writing. It further says that if Director General decides to take over the antiquity he may pay such amount as would be decided by the Advisory Committee.

The act prohibits new construction in the proximity of a protected antiquity and empowers the GoP to prohibit excavation in any area that may contain articles of archaeological significance.

Under this act, the proponents are obligated to ensure that no activity is undertaken in the proximity of a protected antiquity, and during the course of the project if an archaeological discovery is made, it should be reported to the Department of Archaeology accordingly.

This Act will be applicable to the physical interventions such as construction activities to be carried out for the sub-projects covered under this ESMF. No protected or unprotected antiquity has been identified in the primary impact zone of the sub-project areas that are known at this stage. However, this aspect will be re-confirmed while preparing sub-project-specific ESMPs during the project implementation. In addition, chance find procedures will be included in the ESMPs.

3.2.10. Sindh Cultural Heritage (Preservation) Act, 1994

This Act aims to preserve and protect ancient places and objects of architectural, historical, archaeological, artistic, ethnological, anthropological and national interest in the Province of Sindh. Under this Act, the Provincial Government may take necessary actions for the custody, preservation and protection of any premises or objects of architectural, historical, cultural or national value of which there is no owner. This Act puts restriction on the owner's right to destroy, remove, alter or deface the protected heritage.

Some of the old office buildings that are being considered for the rooftop solar power generation under the proposed Project may be protected under this Act. For any proposed works on such buildings, permission will need to be obtained from the GoS. This aspect will be carefully considered during the sub-project-specific ESMPs.

3.2.11. National Environmental Quality Standards

The NEQS were first promulgated in 1993 and have been amended in 1995 and 2000 including standards for liquid effluent and gaseous emissions. The standards for ambient air, drinking water quality and noise levels were published on November, 2010 and standards for motor vehicle exhaust, diesel vehicle, and petrol vehicle published on August, 2009. The following standards are specified therein:

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid Indo trial effluents discharged to inland waters, sewage treatment facilities, and the sea (three separate sets of numbers).
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from Indo trial sources.
- Maximum allowable concentration of pollutants (eight parameters) in ambient air quality.
- Maximum allowable concentration of pollutants (three parameters) in motor vehicle exhausts quality.
- Drinking water standards and
- Noise standards.

These NEQS will be applicable to the proposed Project.

3.2.12. Provincial Motor Vehicles (Amendment) Act, 2014

The Provincial Motor Vehicle Act, 2014 deals with the powers of the Motor Vehicle Licensing Authorities and empowers other related agencies to regulate traffic rules, vehicle speed and weight limits, and vehicle use, to erect traffic signs, and to prescribe special duties of drivers in case of accidents. It also prescribes powers of police officers to check and penalize traffic offenders. This Act will be applicable to the contractors involved in installing the PV systems as part of this Project.

3.2.13. Highway Safety Ordinance (2000)

The Highway Safety Ordinance includes provisions for licensing and registration of vehicles and construction equipment; maintenance of road vehicles; traffic control offences, penalties and procedures; and the establishment of a police force for motorways and national highways to regulate and control the traffic as well as keep the highways clear of encroachments. During the project implementation, the Contractor's vehicles and machinery may need to use the national highways accessing to the sub-project locations; therefore; this ordinance is applicable to the proposed Project.

3.2.14. Land Acquisition Act (LAA) 1894

The LAA of 1894 is the key legislation that has direct relevance to resettlement and compensation in Pakistan. Each province has its own interpretation of the LAA, and some provinces have also passed provincial legislations. The LAA and its implementation rules require that before implementation of any development project the privately owned land and crops are compensated to titled landowners and/or registered tenants/users etc.

Based on the LAA, only legal owners and tenants registered with the Land Revenue Department or those possessing formal lease agreements are eligible for compensation. Also, there is no legal obligation to provide compensation to title-less land users, unregistered tenants, squatters or encroachers for rehabilitation. However, in recent times various deviations to LAA have been practiced in the country.

The exceptions to the rule can be explained by the fact that the law is not rigid and is broadly interpreted depending on operational requirements, local needs, and socio-economic circumstances.

The key clauses of the Act are summarized in **Table 3.2**.

Table 3.1: Key Clauses of LAA

LAA Section	Description
Section 4	Publication of preliminary notification and power for conducting survey.
Section 5	Formal notification of land needed for a public purpose. Section 5a covering the need for enquiry of the concerns or grievances of the affected people related to land prices.
Section 6	The Government makes a more formal declaration of intent to acquire land.
Section 7	The Land Commissioner shall direct the Land Acquisition Collector (LAC) to take order the acquisition of the land.
Section 8	The LAC has then to direct that the land acquired to be physically marked out, measured and planned.
Section 9	The LAC gives notice to all project-affected persons (PAPs) that the Government intends to take possession of the land and if they have any

LAA Section	Description
	claims for compensation then these claims are to be made to him at an appointed time.
Section 10	Delegates power to the LAC to record statements of the PAPs in the area of land to be acquired or any part thereof as co-proprietor, sub-proprietor, mortgage, and tenant or otherwise.
Section 11	Enables the Collector to make enquiries into the measurements, value and claim and then to issue the final "award". The award includes the land's marked area and the valuation of compensation.
Section 16	When the LAC has made an award under Section 11, he will then take possession and the land shall thereupon vest absolutely in the Government, free from all encumbrances.
Section 17	Under this section, the Collector is authorized to acquire land on the basis of the situation declared as an "emergency situation" on behalf of the government and can avoid the formalities to be completed and to avoid any delay in proceedings. In such a situation, the Collector under section 17(4) can pass an award without looking into or addressing the objections/complaints of affectees. Proceedings under this section are independent and not subject to any restrictions and conditions.
Section 18	In case of dissatisfaction with the award, PAPs may request the LAC to refer the case onward to the court for a decision. This does not affect the Government taking possession of land.
Section 23	The award of compensation to the title holders for acquired land is determined at i) its market value of land, ii) loss of standing crops, trees and structures, iii) any damage sustained at the time of possession, iv) injurious affect to other property (moveable or immoveable) or his earnings, v) expanses incidental to compelled relocation of the residence or business and vi diminution of the profits between the time of publication of Section 6 and the time of taking possession plus 15% premium in view of the compulsory nature of the acquisition for public purposes.
Section 28	Relates to the determination of compensation values and interest premium for land acquisition.
Section 31	Section 31 provides that the LAC can, instead of awarding cash compensation in respect of any land, make any arrangement with a person having an interest in such land, including the grant of other lands in exchange.
Section 48A (LAA-1986)	If within a period of one year from the date of publication of declaration under section 6 in respect of any land, the Collector has not made an award under section 11 in respect to such land, the owner of the land shall, unless he has been to a material extent responsible for the delay be entitled to receive compensation for the damage suffered by him in consequence of the delay.

This Act is applicable to sub-projects that would require land acquisition.

3.2.15. Sindh Wildlife Protection Ordinance (2001)

The Sindh Wildlife Protection Ordinance of 1972, as amended in 2001 and 2010 provides for the preservation, protection, and conservation of wildlife by the formation and management of protected areas and prohibition of hunting of wildlife species declared protected under the ordinance. The proposed Project activities will have to be carried out in accordance with this Act. In particular, no activities of SSEP will be carried out inside any protected areas defined under the Act. The ordinance also specifies three broad classifications of the protected areas:

National Parks: Hunting and breaking of land for mining are prohibited in national parks, as are removing vegetation or polluting water flowing through the park. The Kirthar National Park is located about 30-40 km from the Solar Park area at Khanot. The ESMP to be prepared for this sub-project needs to determine the exact distance of the sub-project area from the National Park boundary and any potential impacts on the wildlife resources of the area.

Wildlife Sanctuaries: Wildlife sanctuaries are areas which are left as undisturbed breeding grounds for wildlife. Cultivation, grazing and residing is prohibited in the demarcated areas. Special permission is required for entrance of general public. However, in exceptional circumstances, these restrictions are relaxed for scientific purpose or betterment of the respective area on the discretion of the authority. No sanctuary is known to exist in the vicinity of any of the sub-project areas however this aspect will be reconfirmed during the field investigation to be carried out for the sub-project-specific environmental and social assessment and preparation of ESMPs.

Game Reserves: Game reserves are designated as areas where hunting or shooting is not allowed except under special permits. No game reserves are known to exist in the vicinity of any of the sub-project areas however this aspect will be reconfirmed during the field investigation to be carried out for the sub-project-specific environmental and social assessment and preparation of ESMPs.

3.2.16. Sindh Forest Act, 2012

The Act authorizes Provincial Forest Departments to establish forest reserves and protected forests. The Act empowers the Department to protect, conserve, manage, and sustainably develop forests and biodiversity. The Act prohibits any person to set fire in the forest, quarry stone, remove any forest-produce or cause any damage to the forest by cutting trees or clearing up area for cultivation or any other purpose.

The project activities will have to be carried out in accordance with this Act. No activities will be carried out in any protected forests, and no unauthorized tree cutting will be carried out. The field investigations to be carried out as part of the environmental and social assessments of the sub-projects will confirm the presence or absence of forests in the vicinity of sub-project sites.

3.2.17. Labor Laws

Labor laws in Pakistan are governed by many legislative tools. Principal labor rights are provided by the constitution of Pakistan. In addition to constitutional rights, acts and ordinances have been enforced time to time for limiting working hours, minimum working age, and conditions of employment.

Of the 24 labor-related laws that existed in 2014 in Pakistan, those set out in **Table 3.2** relate directly to the core labor standards of the International Labor Organization's (ILO) and will broadly be applicable to SSEP.

Table 3.2: Laws Related Directly to the ILO Core Labor Standards

Legislation / Guidelines	Brief Description
Employment of Children Act (1991)	Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any factory, mines or any other hazardous employment. In accordance with this Article, the Employment of Child Act (ECA) 1991 disallows

Legislation / Guidelines	Brief Description
	child labor in the country. The ECA defines a child to mean a person who has not completed his/her fourteenth years of age. The ECA states that no child shall be employed or permitted to work in any occupation set forth in the ECA (such as transport sector, railways, construction, and ports) or in any workshop wherein any of the processes defined in the Act is carried out. The processes defined in the Act include carpet weaving, *beeri* (type of cigarette) making, cement manufacturing, textile, construction and others).
Sindh Bonded Labor System (Abolition) Act (2015)	The Bonded Labor System (Abolition) Act seeks to eradicate bonded labor practices prevailing in the respective provinces. The Act define the `Bonded Labor System' as a system of forced, or partly forced, labor under which a debtor enters, or is presumed to have entered into an agreement with the creditor to the effect that: • In consideration of an advance obtained by him or by any of the members of his family (whether or not such advance is evidenced by any document) and in consideration of the interest, if any, due on such advance, or • In pursuance of any customary or social obligation, or • For any economic consideration received by him or by any member of his family.
Sindh Minimum Wages Act (2015)	The Act states that every employer shall be responsible for the payment of minimum wages required to be paid under the Act to all workers employed, either directly or through a contractor, in his commercial or industrial establishment: • Provided that where an employer provides housing accommodation to a worker, he may deduct from the wages of such a worker, an amount not exceeding that in the ordinance; • Where the employer provides a worker with transport to and from the place of work, he may deduct from the wages of such a worker an amount not exceeding that specified in the ordinance.
Sindh Industrial Relations Act (2013)	This Act seeks to regulate formation of trade unions, regulation and improvement of relations between employers and workmen and the avoidance and settlement of any differences or disputes arising between them and ancillary matters.

Pakistan has ratified the ILO conventions for the core labor standards including:

- Freedom of association and collective bargaining (conventions 87 and 98)
- Elimination of forced and compulsory labor (conventions 29 and 105)
- Elimination of discrimination in respect of employment and occupation (conventions 100 and 111)
- Abolition of child labor (conventions 138 and 182).

Pakistan has also ratified the United Nations (UN) Convention on the Rights of the Child in 1990 but is not yet subscribed to the UN Convention of the Protection of the Rights of all Migrant Workers and Members of their Families.

3.3. World Bank Safeguards Policies and Guidelines

The GoS is seeking WB financing for the proposed Project and hence the WB environmental and social safeguard policies and guidelines will be applicable to the project. These policies and their relevance to the proposed Project are discussed below.

3.3.1. Environmental Assessment (OP 4.01)

The WB requires EA to be carried out of projects proposed for Bank funding and thus to improve decision-making. The OP 4.01 defines the EA process and various types of EA instruments. It describes environmental screening process in order to define projects as category A, B, or C, where category A projects are likely to have significant and unprecedented impacts, category B projects are likely to have less significant impacts, and category C projects have minimal impacts. The OP includes a range of EA and management tools relevant to different impact category projects and defines the requirements for public consultant and disclosure.

The proposed Project has been assessed as Category B since the potential impacts are likely to be mostly localized, temporary, and easily reversible/mitigated. The present EA has been carried out in accordance with OP 4.01, to identify the extent and consequences of these impacts and to develop the present ESMF for their mitigation and management. The sub-project-specific ESMPs will also have to be prepared to meet the requirements of this OP.

3.3.2. Natural Habitat (OP 4.04)

This OP outlines the WB Policy on biodiversity conservation taking into account ecosystem services and natural resource management and use by project affected people. The policy requires the assessment of potential project impacts on biodiversity and natural habitat. The aim of the policy is to limit circumstances under which conversion or degradation of natural habitats can occur. The policy can prohibit projects which are likely to result in significant loss of critical natural habitats.

The proposed sub-projects under SSEP are not likely to have any significant impacts on the natural habitat and or biodiversity. Therefore; this OP is not triggered. However, this aspect will be reconfirmed during the environmental and social assessment of individual sub-projects under SSEP.

3.3.3. Pest Management (OP 4.09)

Through this OP, the WB supports a strategy that promotes the use of biological methods of environmental control and reduces the reliance on synthetic chemical pesticides. The interventions under SSEP are not likely to cause an increase in the use of agro-chemicals, therefore; the policy is not triggered. It will be ensured during the Project construction and O&M that no chemical herbicides are used to remove vegetation from the areas where solar panels are installed.

3.3.4. Indigenous Peoples (OP 4.10)

For the purpose of this policy, the term “Indigenous People” is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees.

- Self-identification as members of distinct indigenous group and recognition of the identity by others.

- Collective attached to geographically ancestral territories in the project area and to the natural resources in these habitats and territories.
- Customary cultural, economic social or political institutions that are separate from those of the dominant society and culture, and
- An indigenous language often different from the official language of the country or region.

The OP defines the process to be followed if the project affects the indigenous people (IP).

There are no known IP in Sindh as defined in the OP. Therefore this OP is not triggered for this Project. This aspect will however be reconfirmed during the field investigation to be carried out as part of the environmental and social assessment of individual sub-projects under SSEP.

3.3.5. Physical Cultural Resources (OP 4.11)

The WB safeguards require full protection to physical cultural heritage on the WB financed project sites. The specific aspects of this policy are given below:

- The Bank normally declines to finance projects that will significantly damage non-replicable cultural property and will assist only those projects that are sited or designed so as to prevent such damage.
- The Bank will assist in the protection and enhancement of cultural properties encountered in the Bank financed projects, rather than leaving that protection to chance. In some cases, the project is relocated so that sites and structures can be preserved, studied and restored in situ. In other cases, the structures can be relocated, preserved, studied and restored on alternate sites. Often, scientific study, selective salvage and museum preservation before destruction is all that is necessary. Most such projects should include training and strengthening of institutions entrusted with safeguarding a nations' cultural heritage. Such activities should be directly included in the scope of the project rather than being postponed for some possible future action and costs are to be internalized in overall project costs.
- Deviations from this policy may be justified only where expected project benefits are very high and any loss of cultural heritage is unavoidable, minor or otherwise acceptable. Specific details of the justification should be discussed in project documents.

No sites of archeological, historical, cultural, or religious significance are known to exist at or near proposed sites other than some historical buildings in Karachi and Hyderabad that may be considered for the rooftop component of the solar PV power generation. This aspect will be further confirmed during the sub-project-specific environmental and social assessments. In case the buildings selected for the rooftop solar power generation are protected under the Sindh Cultural Heritage Act of 1994 (see **Section 3.2.10**), a PCR management plan will be prepared for such sub-projects in accordance with the OP 4.11 and the Sindh Cultural Heritage Act of 1994.

The Chance Find procedures have been included in the present ESMF and will also be included in the subsequent ESMPs.

3.3.6. Involuntary Resettlement (OP 4.12)

The WB experience indicates that involuntary resettlement if unmanaged, may give rise to severe economic, social and environmental risks. Production systems are dismantled; people face impoverishment when their productive assets or income sources are lost. This policy includes safeguards to address and mitigate these risks.

The overall objectives of the policy are as follows:

- Involuntary resettlement should be avoided where feasible, or minimized, exploiting all viable alternative project options.
- Where it is not feasible to avoid resettlement, the resettlement activities are sustainable development programs, providing sufficient investment resources to affectees by the project and share with them the benefits of the project. The anticipated affectees are meaningfully consulted and are given due chances to participate in planning and implementing the resettlement process.
- The affectees should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore their direct financial losses. It should be ensured that their condition is better than prior to the start of the project.

The land for the grid-connected solar power plant to be established in the solar park has already been acquired by the GoS, though the possibility of some encroachers being present at the proposed sites cannot be ruled out. The other components of the project (rooftop solar PV and SHSs – please see **Section 2.4**) will not need any land to be acquired. However, this OP is triggered to address any resettlements impacts associated particularly with the solar park and also any possible resettlement impact associated with the SHSs.

3.3.7. Forests (OP 4.36)

The objective of this policy is to assist WB's borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environmental services and values of forest.

No forests are known to exist at the proposed site of the grid-connected solar power plant (Component 1). This aspect will need to be further assessed during the detailed environmental and social assessment of this sub-project.

3.3.8. Safety of Dams (OP 4.37)

The OP 4.37 basically relates to dam safety. Since no dams are involved in the proposed Project hence this OP is not triggered.

3.3.9. Projects on International Waterways (OP 7.50)

Projects on International Waterways may affect the relations between the WB and its borrowers, and between riparian states. Therefore, the Bank attaches great importance to the riparian making appropriate agreements or arrangements for the entire waterway, or parts thereof, and stands ready to assist in this regard. A borrower must notify other riparian of planned projects that could affect water quality or quantity, sufficiently far in advance to allow them to review the plans and raise any concerns or objections.

This OP is not triggered since the proposed Project does not include any activity in any international waterways nor will it cause any impact on them.

3.3.10. Projects in Disputed Areas

The WB will only finance projects in disputed areas when either there is no objection from the other claimant to the disputed area, or when the special circumstances of the case support financing notwithstanding the objection.

This OP is not triggered since no disputed areas as defined under this OP exist in the entire Sindh Province.

3.3.11. WB Policy on Access to Information

The WB Policy on Access to Information (AI Policy) sets out the institution's policy on public AI in the Bank's possession. This Policy supersedes the WB Policy on Disclosure of Information, and takes effect on July 1, 2010. The WB recognizes that transparency and accountability are of fundamental importance to the development process and to achieving its mission to alleviate poverty. Transparency is essential to building and maintaining public dialogue and increasing public awareness about the Bank's development role and mission. It is also critical for enhancing good governance, accountability, and development effectiveness. Openness promotes engagement with stakeholders, which, in turn, improves the design and implementation of projects and policies, and strengthens development outcomes. The AI Policy facilitates public oversight of Bank-supported operations during their preparation and implementation, which not only assists in exposing potential wrongdoing and corruption, but also enhances the possibility that problems will be identified and addressed early.

In response to these requirements, the present ESMF will be disclosed internationally as well as locally and the subsequent ESMPs will also be disclosed in the same manner.

3.3.12. WB Environment, Health, and Safety Guidelines

Environment, Health, and Safety (EHS) Guidelines of the World Bank Group (WBG)are applicable to the proposed Project. In particular, contractors will be required to implement the General EHS Guidelines (April 2007).[3]

3.3.13. WB Guidance Note on Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx

This Note provides guidance on identifying, assessing and managing the risks of adverse social and environmental impacts that are associated with the temporary influx of labor resulting from Bank-supported projects. The Note contains guiding principles and recommendations to be considered as part of the design and implementation of projects with civil works that require labor from outside the project's area of influence. This Note is particularly applicable to the sub-project involving grid connected solar power plant and should be used during the detailed environmental and social assessment of the relevant sub-projects.[4]

[3] WBG EHS Guidelines are available at: http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES

[4] The Note is available at: http://pubdocs.worldbank.org/en/497851495202591233/Managing-Risk-of-Adverse-impact-from-project-labor-influx.pdf.

3.3.14. Applicability of WB Policies and Guidelines

The applicability of environmental and social safeguard policies and guidelines of the WB for the proposed Project is summarized in **Table 3.3**.

Table 3.3: Applicability of WB Safeguard Policies

WB OPs		Triggered		Justification/Action Taken or to be Taken
		Yes	No	
Environmental Assessment	OP 4.01	✓		The Project has a potential to cause negative impacts hence this OP is triggered. Since these impacts are likely to be mostly localized in nature and moderate in significance, the Project has been assessed as Category B. The present ESMF has been prepared in response to this OP. Subsequent ESMPs will also need to be prepared for the sub-projects under SSEP to meet the required as defined in this OP.
Natural Habitats	OP 4.04		✓	This policy is not triggered since no natural habitat is likely to be affected by the proposed activities. The subsequent ESMP will reconfirm this aspect.
Pest Management	OP 4.09		✓	This Policy is not triggered since the Project does not include usage or purchase of agro-chemicals. It will be ensured that no such chemicals are used for the grid-connected solar power plant (Component 1 of the proposed Project).
Indigenous Peoples	OP 4.10		✓	There are no distinct, vulnerable, social and cultural groups in the Project area which could qualify as indigenous.
Physical Cultural Resources	OP 4.11	✓		No PCRs are known to exist in the Project area nor identified during the field investigations and consultations, except some historical buildings that may be considered for the rooftop solar power generation (Component 1-iii). In case the buildings selected for the rooftop solar power generation are protected under the Sindh Cultural Heritage Act of 1994 (see Section 3.2.10), a PCR management plan will be prepared for such sub-projects in accordance with this OP and the Sindh Cultural Heritage Act of 1994. The Chance Find procedures are included in the ESMF.
Involuntary Resettlement	OP 4.12	✓		No land acquisition is likely to be needed for the Project. However, the need for land acquisition and availability of land without encroachments/encumbrances will be carefully assessed during the sub-project assessment and screening. RAPs or ARAPs will be prepared where resettlement impacts are foreseen.
Forests	OP 4.36		✓	The proposed interventions are not likely to cause any impact on the forests.

WB OPs		Triggered		Justification/Action Taken or to be Taken
		Yes	No	
Safety of Dams	OP 4.37		✓	The Project does not include any dam construction or maintenance.
Projects on International Waterways	OP 7.50		✓	No Project activities will be carried out inside or associated with any international waterways nor will the Project impact any of such waterways.
Projects in Disputed Areas	OP 7.60		✓	The Project is not located in or near any disputed area.
Access to Information		✓		Some initial consultations carried out during the ESMF preparation. These consultations will be continued during the preparation of ESMPs and RAPs/ARAPs and also during the Project implementation. The present ESMF and subsequent ESMPs and RAPs/ARAPs will be disclosed nationally as well as internationally.

3.4. Multilateral Environmental Agreements

Pakistan is signatory of several MEAs, including:

- Basel Convention,
- Convention on Biological Diversity,
- Convention on Wetlands (Ramsar),
- Convention on International Trade in Endangered Species (CITES),
- UN Framework Convention on Climate Change (UNFCCC),
- Kyoto Protocol,
- Montreal Protocol,
- UN Convention to Combat Desertification,
- Convention for the Prevention of Pollution from Ships,
- UN Convention on the Law of Seas,
- Stockholm Convention on Persistent Organic Pollutants,
- Cartina Protocol.

These MEAs impose requirements and restrictions of varying degrees upon the member countries, in order to meet the objectives of these agreements. However, the implementation mechanism for most of these MEAs is weak in Pakistan and institutional setup mostly nonexistent.

The proposed Project will have to adhere to these MEAs including the ones relating to biodiversity, wetlands, persistent organic pollutants, and CITES.

4. Overview of Baseline Conditions

This Chapter provides an overview of the baseline conditions for the Sindh province. This overview has been prepared on the basis of secondary resources including previous EIA reports[5] and official websites of various government departments. More site-specific baseline conditions will need to be included in the sub-project-specific ESMPs.

4.1. Physical Environment

4.1.1. Geography

Sindh can be divided into four distinct parts topographically: Kirthar range on the west, a central alluvial plain bisected by the Indus River in the middle, a desert belt in the east and south-east, and the Indus delta in the south (**Figure 4.1**). The features of these parts are briefed below.

Kirthar Range: The Kirthar range consists of three parallel tiers of ridges, which run from north to south with varying width between 20 and 50 kilometers. The range consists of ascending series of ridges from east to west, which are about 1,200 to 2,400 meters high. The hills decrease in altitude from north to south. Towards the south, they spread out in width and form a Sindh Kohistan. The Kirthar range has little soil corner and is mostly dry and barren. The grid-connected solar power plant inside the Solar Park will be located on the eastern fringes on this zone, close to the central alluvial plain described below.

Central Alluvial Plain: The fertile central plain constitutes the valley of the Indus River. This plain is about 580 kilometers long and about 51,800 square kilometers in area and gradually slopes downward from north to south. It is a vast plain, around 100 meters high above sea level. The lower part of this plain, which starts from Hyderabad is predominantly covered with flood silt. There are a few limestone ridges in this plain. Some of them are near Rohri in Sukkur district commonly known as Rohri cuesta, which extends about 50 kilometers South of Rohri and has an average height of about 75 meters above sea level. Another such ridge is the Ganjo Takkar, a cuesta of limestone, which stretches southward from Hyderabad up to a distance of 25 kilometers. There are also a few depressions and lakes in this plain. According to the past tradition, the Central Alluvial Plain has been divided into three distinct zones:

- Lar or Southern Sindh comprising the areas south of Hyderabad.
- Wichalo or Central Sindh, the area lying immediately around Hyderabad.
- Siro, or Northern Sindh, comprising the area beyond Naushahero Feroze and Sehwan.

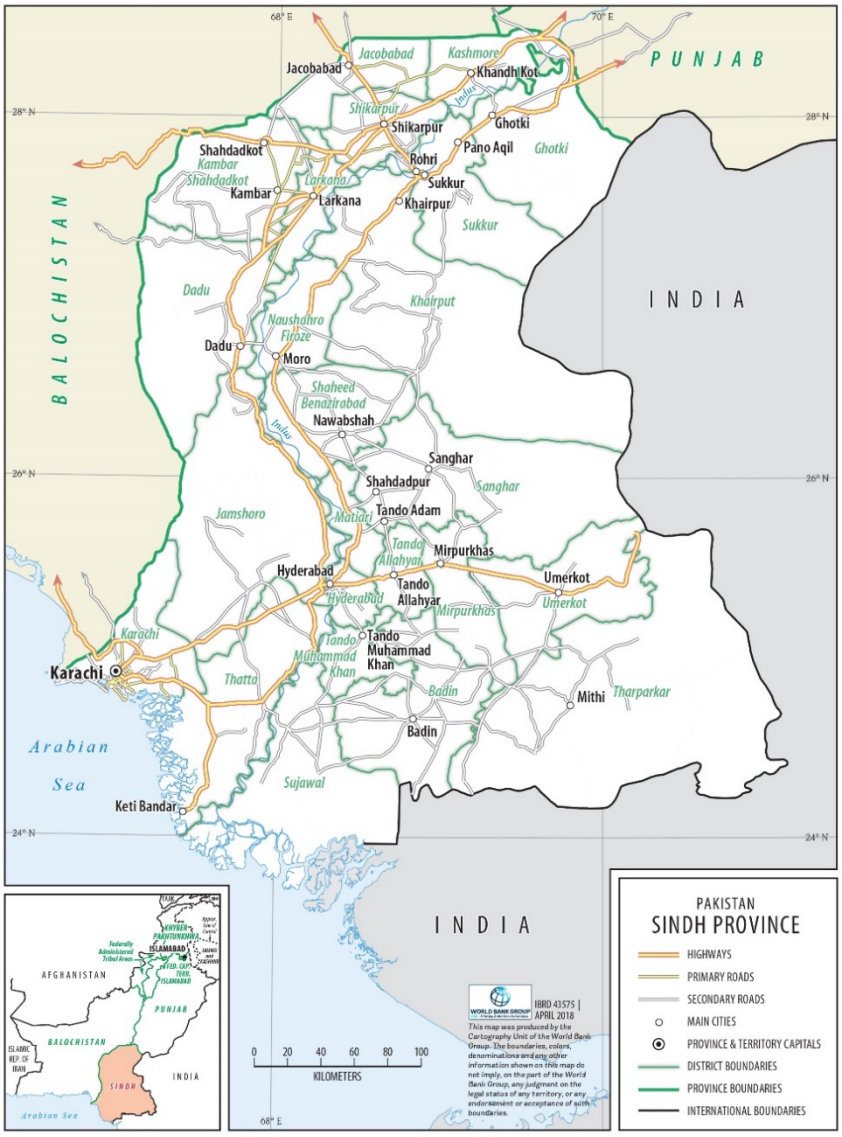
Eastern Desert Belt: The eastern desert region includes low dunes and flats in the north, the Achhrro Thar (white sand desert) to the south and the Thar Desert in the southeast. Its major portion lies in India. In the north it extends up to Bahawalpur division of Punjab, where it is called Cholistan. With little rainfall and low water table, most of the area is a barren land with scattered stunted thorny bushes. In the extreme southeast corner of the desert is Nagar Parkar taluka of Tharparkar district. There is small hilly tract known as Karunjhar hills. These hills are about 20 kilometers in length from north to south and have

[5] Most notably, the Environmental and Social Management Framework (ESMF) of Sindh Disaster and Climate Resilience Enhancement Project. Government of Sindh, 2016.

height of about 300 meters. It consist of granite rocks, probably an outlying mass of the crystalline rocks of the Aravalli rang. The Aravalli series belongs to Archaen system, which constitutes the oldest rocks of the earth crust. The small dam sub-projects of Tharparkar District are falling in this zone. Some of the SHS sub-projects may be located in this zone.

Indus Delta: The distributaries of the Indus start spreading out near Thatta across the deltaic flood plain in the sea. The even surface is marked by a network of active and abandoned channels. At a high tide, a coastal strip of 10 to 40 kilometers wide is flooded. Some of the SHS sub-projects may be located in this zone.

Figure 4.1: Sindh Province



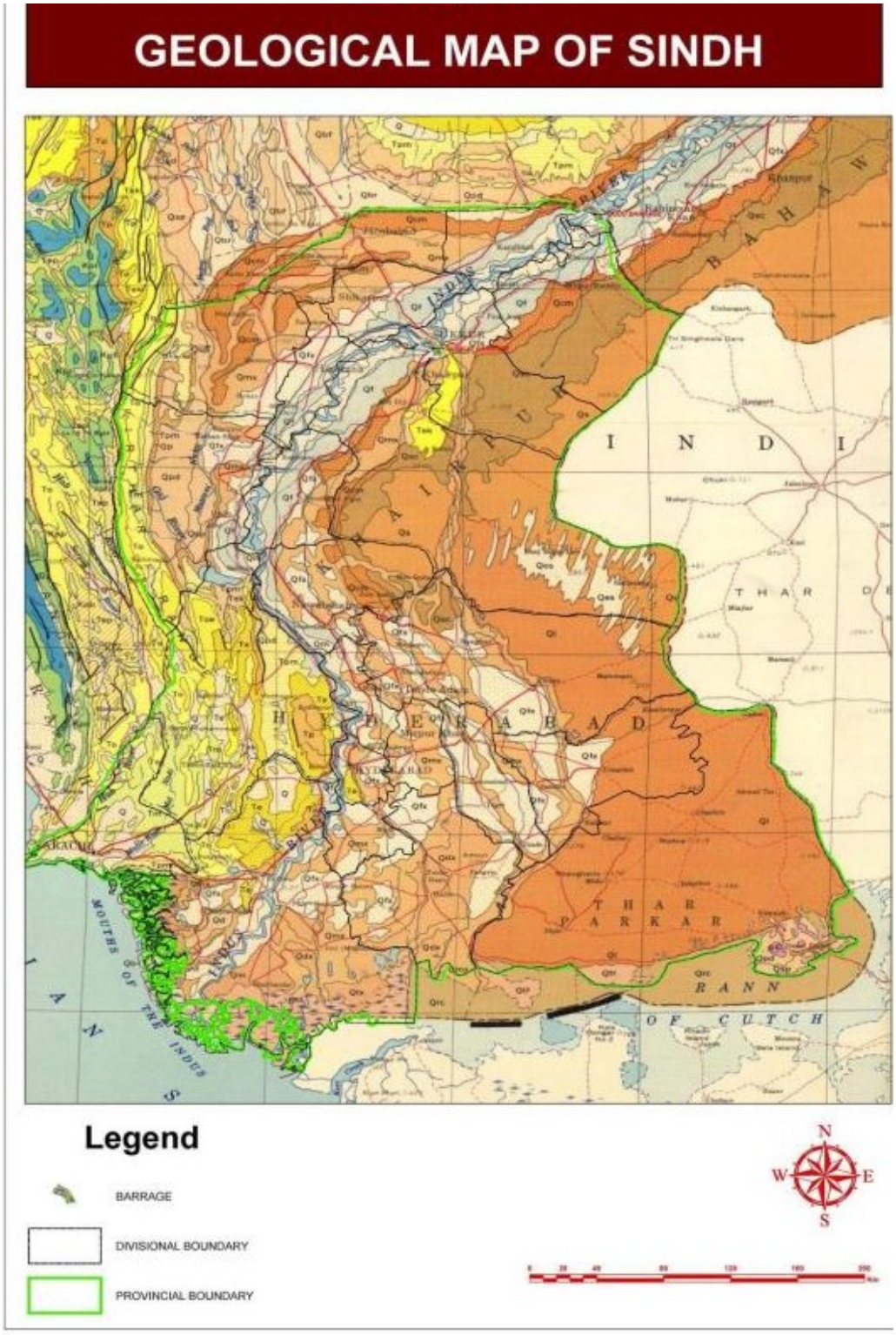
Source: World Bank

4.1.2. Geology

The geology of Sindh is divisible in three main regions, the mountain ranges of Kirthar, Pab containing a chain of minor hills in the west and in east it is covered by the Thar Desert and part of Indian Platform where the main exposure is of Karunjhar Mountains, which is famous for Nagar Parkar Granite. In the north Sindh is enquired by rocks of Laki range extending to Suleiman range and its southern most part is encircled by the Arabian Sea.

The rocks exposed in this area belong to upper Cretaceous period and are recent in age. The sub-surface rocks are about 20,000 feet thick and belong to Cretaceous and Pre-Cretaceous periods. Mostly the rocks are of sedimentary origin of clastic and non-clastic nature and belong to marine, partly marine and fluviatile depositional environments (**Figure 4.2**).

Figure 4.2: Geology of Sindh Province



Source: Geological Survey of Pakistan – GSP.

Basin wise Sindh lies in the lower Indus Basin and its main tectonic features are the platform and fore deep areas. Thick sequences of Pab sandstone of Upper Cretaceous, Ranikot Group (Khadro, Bara, Lakhra) of Paleocene, Laki, Tiyon, and Khirthar of Eocene age, Nari Formation of Oligocene, Gaj Formation of Lower to Middle Miocene, Manchar of Upper Miocene to Pliocene, Dada Conglomerate of Pleistocene are present in various areas of Sindh. Limestone and sandstones are the most dominant sedimentary rocks in the area. Structurally Sindh generally contains gently folded anticlinal features trending in north-south direction.

The Thatta District geologically belongs to early Eocene Laki formation. The Laki formation is dominantly composed of cream colored white fossiliferous limestone of massive and nodular character with subordinate calcareous sandstone, shale and marl. Structurally the region belongs to Karachi Arc zone that comprises a series of about 200km long and 50km wide parallel to sub parallel, small, rounded dome shaped, anticline hills with corresponding wide synclinal valleys and Piedmont plains.

The elevation of the area varies from 350m in the north to 75m in south. The main rivers of the area are Naing, Barran and Malirs. In addition to these rivers, the semi-arid region is characterized by a number of dry streams that dissects the eastern slope of Kirthar Range. The Rod Nadi is one of such consequent stream has carved its channel through folded series of rocks.

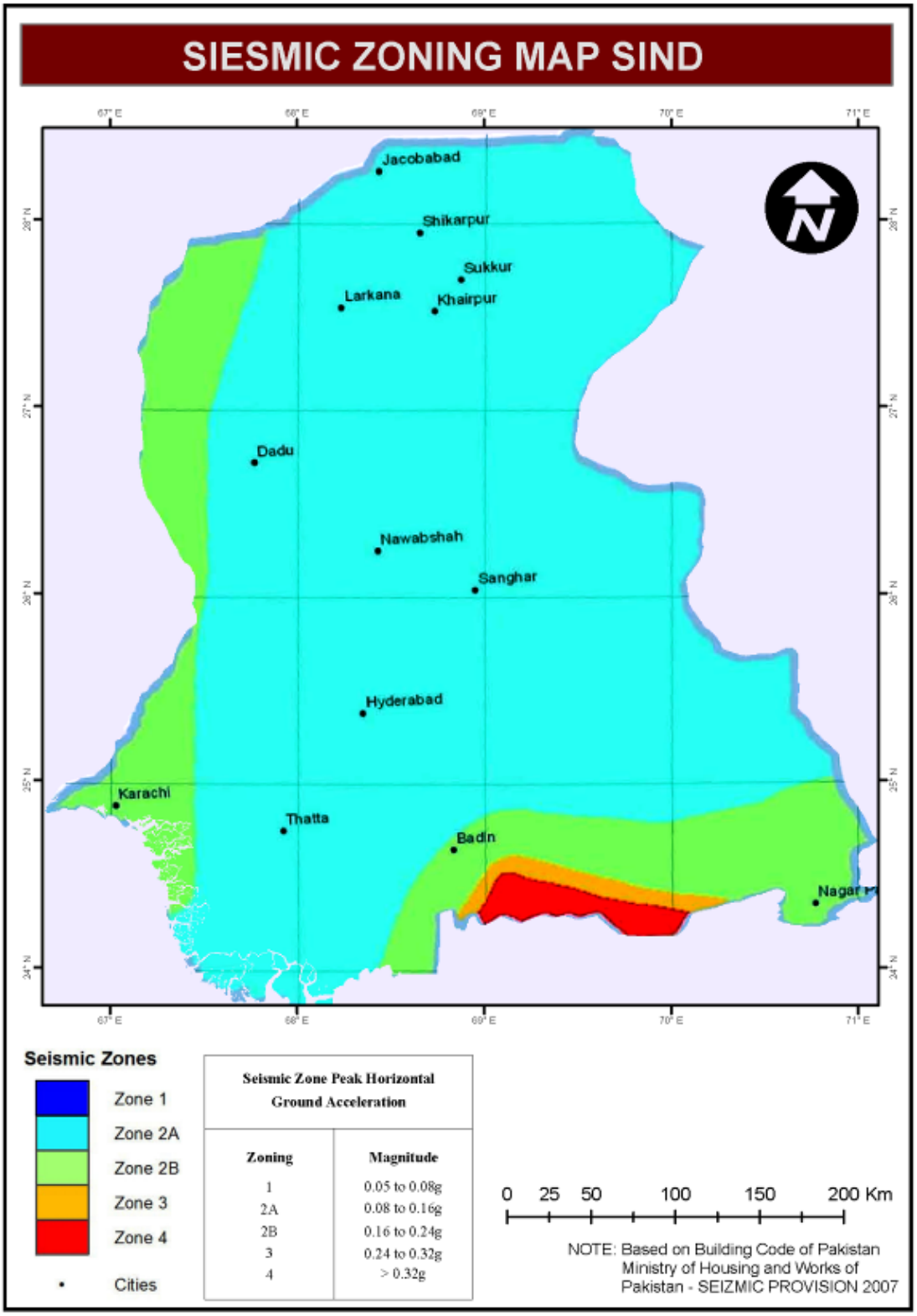
In Tharparkar District, the area has a remarkable feature as it exhibits a variety of rocks from Pre-Cambrian basement rock to Tertiary sandstone and clays depicting a long tectonic history of the region. The desert to the south of Nagarparkar is believed to have grown over last 3,000 to 4,000 years, before that the region had more humid and tropical climate which favored growth of thick vegetation and habitation of wild animals such as and peacocks and deers. The presence of lignite coal in Thar coal field showed that a humid climate existed at the time. The eastward extension of desert condition was prevented by Aravalli Mountain range about 250km from Nagarparkar where moisture bearing clouds of southwest monsoon precipitates. Since there are no hills across the direction of winds the south west monsoon just passes over Thar Desert. The Nagarparkar is surrounded on three sides by Rann of Kutch shelf which was a shallow arm of sea during Pleistocene which extended and locally submerged the sloping land. The Indus once flowed into it and is now silted up and forms an extensive and desolate salt marsh during dry period and tidal flat covered with little seawater during monsoon period.

The River Indus and its banks are alluvial deposits of fine sands and non-plastic silts.

4.1.3. Seismicity

The seismicity of the Sindh province is shown in **Figure 4.3**. Most parts of the province fall under the Zone 2A with ground acceleration of 0.08 to 01 g. Most of the sub-projects under SSEP are also likely to be located in this zone.

Figure 4.3: Seismic Zones of the Project Area



Source: http://db.world-housing.net/building/176 on 11th Nov-2015.

4.1.4. Soil Morphology

Large quantities of sediments are brought by Indus River and are deposited along the Indus River banks and especially in the deltaic zone. Further, hill torrents also bring silt and clay deposits in the lower reaches. These silts provide a highly fertile layer of soil to the region. The soils along the Indus River banks are silty and sandy loam. Outside the active flood plain, the soils are generally calcareous, loamy and silty clay. Most of the soils in the district of Thar are sandy. Moving sand dunes are also found in these districts. In Tharparkar area, the undulating flat plain is covered with variable soils mainly derived by erosion and residual weathering of the granites, granite gneisses and amphibolite's. While in the case of Dadu and Jamshoro, the soils in the plain near to sub-project sites have homogenous porous structure, mainly silt and fine silt clayey, strongly calcareous with 18-20 percent lime content uniformly distributed in the profile. Small patches contain shallow or very shallow, strongly calcareous, gravely and stony loams. While the soils afford very sparse shrub and grass vegetation offering limited grazing, the rocky outcrop only has a water catchment value.

4.1.5. Climate and Rainfall

The climate of Sindh is arid and hot. According to classification made by United Nations Educational, Scientific and Cultural Organization (UNESCO), the region has been divided into three zones: Coastal: South of Thatta; Southern: from Thatta through Hyderabad to Nawabshah; and Northern: from Nawabshah to Jacobabad.

In an average year, coastal region receives a maximum rainfall of 175-200mm. The rainfall pattern and wind speed in some selected places of the Province is illustrated in the **Figures 4.4** to **4.17**.

4.1.6. Temperature

The coldest season extends from December to February when dominating influence is the eastern winds. Mean monthly temperature during winters varies from 20°C near the coast to 14°C in the north. Forests are very rare in south of Nawabshah. Mean daily temperature rises rapidly from February onwards to its peak in May and June, rather earlier in the south than in the north. Mean maximum temperature reaches about 24°C in May in the south and as high as 45°C in June in the north. The severity of the heat varies from year to year - the highest temperature ever recorded on the subcontinent was 53°C at Jacobabad.

4.1.7. Humidity

The average humidity is 40-60 percent in the Sindh. Monthly rate of evaporation in the irrigated areas varies from 76mm in the north to 114mm in the south. Rainfall for the three months is less than 25mm. Winds are rather variable, being transitional from the northeast to southwest as the season develops. Humidity is at its lowest generally below 40 percent, but increases as the sea breeze becomes dominant. Evaporation is correspondingly at its highest exceeding 25mm in rocky desert areas.

July to mid-September is the monsoon season and is characterized comparatively by low day temperature, high humidity (over 60 percent in the south and 50 percent in the north), reduced evaporation (only 15 or 18mm at some stations in August) and a considerable increase in clouds in coastal areas. Occasional depressions from the east result in a 4 or 5-day period of rain and thunderstorm, especially in the south. The rainfall is very variable; instances have been recorded where a single day has considerably exceeded the highest

annual average. Mid-September to November is the period of sea breeze with occasional north winds. Temperature rises slightly then falls back in November. Humidity falls to about 10 to 15 percent of the monsoon level and the evaporation decreases about 100mm in the north, 125mm in the south.

Figure 4.4: Annual Rainfall in Project Area

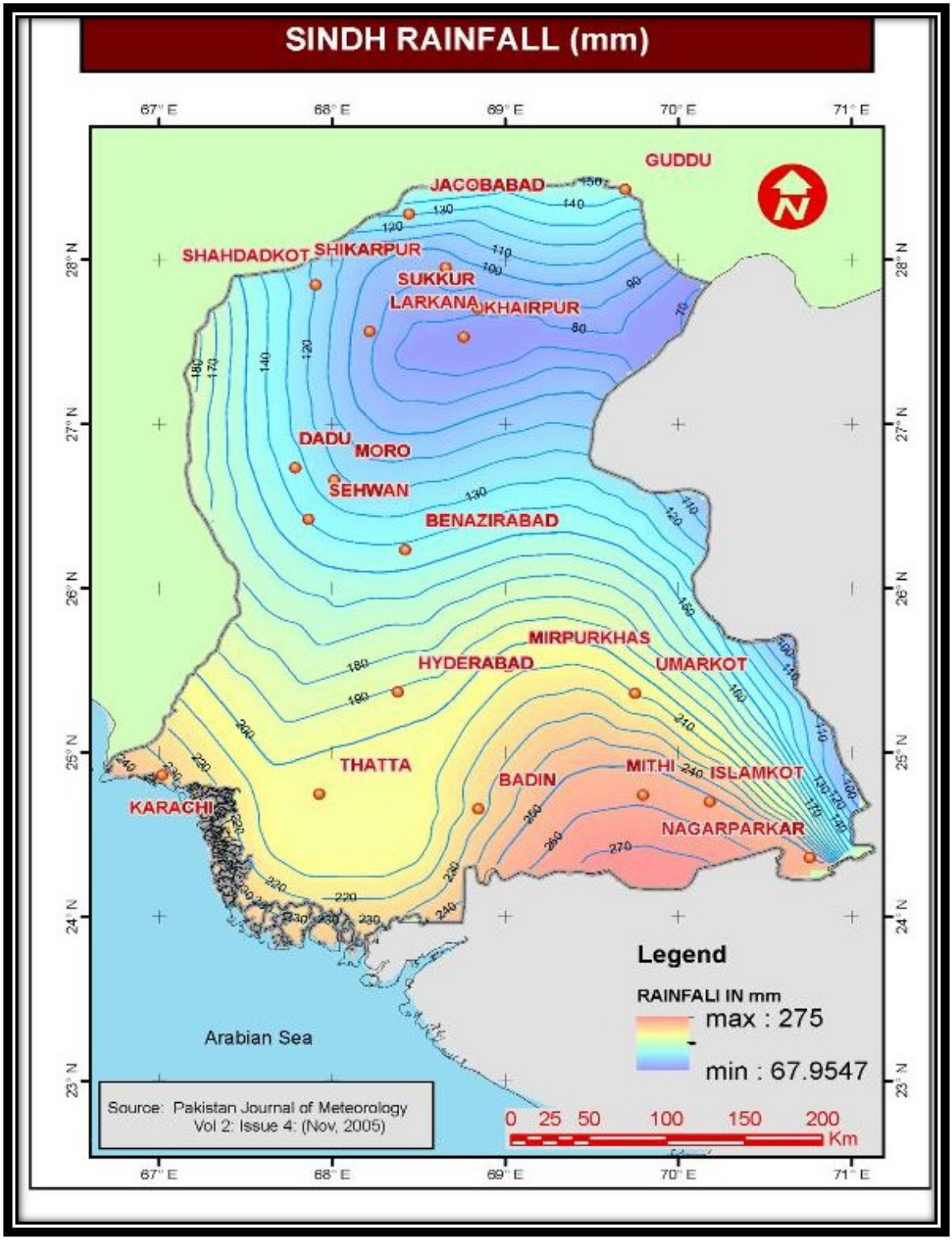
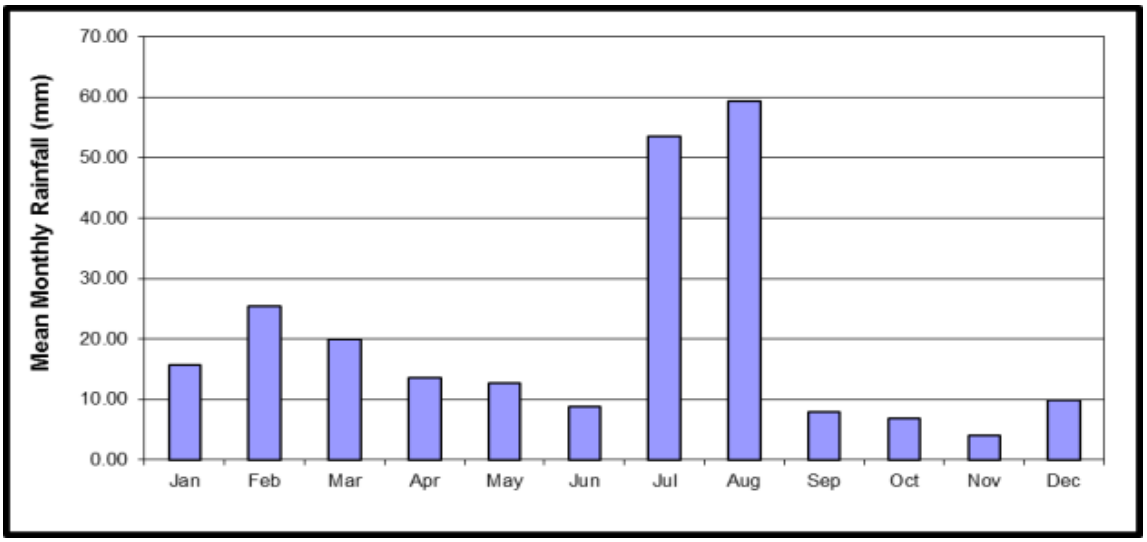
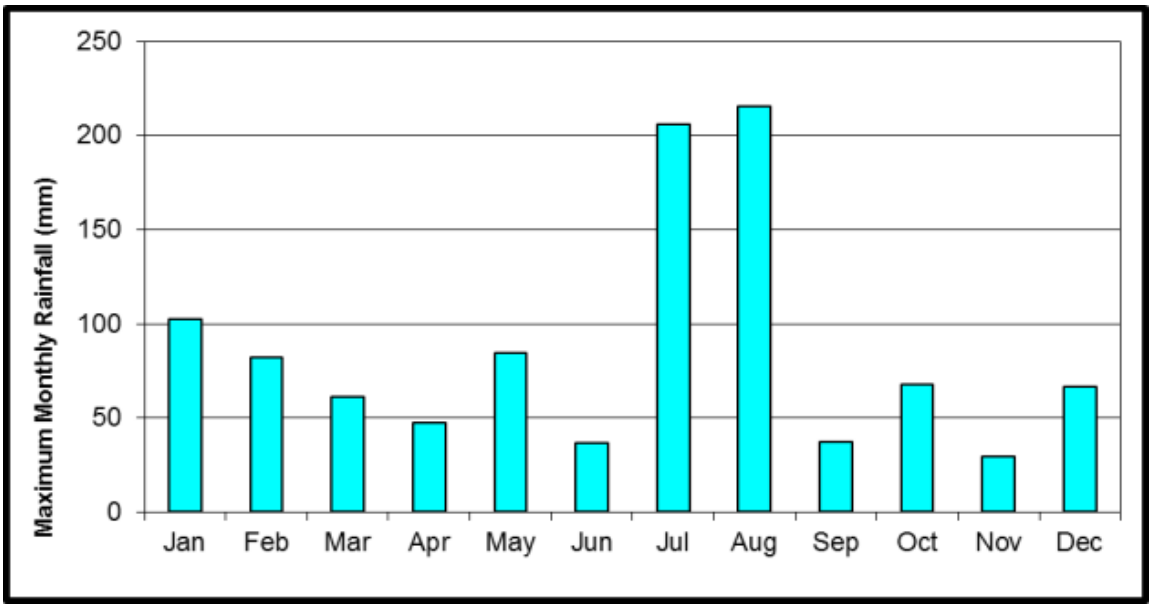


Figure 4.5: Mean Monthly Rainfall at Nai Gaj



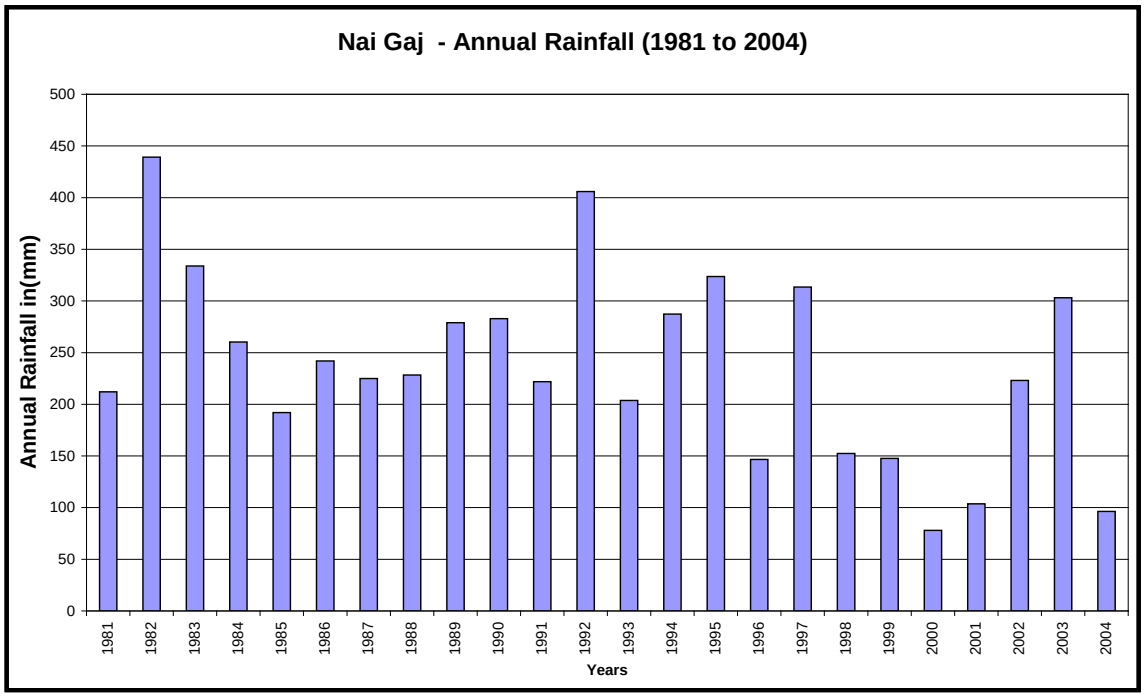
Source: WAPDA: Detail Design Report 2007.

Figure 4.6: Mean Maximum Monthly Rainfall at Nai Gaj



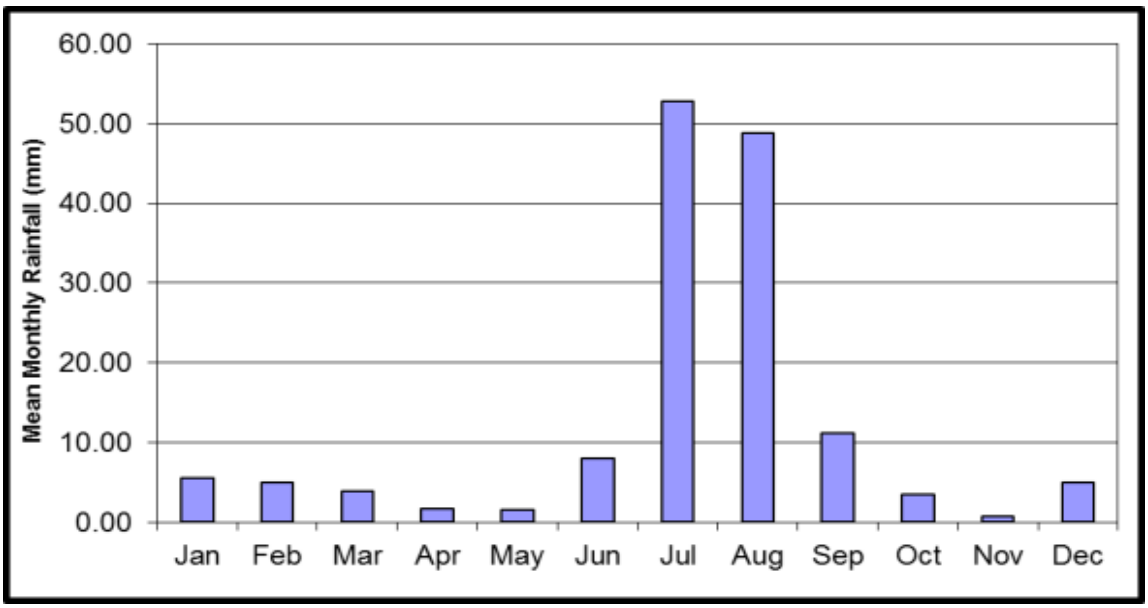
Source: WAPDA: Detail Design Report 2007.

Figure 4.7: Mean Annual Rainfall at Nai Gaj



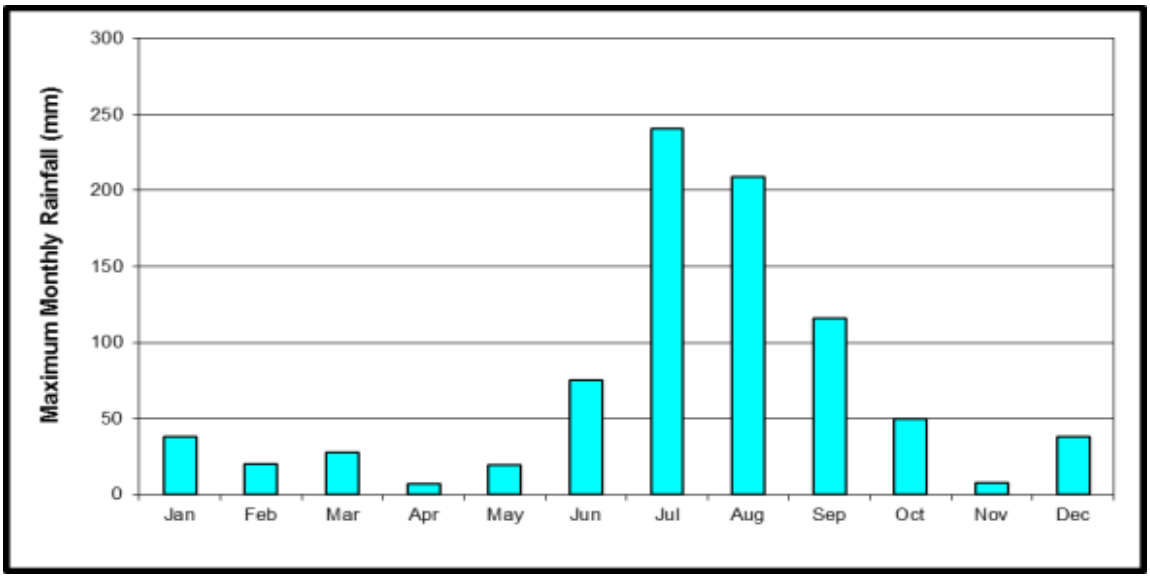
Source: WAPDA: Detail Design Report 2007.

Figure 4.8: Mean Monthly Rainfall at Dadu



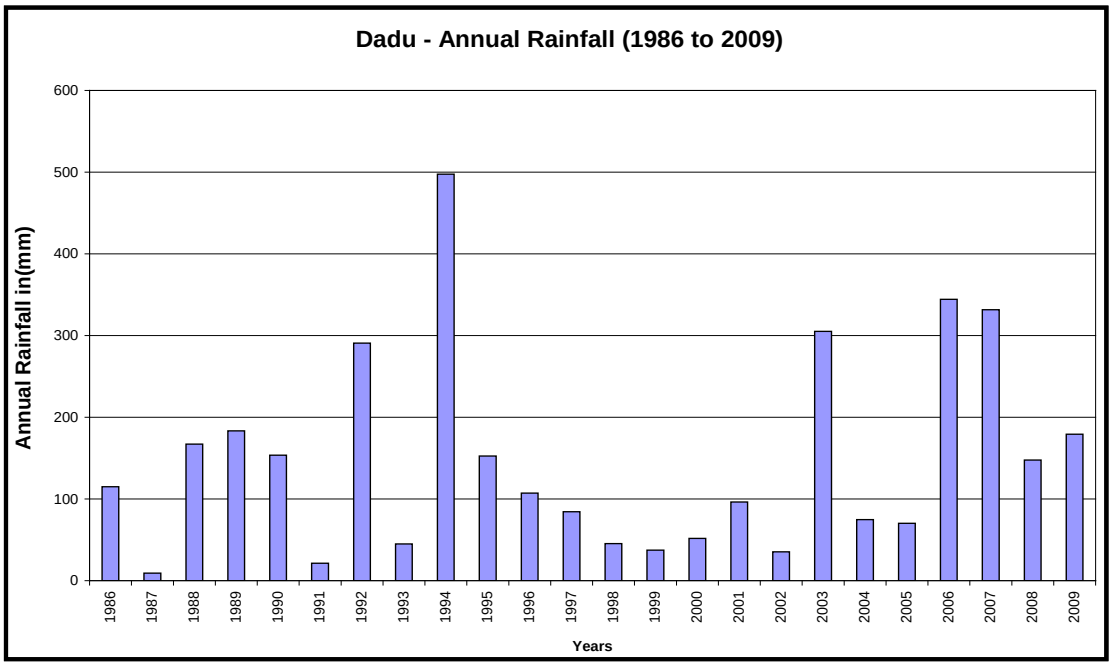
Source: Pakistan Meteorological Department.

Figure 4.9: Maximum Monthly Rainfall at Dadu



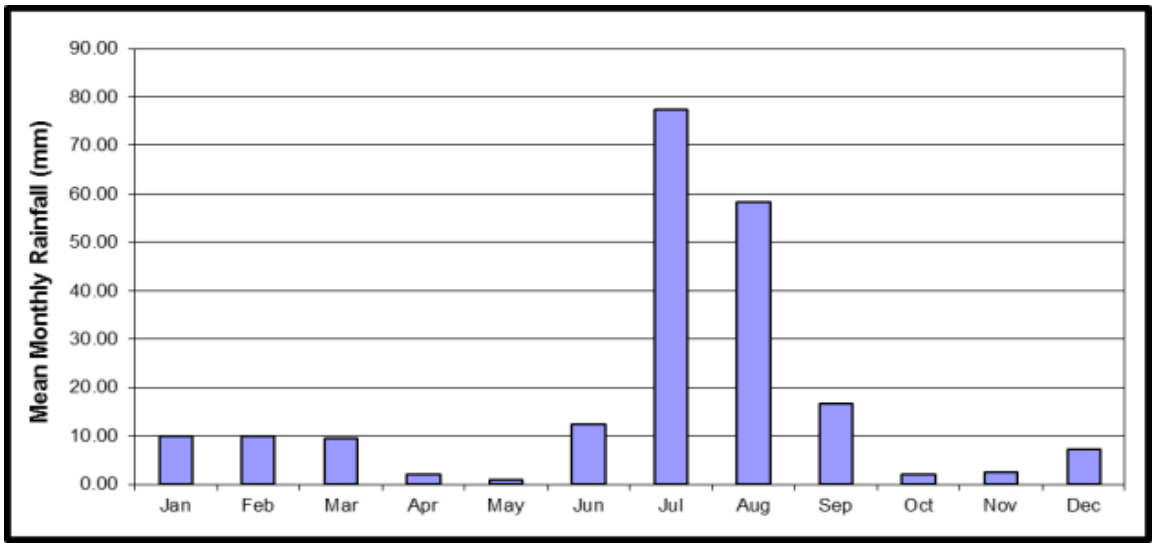
Source: Pakistan Meteorological Department.

Figure 4.10: Annual Rainfall at Dadu



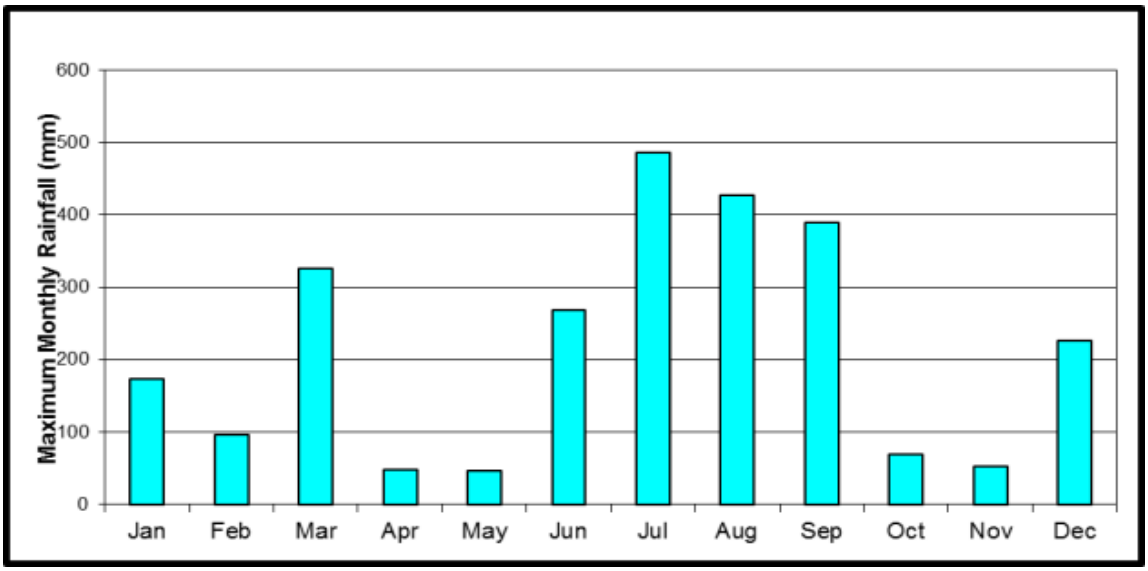
Source: Pakistan Meteorological Department.

Figure 4.11: Mean Monthly Rainfall at Karachi



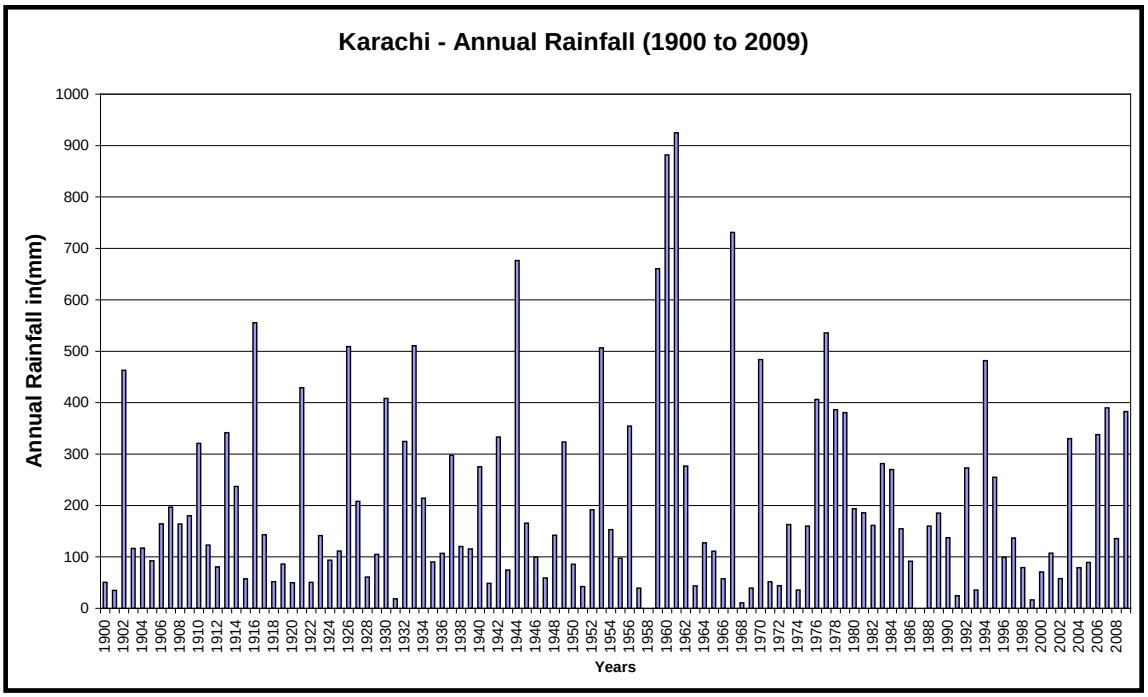
Source: Pakistan Meteorological Department.

Figure 4.12: Maximum Monthly Rainfall at Karachi



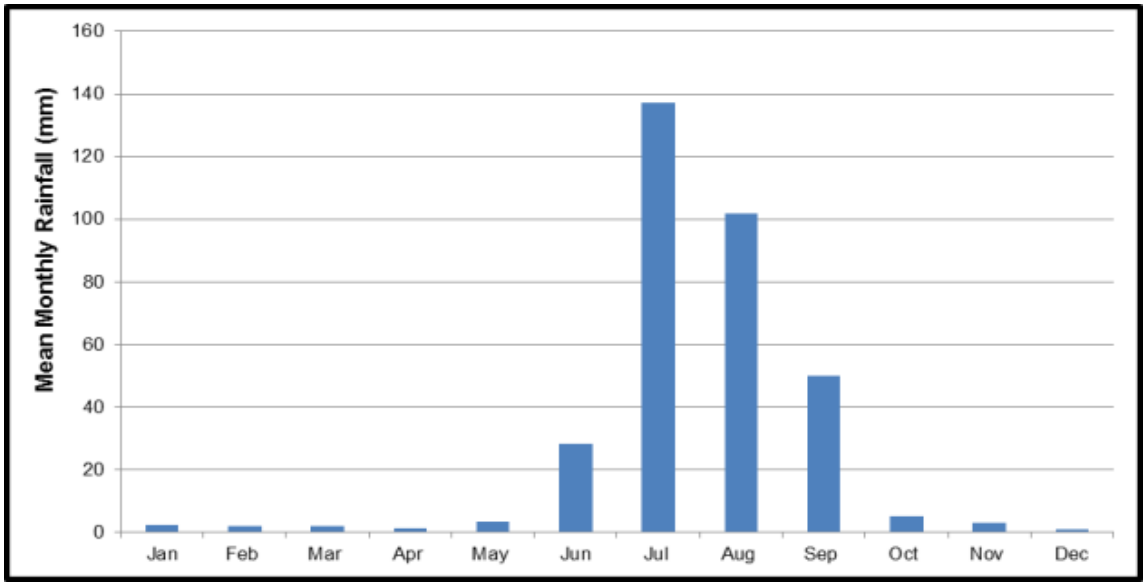
Source: Pakistan Meteorological Department.

Figure 4.13: Annual Rainfall at Karachi



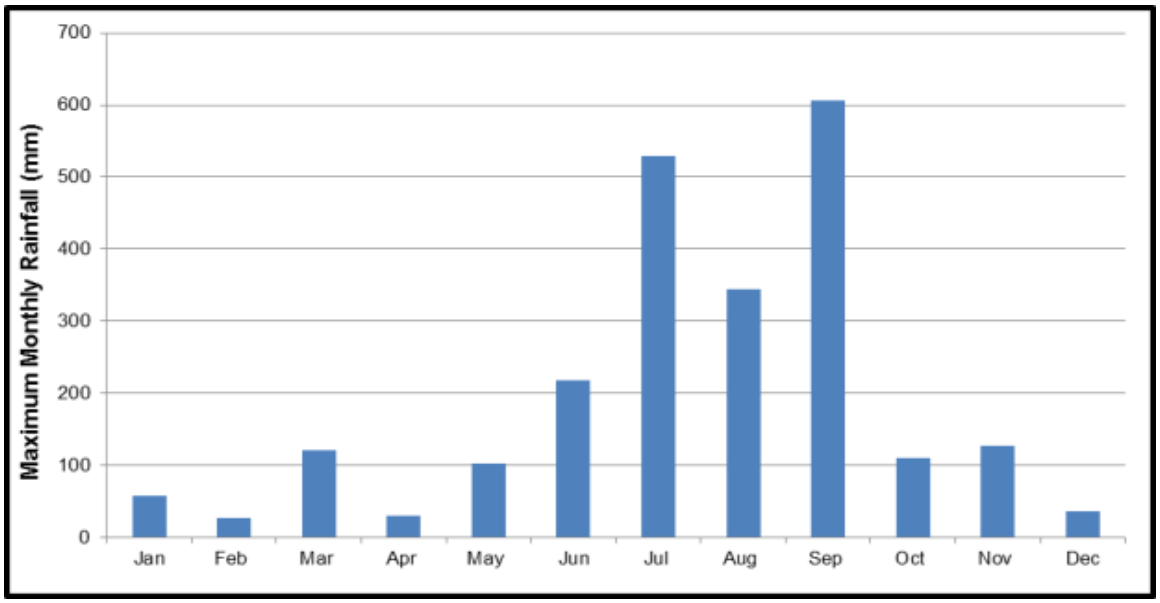
Source: Pakistan Meteorological Department.

Figure 4.14: Mean Monthly Rainfall at Nagarparkar



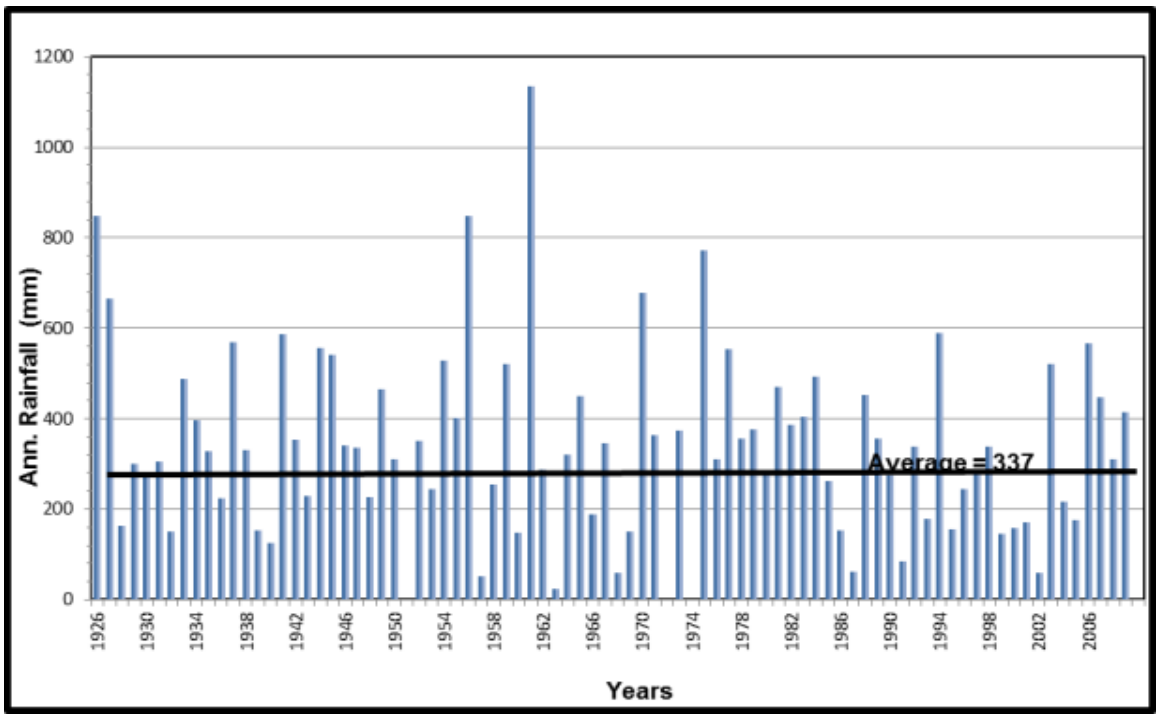
Source: Pakistan Meteorological Department.

Figure 4.15: Maximum Monthly Rainfall at Nagarparkar



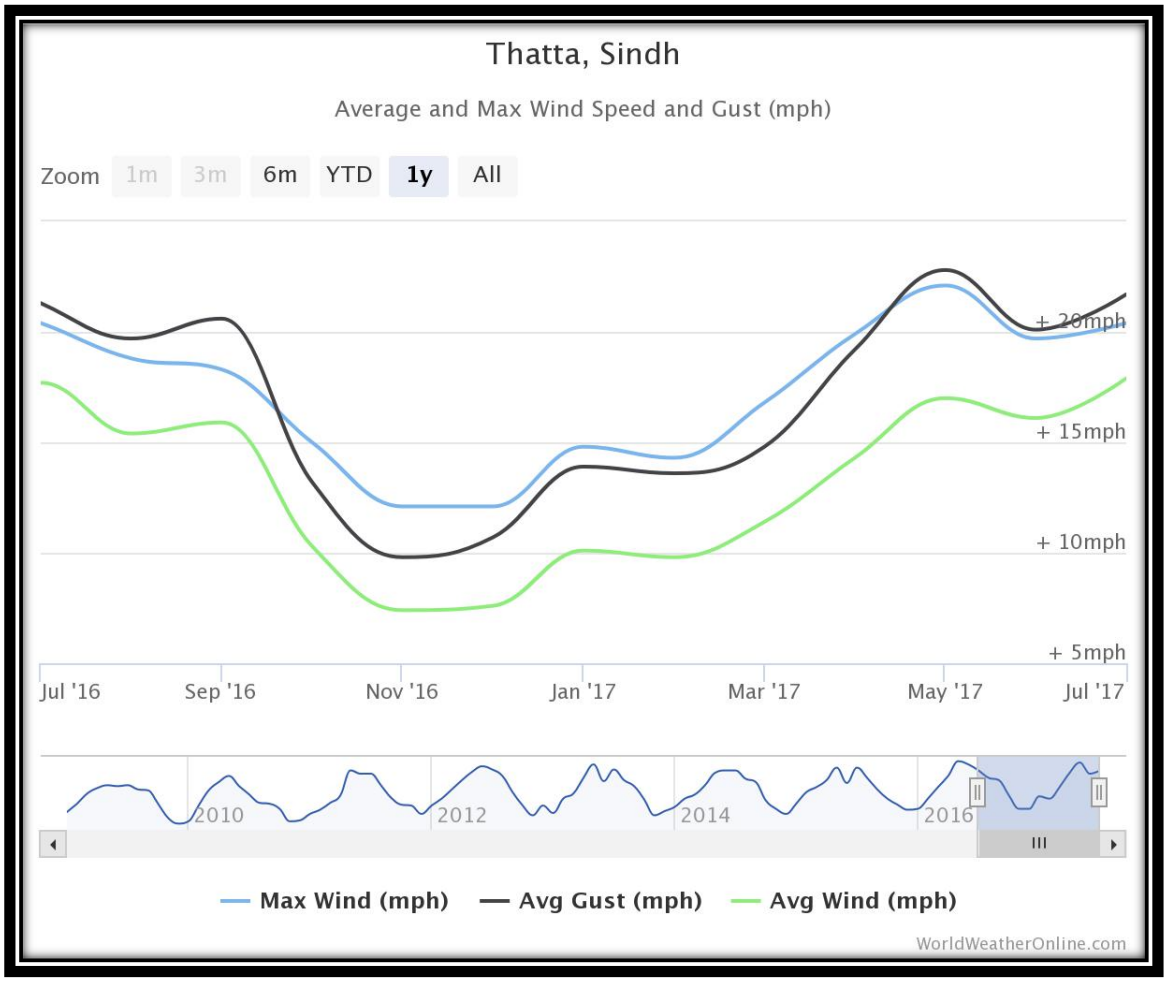
Source: Pakistan Meteorological Department.

Figure 4.16: Rainfall at Nagarparkar



Source: Pakistan Meteorological Department.

Figure 4.17: Wind Speed at Thatta



Source: https://www.worldweatheronline.com/thatta-weather-averages/sindh/pk.aspx.

4.1.8. Surface Hydrology

The Indus River is the major source of surface water in the province. There are canals drawn from the rivers and a number of wetlands also exist in the province. Sindh is one of the primary beneficiaries of the Indus Basin Irrigation System (IBIS). It has three major barrages on the Indus River that divert approximately 48 million acre feet (MAF or 59.0 billion cubic meters- BCM) of water annually to the 14 main canal commands in Sindh. These canal systems have an aggregate length of 13,325 miles (21,445 km), which serve a gross command area (GCA) of 14.391 million acres (5.8million ha). There are about 42,000 watercourses (tertiary channels), which have an aggregate length of about 75,000 miles (120,000 Km). Around 78 percent of the area in Sindh province is underlain by saline groundwater, which is unsuitable for irrigation. Surface and sub-surface drainage systems are inadequate, resulting in much of the drainage effluent being either retained in the basin or disposed into rivers and canals. There are 13 existing surface drainage systems in Sindh, which serve a total area of over 6.2 million acres (2.5 million hectares) and have an aggregate length of about 3,811 miles (6,133 km). In addition, there are two sub-surface drainage systems, which serve an area of 0.10 million acres (0.04million ha). Due to inadequate drainage cover, nearly one-fifth of the canal command areas have been affected by water logging and salinity.

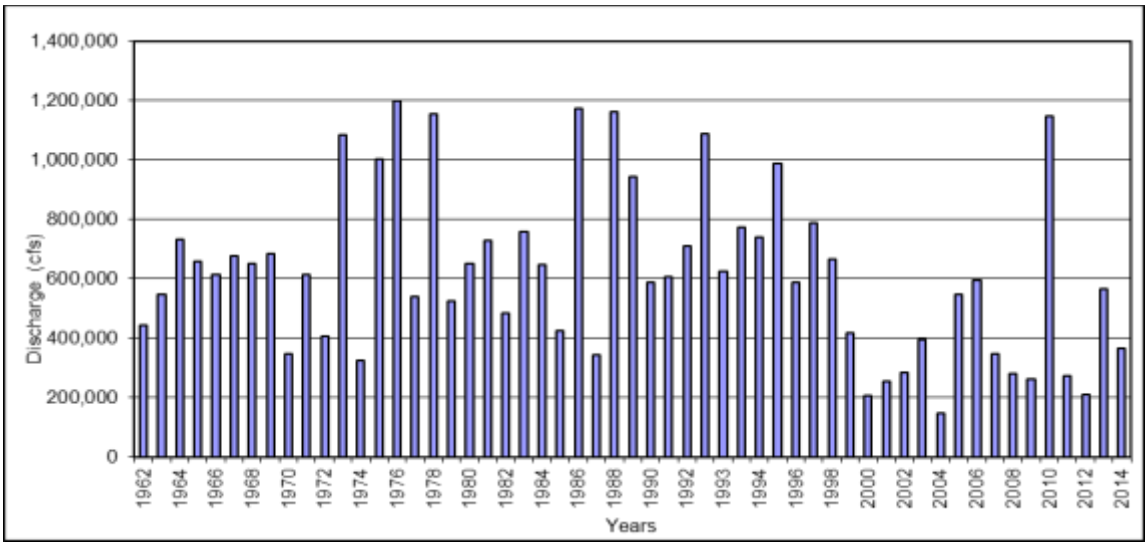
4.1.9. Characteristics of Indus River

The Indus River in its lower reaches travels through Sindh province for a distance of 370 miles (595 km); reaching Arabian Sea from Guddu Barrage. The Lower Indus River is highly braided alluvial channel with a slope of less than one-half foot per mile. Through natural accretion, the river bed has risen to such levels that during high floods the water level is above the surrounding natural ground level. The river in almost its entire length in Sindh is confined only by an intricate system of bunds (embankments).

The Lower Indus River probably presents the greatest flood management problem in Pakistan. Being at the downstream end of the river system, flood discharges are the highest, flood volumes are the largest and flood durations are the longest. The probability of high floods also is greater in the lower reaches of the river system because the Lower Indus River receives flood flows originating in any part of the river systems in Pakistan or its tributaries in neighboring India.

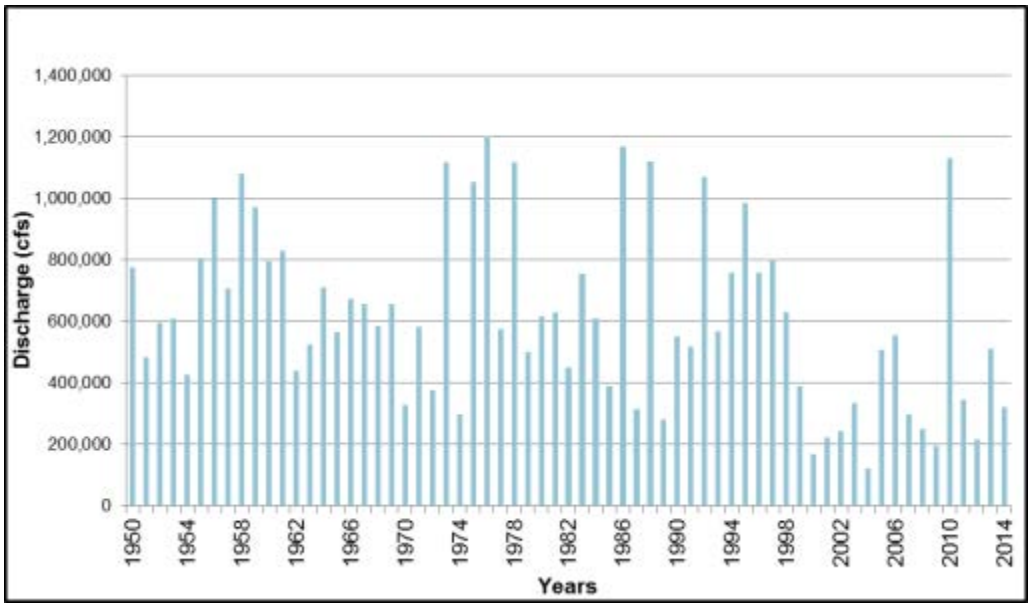
The peak flood discharges at Sukkur and Kotri Barrages are shown in **Figures 4.18** and **4.19**.

Figure 4.18: Annual Peak Discharge at Sukkur Barrage (1962-2014)



Source: Irrigation Department, Government of Sindh.

Figure 4.19: Peak Discharge on Kotri Barrage Since 1950 to 2015



Source: Irrigation Department, Government of Sindh.

4.1.10. Characteristics of Streams in Kohistan

Kohistan Region lies in western Sindh spread over three districts namely Dadu, Jamshoro and Malir between western hills of Kirthar and River Indus. The area between the Kirthar Range and the River Indus is a vast strip of alluvial plains of virgin land which is irrigated by rain flood water during monsoon and after that it becomes dry and barren.

Large number of hill torrents emanate from Kirthar Range in Western Sindh. The mountainous terrain of the Kirthar Rage is almost barren having below plant life to intercept or retard the storm runoff from the catchments. The mean annual rainfall varies in the range of 82 to 221 mm. Flash floods come for a short period during the rainy season. The highest floods normally come in July and August, though some high discharges have been recorded in the winter and the early spring. The flows are usually low in early summer. Due to lack of proper management, most of the water flows unused through the Indus River into the Arabian Sea. As the flashy floods rapidly disappear, the irrigation is uncertain. It is realized that if these flood waters are harnessed, continuous irrigation supplies can be ensured.

4.1.11. Lakes and Wetlands[6]

A large number of wetlands and lakes exist in the Sindh Province; many of them are Ramasar sites. The key sites are briefly described below.

The Indus Dolphin Reserve is spread over 135 km from the Sukkur upstream to the Guddu Barrage. In 1974, the entire area was declared the home of the endangered Blind Dolphin (IUCN Red Data Book). The major threats it faces include split populations of the dolphins due to dams and barrages on the River Indus, reduction in habitat size during dry season, high turbidity, pollution, and hunting. The number of dolphins at the site has increased from 150 in 1974 to 620 in 2001.

[6] Source: Sindh State of Environment and Development, IUCN, 2004. Sindh Programme Office. xxvii+423 pp.

Keenjhar (Kalri) Lake is a large freshwater lake providing drinking water to Karachi. It is located in Thatta district. It was declared a Ramsar site in 1976 and later became a wildlife sanctuary under the Sindh Wildlife Protection Ordinance. An annual Waterfowl Census has been carried out since 1971. Some baseline information indicates 65 species of fauna whose number had increased from 50,000 to 150,000 in the 1970s to 205,000 in 19886. Major threats to the lake include illegal fishing operations, an excessive number of motorized fishing boats and the use of synthetic nets in the lake. The grazing of domestic animals and unchecked recreational activities are other significant threats.

Drigh Lake is a small, slightly brackish lake with extensive marshland. The lake was declared a wildlife sanctuary in 1972, and became a Ramsar site in 1976. Threats include diversion of water; and overgrown Typha and Tamarix resulting in increased grazing resource. The number of wintering birds visiting the site has decreased over the years from 32,000 in 1973 to 17,400 in 1987-88.

Haleji Lake is a perennial freshwater lake with marshes and a brackish seepage lagoon. Considered a game reserve in 1971, this lake was declared a wildlife sanctuary and in 1976, the lake proceeded to become a Ramsar site. Haleji serves as an important source of water for Karachi besides being a popular recreational destination. Threats to the site include the overlapping of the management of the lake by the Karachi Water and Sewerage Board (KWSB) and the SWD; the unauthorized and illegal fishing, hunting and cutting of trees and siltation, as well as eutrophication. The number of birds visiting the site was 60,000 to 100,000 in the 1970s. In 1988, the figure was 103,000.

Jubho Lagoon is a shallow, small brackish water lagoon with mudflats and marshes that support a large concentration of migratory birds including flamingos and endangered Dalmation pelicans, a rare species in the world. This was declared a Ramsar site in 2001 because of the efforts made by IUCN Pakistan.

Nurruri Lagoon is also a brackish, privately owned lagoon with barren mudflats that is visited by large concentrations of migratory water birds. It was also declared a Ramsar site in 2001. Increased salinity, sea intrusion, population pressures, agricultural and industrial pollution are major threats to this site.

Deh Akro is a wildlife sanctuary consisting of four major habitats; desert, wetland, marsh, and agricultural. Located 330km northeast of Karachi, it is a natural inland wetland ecosystem, which supports a variety of rare and endangered wildlife species. This area hosts a considerable number of rare fauna. Many indigenous fish species are also found here. Water scarcity during a persistent dry spell is adversely affecting this area.

Runn of Kutch is part of the great Thar desert and comprises of stabilized sand dunes, with broad interdunal valleys of alluvial soil, connected across the frontier with India, which includes permanent saline marshes, coastal brackish lagoons, tidal mudflats, and estuarine habitats. The site supports many locally and globally threatened species, including the Great Indian bustard (Choriotis nigriceps), Houbara bustard (Chlamydotis undulata), Sarus crane (Grus antigone), and hyena (Hyeana hyaena) and supports more than 1% of the biogeographical population of flamingos.

Indus Delta is the fifth largest delta in the world. The fan-shaped delta consists of creeks, estuaries, mud flats, sand dunes, mangrove habitat, marshes and sea bays. It shelters 82,669 mangroves, mostly Avicenna marina which comprises 97% of the total mangrove area in the country and is said to be the largest coastal mangrove forest in the world. A large number of species of birds (including the threatened Dalmatian pelican) of fish and

shrimps, and of dolphins (Plumbeous dolphin, Finless porpoise, and Bottlenose dolphin), humpback whale and reptiles are found here. The area is rich in archaeological and religious heritage.

4.1.12. Groundwater

One of the impeding factors for the irrigated agriculture in Sindh is the brackish groundwater. More than 80 percent of the irrigated land in Sindh is underlain with brackish water unfit for agriculture. The shortage of irrigation water coupled with drought conditions in Sindh has increased the importance of groundwater exploitation wherever fresh water is available. Fresh groundwater is found mostly in a strip parallel to the left bank of Indus River and some pockets in other areas.

More than 30,000 tube wells in private and public sector are installed for agriculture purpose. Rapid development of groundwater by private sector is endangering groundwater sustainability by further lowering the water table and inviting intrusion of saline water into fresh water aquifer. The alluvium, which predominantly consists of sand of various grades constitute an extensive groundwater reservoir in Pakistan. The numbers of public and private tube wells in Sindh province are illustrated in the following **Table 4.1**.

Table 4.1: Private and Public Tube wells in Sindh

Year	Public			Private			Total		
	Electric	Diesel	Total	Electric	Diesel	Total	Electric	Diesel	Total
2006-07	3	190	193	25	256	281	28	446	474
2007-08	-	-	-	14	197	211	14	197	211
2008-09				14	164	187	14	164	187
2009-10	2	3	5	4	149	153	6	152	158
2010-11	20	16	36	23	303	326	43	319	362
2011-12	11	7	18	12	290	302	23	297	320

Source: Director General of Agriculture Extension Sindh, Hyderabad.

4.1.13. Air Quality and Noise

Air quality and noise are likely to be within the acceptable limits at the proposed sites of the grid-connected solar power plant and the SHS sub-projects. However; air quality and noise in Karachi and Hyderabad, where the rooftop solar power generation sub-projects are to be implemented, are likely to be exceeding the acceptable limits defined in the NEQS. This aspect will be considered in detail during the environmental and social assessment of each sub-project and if necessary instrument measurements will also be carried out.

4.2. Biological Environment

The Sindh province has a diverse habitat, which supports a large variety of animal from riverine forest to the desert ecosystem of Tharparkar, and from Kirthar mountains to the mangroves forest of Indus Delta. Common animal habitats are riverine plains, mountains, desert and deltaic region. These habitats support the peculiar species according to their requirements.

4.2.1. Fauna

Dadu and Jamshoro Districts. Manchar Lake is one of the largest fresh water lakes in Pakistan, situated in Dadu district. It is a vast natural depression flanked by Kirthar range in the west, Lakhi hills in south and river Indus in the east. On the north eastern side is the protective embankment. The lake is fed by two canals, the Aral Wah and the Danister from the river Indus. The lake also collects water from numerous small streams in the Kirthar Mountains. The common large mammalian species are Asiatic jackal (Canis aureus), Red Fox (Vulpes vulpes), Jungle cat (Felis chaus), Small Indian mongoose (Herpestes javanicus), Grey mongoose (Herpestes edwardsi). While the small mammals include Five-striped Palm Squirrel (Funambulus pennant), and Indian Gerbil (Tatera indica). The Desert hare (Lepus nigricollis) and Long-eared Hedgehog (Hemiechinus collaris) are also reported in the area.

Reptilian Species in the area include Indian Flapshell turtle (Lissemys punctata andersoni), Afghan Ground Agama (Trapelus megalonyx), Indian Garden Lizard (Calotes v. versicolor), Spotted Indian House Gecko (Hemidactylus brookii), Three fingered sand fish (Ophiomorus rathmai), Black Cobra (Naja). The amphibian species include Marbled Toad (Bufo stomaticus) and Skittering Frog (Euphlyctis c. cyanophlyctis).

The avian species in the area include Little Grebe (Tachybaptus ruficollis), White Pelican (Pelecanus onocrotalus), Large Cormorant (Phalacrocorax carbo), Indian Pond Heron (Ardeola grayii), Large Egret (Egretta alba), Intermediate Egret (Egretta intermedia), Cattle Egret (Bubulcus ibis), Spoonbill (Platalea leucorodia), Yellow wattled Lapwing (Vanellus malabaricus) and House Bunting (Emberiza striolata).

Thatta District. The Thatta area has important habitat of mangroves, mudflats, coasts and provide habitat to species of mammals, birds, reptiles and amphibians. The key mammalian species in the Thatta District include Fishing Cat, Jungle Cat, Desert Cat, Small Indian Civet, Bengal Fox, Jackal, Wild Boar, Mongoose, Desert hare and Squirrel are reported in the area. In small mammals, nine species belonging to two orders and four families are reported. Many water birds, mainly larids and charadriids use the area during winter as staging, feeding and wintering ground. As many as 85 species of birds have been reported in the area (World Wildlife Fund - WWF Ecological Assessment Report 2010-11). Around 11 species of reptiles belonging to three orders and 10 families are reported which include five snakes, five lizards, one fresh water turtle. Three species of amphibians are reported in the area of which included two species of frogs and one toad.

4.2.2. Flora

Most areas in Sindh are located on the border land of tropical and extra tropical regions with very little rainfall. The dominant flora of this arid zone consists of communities of deciduous and xerophytic trees and shrubs. Plants and trees with small leaves and thorny species are predominant. These include: Babul (Acacia nilotica), Nim (Azadirachta indica), Ber (Ziziphus vulgaris or jujube), Lai (Tamarix Orientalis), Kirrir (Capparis aphyla), and Kandi (Prosopis cineraria) and various species of mangroves (Aegiceras majus, Brugiera gymnorhiza, and Ceriops candolleana - Chauri/Kirari) and weeds in Indus Delta. Several types of water lilies are also found in waterlogged areas, surface drains, and on the periphery of lakes. In many places, the open water is dominated by submerged aquatic vegetation filling the whole water profile. The more common weeds and lilies include: Typha Angustala, Juncus articulatus, Scipus Littotalis, Phragetes Kark, and Nyasphaea Lutus.

4.2.3. Wildlife Protected Areas

Currently, there are a large number of wildlife protected areas in Sindh (see **Annex B** for a list of these areas). SWD is the management authority of wildlife protected areas (including protected wetlands), game reserves and national parks. Apart from these protected areas, a number of wetlands are present in Sindh province, ten of which are declared wetlands of international importance (Ramsar Sites). As per Sindh Wildlife Protection Ordinance, the protected areas have been divided into the following three categories:

- **National Parks:** Hunting and breaking of land for mining are prohibited in national parks, as are removing vegetation or polluting water flowing through the park. There is only one national park (Kirthar National Park) in Sindh province, which is located in Dadu and Jamshoro districts.
- **Wildlife Sanctuaries:** Wildlife Sanctuaries are areas which are left as undisturbed breeding grounds for wildlife. Cultivation, grazing and residing is prohibited in the demarcated areas. Special permission is required for entrance of general public. However, in exceptional circumstances, these restrictions are relax-able for scientific purposes or betterment of the respective area at the discretion of the authority.
- **Game Reserves**: Game reserves are designated as areas where hunting or shooting is not allowed except under special permits.

The protected areas declared by SWD however contain pockets of lands where irrigation and cultivation is on-going since ages and even after the declaration of these areas as protected areas. There are proprietary issues as well as other legal issues pertaining to this aspect. Furthermore, the exact geographical boundaries of these protected areas are not very well defined on available maps, resulting in the approximation of these boundaries.

None of the sub-project proposed sites under SSEP are likely to be within or adjacent to any of the protected areas. This aspect will however be reconfirmed during the detailed environmental and social assessment of each sub-project and addressed in the respective ESMPs.

4.3. Social and Socioeconomic Conditions

4.3.1. Demographic Profile

Since the inception of Pakistan six censuses have been conducted, the first one in 1951, the second one in 1961, the third one in 1972, the fourth in 1981, the fifth census which was scheduled to be conducted in 1991 was conducted in March, 1998, and the most recent census has been carried out in 2017; salient aspects are described below.

The total area of Sindh Province is 140,914 km^2 and the total population of the province in 1998 was 30.44 million, the estimated population in 2012 was 44.8 million,[7] and according to the initial results of the latest census carried out in 2017, the population in Sindh is about 47.9 million.[8] The average annual growth rate since the previous census in 1998 has been estimated to be 2.41 percent. With 8.58 million households, the average household size in the Province is 5.58 persons, according to the latest census. Over 52 percent of the Sindh

[7] Development Statistics of Sindh, 2013, Bureau of Statistics, Government of Sindh.
[8] Source: http://www.pbscensus.gov.pk/

residents live in urban areas whereas the national average for urbanization is 36.4 percent. The life expectancy in accordance to the 1996 surveys is 55.4 years and literacy rate is 45.29 percent. The crude death rate is 8.6 percent and crude birth rate is 35.5 percent.

4.3.2. Healthcare Facilities

Table 4.3 lists the health facilities that currently exist in the Province, according to the statistics available from the GoS.

Table 4.2: Health Facilities in Sindh

Hospital Type	Number of Hospitals	Number of Beds
Teaching Hospitals	5	7,382
Civil Hospitals	17	2,061
Other Hospitals (Government)	38	3,459
Taluka Hospitals	47	1,496
Departmental Hospitals	31	3,073
Private Hospitals	502	11,516
Local Bodies Hospitals	8	1,139
Basic Health Units	800	1,615
Rural Health Centers	133	1,703

Source: Health Profile of Sindh (District Wisw) for the Year 2016. Bureau of Statistics, Planning and Development Department. June 2017, Government of Sindh.

4.3.3. Educational Facilities

A large number of educational institutions including schools, colleges, and universities exist in the Sindh province, as shown in **Table 4.4**.

Table 4.3: Educational Facilities in Sindh (2015-16)

Type of Educational Institute	Total
Primary (Schools)	41,131
Middle	2329
Secondary	1696
Higher Secondary	291
Intermediate (Colleges)	39
Degree	202
Post Graduate	13
Medical	3
Homeopathic	10
Tibbia	4
Engineering and Technology	2
Law	8
Home economics	2
Physical Education	2
Commerce	2
Teachers' Training	29
Technical Colleges/Polytechnic/Mono-technic Institute	71
Commercial Institutions and Technical Training Centers	39
Vocational Institutions/ Centers and Schools	139

Source: School Education Statistics, Sindh, 2015-16. Bureau of Statistics, Planning and Development Department. June 2017, Government of Sindh.

4.3.4. Culture

Sindh has a rich heritage of traditional handicraft that has evolved over the centuries. Perhaps the most professed exposition of Sindhi culture is in the handicrafts of Hala, a town some 30 kilometers from Hyderabad. Hala's artisans manufacture high-quality and impressively priced wooden handicrafts, textiles, paintings, handmade paper products, and blue pottery. Lacquered wood works known as Jhandi, painting on wood, tiles, and pottery known as Kashi, hand woven textiles including khadi, susi, and ajraks are synonymous with Sindhi culture preserved in Hala's handicraft.

The Small and Medium Enterprises Development Authority (SMEDA) is planning to set up an organization of artisans to empower the community. SMEDA is publishing a directory of the artisans so that exporters can directly contact them. Hala is the home of a remarkable variety of traditional crafts and traditional handicrafts that carry with them centuries of skill that has woven magic into the motifs and designs used.

Sindh is known the world over for its handicrafts and arts. The work of Sindhi artisans was sold in ancient markets of Damascus, Baghdad, Basra, Istanbul, Cairo and Samarkand. Referring to the lacquer work on wood locally known as Jhandi, T. Posten (an English traveler who visited Sindh in the early 19th century) asserted that the articles of Hala could be compared with exquisite specimens of China. Technological improvements such as the spinning wheel (charkha) and treadle (pai-chah) in the weaver's loom were gradually introduced and the processes of designing, dyeing and printing by block were refined. The refined, lightweight, colorful, washable fabrics from Hala became a luxury for people used to the woolens and linens of the age.

The *ajrak* has existed in Sindh since the birth of its civilization. The color blue is predominantly used for *ajraks*. Sindh was traditionally a large producer of indigo and cotton cloth and both used to be exported to the Middle East. The ajrak is a mark of respect when it is given to an honored guest or friend.

4.3.5. Religion

Sindh's population is mainly Muslim. Sindh is home to nearly all (93 percent) of Pakistan's Hindus, who form 8.41 percent of the province's population. The majority of Muslims are Sunni Hanafi followed by Shia. The non-Muslim communities include Hindus, Christians, and Zoroastrians. A large number of Hindus migrated to India after the independence of Pakistan in 1947 while Muslim refugees, Muhajirs, arrived from India.

4.3.6. Languages

According to the 1998 Population Census of Pakistan following are the major languages of the province: Sindhi (59 percent); Urdu (19 percent); Punjabi (10 percent) (including Standard, Saraiki, Hindko, and Pahari-Potowari dialects 7 percent, 1 percent, 1 percent and 1 percent respectively); Pashto (5 percent); Balochi (5 percent); and Dhatki (Thari) majority in two districts (Tharparkar and Umerkot covering 20 percent of Province land). Other languages include Kashmiri, Gujarati, Memoni, Dari, Kutchi, Khowar, Shina, Kashmiri, Bengali, Lari (dialect), and Brahui.

4.3.7. Gender Issues

The female population in Pakistan according to the 1998, Census, is around 48 percent. In view of this situation, gender issues assume special focus and need to be properly addressed and evaluated. The status of women in rural Sindh is acutely disadvantaged. Women bear

a disproportionately high share of burden of poverty; have unequal access to economic options and social services lower endowments of land and other productive assets. Women are severely hindered in their horizontal and vertical social mobility.

Gender discrimination has become an issue in Pakistan with many Government and non-Government organizations working to resolve the issue. Other parts of Pakistan, women in Sindh commonly face problems in family law, discrimination at work place, discrimination in education, physical or psychological abuse, and social restrictions. In Sindhi culture, there are different norms, which become hurdles for women to get basic right like education, mobility, and freedom. Arranged forced marriages are still common and women commonly have no access to court for justice due to cultural hindrance. The literacy rate and school enrolment ratio of girls in province is very low, with girls remaining at home to complete domestic chores.

Honor killing are criminalized in Pakistani law, with punishment of 10-14 years in prison. However, each year, hundreds of women, girls and men are killed in the Country in the name of restoring the family's honor; there were 125 reported cases of honor killing, known as *karo kari* in Sindh, during 2016.[9] Marriages are sometimes arranged in order to settle disputes between different clans, particularly in rural areas.

Within the agriculture sector, there is unique relationship that exists between the women and nature. Women are pre-dominant in all the sub-sectors of agriculture namely farming, processing and distribution. The predominant role of women in agriculture has enabled most women farmers to become increasingly responsible for educational and other material needs of their wards, especially for female headed households.

Bonded labor is quite common in Sindh and according to recent estimates, 1.2 to 1.3 million people are engaged in bonded labor in the Province. During the time that they are bonded, laborers and their families are kept in detention-like conditions. Often the wives and children of male laborers are also held in captivity.[10]

4.3.8. Poverty

A major part of population lives in rural areas and poverty is pervasive in rural Sindh. About 37 percent of the rural population lives below the poverty line, compared to 33 percent in Pakistan on an overall basis. Over 70 percent of the rural population is landless. Analysis of 2001 Pakistan Rural Household Survey data shows that rural households, including the landless, derive 56 percent of their income from agriculture, directly or indirectly. A typical poor household in rural Sindh has little assets or land, depends on wage income, and is significantly larger than the non-poor household in Sindh or even compared to the average poor household of Pakistan. The rural poor tend to be employed mostly as agriculture wage workers. Rural Sindh is highly dependent on public services with little role of the private sector. Thus reforms to improve public service delivery and stimulate rural growth that raises agricultural and nonagricultural wages are fundamental for reducing poverty.

The Benazir Income Support Program (BISP) poverty assessment report reveals that the overall mean poverty score, which may vary between 0 and 100, is highest for Punjab

[9] Statistics taken from Human Rights Commission of Pakistan (http://hrcp-web.org/hrcpweb/campaigns/)
[10] Source: Triple Bottom-Line – Sustainability Advocacy (http://www.tbl.com.pk/the-menace-of-bonded-labour-in-pakistans-agricultural-sector/)

(27.7), and lowest for Sindh (20.3). The corresponding scores for Khyber Pakhtunkhwa (KP) and Balochistan are higher than Sindh but lower than Punjab.

A major part of population (over 60 percent) lives in rural areas and poverty is pervasive in rural Sindh.

4.3.9. Indigenous People

Pakistan does not have any separate policy to define IPs or to protect their rights and cultural identities. However, the WB's Policy OP 4.10 on `Indigenous Peoples' defines IPs, in a generic sense of the term, as a distinct, vulnerable, social and cultural group possessing the following characteristics:

- Self-identification as member of a distinct indigenous cultural group and recognition of this identity by others;
- Collective attachment to geographically distinct habitat or ancestral territories in the project area and to the natural resources in these habitats and territories;
- Customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- An indigenous language, often different from the official language of the country of region.

There are no communities in Sindh that are recognized as IPs under Bank Policy.

4.3.10. Vulnerable Groups

Sindh has a number of distinct vulnerable communities. These include the *Mohanas* (boat people) of Manchar Lake and the original Thari people who have a distinctive culture and lifestyle, conditioned to living in almost perpetual drought. These communities are generally poor and vulnerable. A majority, though not all, of these people are Hindus belonging to what are termed as the `scheduled castes'.

The total Scheduled Cast population in Sindh was around 300,000 as per the 1998 Census. Out of these, 93 percent were amongst the rural population of Sindh and out of this rural population, 87 percent were residing in the Tharparkar District. The Hindu Schedule Cast tribes in Sindh that may be termed as ethnic minorities are mainly Bheels, Kolhis, Oads and Meghwars. Some Muslim tribes of Tharparkar can also be considered as ethnic minorities, given that their culture and lifestyle is very similar to the Hindu tribes. The Bheels are mostly nomads, while the Kolhis and Meghwars (who migrate seasonally) are engaged largely in non-farming work e.g. road construction and house building. Large numbers of women also work on construction sites. Women of these tribes are well known for their hard work and put in long hours of physical labor whether in Thar or outside.

4.3.11. Archeological Sites

A large number of archeological, cultural, historical, and religious sites and buildings exist in the Sindh Province and many of them are protected under the Antiquities Act of 1975 and the Sindh Cultural Heritage (Preservation) Act of 1994. A list of such protected sites and buildings is provided in **Annex C**.

None of the known sites for SSEP sub-projects are located at and adjacent to the archeological sites (items 1 to 132 in the list given in **Annex C**), however some of the culturally protected buildings (items 133 onwards) particularly in Karachi and Hyderabad

may be considered for the rooftop solar power generation. This aspect will be carefully investigated during the detailed environmental and social assessment of each sub-project and appropriate actions (such as development of a PCR management plan) will need to be taken.

5. Potential Impacts

This Chapter assesses the Project for key environmental and social aspects, identifies significant potential impacts that may be caused by the Project activities and proposes appropriate mitigation measures to address these impacts. Most of this impact assessment is generic and not site specific since the nature and location of interventions under the proposed Project are not fully known at this stage. More site- and sub-project-specific impact assessment will need to be carried out while preparing the respective ESMPs.

5.1. Impact Assessment Methodology

The significance of potential impacts was assessed using the risk assessment methodology that considers impact magnitude and sensitivity of receptors, described below.

5.1.1. Impact Magnitude

The potential implications of the Project have been categorized as major, moderate, minor or nominal based on consideration of the parameters such as i) duration of the effect; ii) spatial extent of the impact; iii) reversibility; iv) likelihood; and v) legal standards and established professional criteria.

The magnitude of each potential impact of the Project has been identified according to the categories outlined in **Table 5.1**.

Table 5.1: Parameters for Determining Magnitude

Parameter	Major	Moderate	Minor	Minimal
Duration of potential impact	Long term (beyond the Project life)	Medium Term (within the Project life span)	Limited to construction period	Temporary with no detectable potential impact
Spatial extent of the potential impact	Widespread far beyond Project boundaries	Beyond next Project components, site boundaries or local area	Within Project boundary	Specific location within Project component or site boundaries with no detectable potential impact
Reversibility of potential impacts	Potential impact is effectively permanent, requiring considerable intervention to return to baseline	Environmental or social parameter needs a year or so with some responsesto come back to baseline	Baseline returns naturally or with limited response within a few months	Baseline remains constant
Legal standards and established professional criteria	Breaches national standards and or international guidelines/obligations	Complies with limits given in national standards but violates international lender guidelines in one or more parameters	Meets minimum national standard limits or international guidelines	Not applicable
Likelihood of potential	Occurs under typical operating	Happens under worst case (negative	Occurs under abnormal,	Unlikely to happen

Parameter	Major	Moderate	Minor	Minimal
impacts occurring	or construction conditions (Certain)	consequences) or best case (positive impact) working conditions (Likely)	exceptional or emergency conditions (occasional)	

5.1.2. Sensitivity of Receptor

The sensitivity of a receptor has been determined based on a review of the population (including proximity/numbers/vulnerability) and the presence of features on the site or the surrounding area. For each potential impact of the Project, sensitivity of the related receptor was determined using the criteria outlined in **Table 5.2**.

Table 5.2: Criteria for Determining Sensitivity

Sensitivity Determination	Definition
Very Severe	Vulnerable receptor with little or no ability to absorb proposed changes or minimal opportunities for mitigation.
Severe	Vulnerable receptor with little or no ability to absorb proposed changes or limited opportunities for mitigation.
Mild	Vulnerable receptor with some ability to absorb proposed changes or moderate opportunities for mitigation
Low	Vulnerable receptor with good ability to absorb proposed changes or/and excellent opportunities for mitigation

5.1.3. Assigning Significance

Following the assessment of impact magnitude and determining the sensitivity of the receiving environment or potential receptor, the significance of each potential impact was established using the impact significance matrix shown in **Table 5.3**.

Table 5.3: Criteria for Determining Impact Significance

Magnitude of Impact	Sensitivity of Receptors			
	Very Severe	Severe	Mild	Low
Major	Critical	High	Medium	Negligible
Moderate	High	High	Medium	Negligible
Minor	Medium	Medium	Minor	Negligible
Minimal	Negligible	Negligible	Negligible	Negligible

5.2. Summary of Assessed Impacts

The Project's potential impacts and their significance have been assessed using the methodology described in the above section. A summary of these impacts and their significance along with the mitigation measures are presented in **Table 5.4**; these impacts are discussed in the subsequent sections.

Table 5.4: Summary of Potential Impacts, their Significance and Mitigation Measures

Impact of Various Activities	Sensitivity	Magnitude	Significance before Mitigation	Mitigation and Enhancement Measure	Significance of Residual Impact
Impacts from Siting – Environmental Aspects					
Impact on natural vegetation and forests due to permanent clearing of land for establishing the grid-connected solar power plant	Mild	Minor to Moderate	Minor to Medium	Compensatory tree plantation in case of any tree felling necessitated by the sub-project siting	Negligible
Impact on wildlife habitats due to permanent clearing of land for establishing the grid-connected solar power plant	Mild	Minor to Moderate	Minor to Medium	To be determined during ESMP preparation based upon detailed impact assessment.	To be determined later.
GHG emissions from site clearing and other construction activities, materials life cycle	Mild	Moderate	Medium	No mitigation is needed since the net GHG emissions are negligible when compared to other feasible options for power generation. In fact there is likely to be a net decrease in GHG emissions because of power generation from a non-fossil fuel source.	Negligible (negative); Low to Medium (beneficial)
Additional load on rooftops of buildings	Mild	Moderate	Medium	Structural integrity of the roofs will be assessed as part of the engineering design of each sub-project.	Negligible
Damage caused by solar panels and their supporting structure if broken by windstorms	Severe	Moderate	High	Construction design to ensure incorporation of maximum wind speed and other similar factor that may cause damage to the panels and or their support.	Low
Impacts from Siting – Social					
Land acquisition	Severe	Major	High	Land acquisition will be avoided by locating the sub-projects: i) within already acquired land in the solar park; ii) on rooftops of government buildings; and iii) on rooftops of rural houses.	Negligible

Impact of Various Activities	Sensitivity	Magnitude	Significance before Mitigation	Mitigation and Enhancement Measure	Significance of Residual Impact
				GRM will be established to address related grievances and complaints.	
Other resettlement impacts on encroachers and other people who may lose assets and or livelihood	Mild	Moderate	Medium	Cash compensation will be paid to such affectees. These impacts will be assessed while screening sub-projects. In case resettlement impacts are identified for any sub-project, a RAP or ARAP will be prepared. GRM will be established to address related grievances and complaints.	Low
Permanent loss of roof space (particularly for the rural solar electrification sub-projects)	Mild	Moderate	Medium	This impact cannot be mitigated.	Medium
Impacts from Construction – Environmental					
Risk of soil pollution and soil erosion (from construction sites and camps)	Mild	Moderate	Medium	Pollution prevention plan and implementation of Environmental Code of Practice (ECoP) to be detailed in sub-project-specific ESMPs. GRM will be established to address related grievances and complaints.	Negligible
Risk of water pollution (from construction sites and camps)	Mild	Moderate	Medium	Pollution prevention plan and implementation of ECoPs to be detailed in sub-project-specific ESMPs. GRM will be established to address related grievances and complaints.	Negligible
Dust and air pollution from construction activities	Mild	Moderate	Medium	Maintenance of construction equipment and vehicles; dust control measures as specified in ECoPs to be detailed in ESMPs. GRM will be established to address related grievances and complaints.	Negligible
Noise and vibration from construction activities and construction camps (grid connected solar power plant)	Mild	Moderate	Medium	Maintenance of construction equipment and vehicles; noise control measures as specified in ECoPs	Negligible

Impact of Various Activities	Sensitivity	Magnitude	Significance before Mitigation	Mitigation and Enhancement Measure	Significance of Residual Impact
				GRM will be established to address related grievances and complaints.	
Light pollution (from construction sites and camps)	Mild	Moderate	Medium	Shaded lights to be used where appropriate. Flood lights to be avoided as far as possible (without compromising the security concerns) GRM will be established to address related grievances and complaints.	Negligible
Noise and vibration from construction activities (rooftop solar power generation and rural electrification)	Severe	Major to Moderate	High	The construction works to be schedules to avoid office working hours. Work schedule to be prepared in consultation with the building occupants. Noise control measures as specified in ECoPs GRM will be established to address related grievances and complaints.	Low
Generation of spoils (for grid-connected solar power plant)	Mild	Moderate	Medium	Disposal of spoil and excavated material within solar park in a manner not to affect other users of solar park. Proper landscaping to be carried out. GRM will be established to address related grievances and complaints.	Negligible
Generation of solid waste and hazardous waste (from construction sites and camps)	Mild	Moderate	Medium	Minimize generation of waste. Proper collection and disposal of wastes in approved sites or to vendors; ECoPs. To be detailed in sub-project-specific ESMPs. GRM will be established to address related grievances and complaints.	Negligible
Impacts on building roofs such as structural damage and water leakage into the building	Severe	Moderate	High	Construction design to ensure that building roof is not damaged nor water proofing impacted GRM will be established to address related grievances and complaints.	Low

Impact of Various Activities	Sensitivity	Magnitude	Significance before Mitigation	Mitigation and Enhancement Measure	Significance of Residual Impact
Impact on wildlife (for grid-connected solar power plant)	Mild	Moderate	Medium	Implementation of ECoPs for wildlife protection	Negligible
Inadequate site restoration	Mild	Moderate	Medium	Implementation of ECoPs for site restoration GRM will be established to address related grievances and complaints.	Negligible
Impacts from Construction – Social Aspects					
Employment opportunities for local communities	Mild	Moderate	Medium (positive)	Preference will be given to the local communities in the construction works GRM will be established to address related grievances and complaints.	-
Impacts on access roads and damages to local infrastructure/existing structures	Mild	Moderate	Medium	Any damages caused by the construction works will be repaired/rehabilitated by the contractor GRM will be established to address related grievances and complaints.	Low
Community health and safety from construction traffic and activities	Severe	Moderate	High	Traffic, noise and dust control measures in accordance with ECoPs; Occupational health and safety (OHS) management plan to be implemented. GRM will be established to address related grievances and complaints.	Low
Workers health and safety	Severe	Moderate	High	OHS measures in accordance with ECoPs; regular trainings.	Low
Blocked access due to construction activities	Mild	Moderate	Medium	Activities to be schedules and planned in consultation with the building occupants ensuring that office activities are not affected. Rural solar electrification works to be implemented in consultation with the concerned community. GRM will be established to address related grievances and complaints.	Negligible

Impact of Various Activities	Sensitivity	Magnitude	Significance before Mitigation	Mitigation and Enhancement Measure	Significance of Residual Impact
Additional load on local resources	Mild	Moderate	Medium	Contractor to obtain water in a manner not to affect the local communities; liaison with local communities to be maintained; GRM will be established to address related grievances and complaints.	Negligible
Social conflict and privacy of women	Mild	Moderate	Medium	Camps to be established at least 500 m away from communities; contractor to enforce code of conduct to respect local norms and culture; liaison with local communities to be maintained; GRM to be established.	Negligible
Damage to sites/places of religious/cultural significance	Major	Moderate	High	Such sites to be demarcated and avoided during construction activities; liaison with local communities to be maintained; GRM to be established. For the sub-projects involving rooftop solar power generation on protected buildings, necessary approvals will be obtained from GoS, a PCR management plan will be included in the ESMP, and structural integrity of the building will be carefully assessed.	Low
Impacts from O&M – Environmental					
Water requirements for cleaning the solar panels	Severe	Major to Moderate	High	Options will be considered to avoid using water for the panel cleaning; cleaning with compressed air will be considered. In case of water cleaning, recycling of water will be considered. It will be ensured that water is obtained in a manner not to affect the existing water usage/users. GRM will be established to address related grievances and complaints.	Low

Impact of Various Activities	Sensitivity	Magnitude	Significance before Mitigation	Mitigation and Enhancement Measure	Significance of Residual Impact
Improper disposal of broken/damaged solar panels, batteries, and supporting structure	Mild	Moderate	Medium	O&M Manual to be prepared addressing this aspect as well. GRM will be established to address related grievances and complaints.	Negligible
Light pollution	Mild	Moderate	Medium	Shaded lights to be used where appropriate. Flood lights to be avoided as far as possible (without compromising the security concerns) GRM will be established to address related grievances and complaints.	Negligible
Impacts from O&M – Social					
Community health and safety risks (electrocution)	Severe	Major	High	Community training and awareness for proper handling of live parts GRM will be established to address related grievances and complaints.	Low
Workers health and safety during maintenance	Severe	Major	High	Implementation of Standard operating procedures (SOPs) to be included in the O&M Manual.	Low

5.3. Environmental Impacts from Sub-project Siting

The generic environmental impacts of siting of the sub-projects under SSEP are discussed below; more detailed and site-specific environmental impacts will need to be covered under the respective ESMPs.

5.3.1. Impacts on Natural Vegetation, Habitat, and Forests

This potential impact is relevant to the grid-connected solar power plant. The siting of such power plant will require a large area to be cleared of all existing vegetation and trees potentially causing impacts on the natural habitat, natural vegetation, and forest. The area currently selected for this sub-project does not support any sensitive habitat, does not have any dense and significant natural vegetation, and does not have many trees. Hence the siting of the proposed sub-project is not likely to cause any significant impact on the natural habitat, vegetation, or forest. This aspect will be further investigated during the preparation of sub-project-specific ESMP.

Significance of the potential impacts has therefore been assessed as Minor to Medium per the criteria defined in **Section 5.1** and summarized in **Table 5.4**.

Mitigation

Compensatory tree plantation (five saplings to be planted for each tree to be felled) will be carried out within the solar park of possible. Landscaping and plantation will be carried out within the power plant area where possible. One possible location for this plantation is along the boundary wall of the power plant as well as around the entire solar park.

5.3.2. Impacts on Wildlife and Habitat

This impact is mostly associated with the loss of natural vegetation and habitat discussed above. Clearance of natural vegetation from a large tract of land can potentially disturb the natural habitat and the associated wildlife species. As stated earlier, the proposed site for the grid-connected solar power plant does not support any critical or sensitive habitat and hence no wildlife species of significance are likely to exist there. However, the area is close (around 30 km) to the Kirthar National Park, which supports a number of wildlife resources. During the site-specific ESMP preparation, this aspect needs to be carefully investigated and assessed.

Significance of the potential impacts has therefore been assessed as Minor to Medium, as shown in **Table 5.4**.

Mitigation

The mitigation described under **Section 5.3.1** above will address the impacts on wildlife and habitat as well. Additional site-specific mitigation measures may be included in the ESMP as needed.

5.3.3. GHG Emissions

The manufacturing of the solar power plant, equipment and material transportation, construction activities including site clearance, and O&M activities will generate GHG emissions. The quantification of these emissions cannot be carried out at this stage because of lack of sub-project details. These emissions will however be more than compensated through substitution of fossil fuel based power generation with the solar power generation.

The net impact is likely to be beneficial with low to medium significance as shown in **Table 5.4**. This aspect will be further assessed and quantified during the preparation of sub-project-specific ESMP.

5.3.4. Additional Load on Rooftops

The sub-projects involving rooftop power generation on government buildings and SHSs will require solar panels to be installed on rooftops. Many of the government buildings are quite old whereas the rural houses do not generally use any building codes or construction standards. Hence the solar panel installation on rooftops can potentially damage the buildings. This potential impact has been assessed as having medium significance, as shown in **Table 5.4**.

Mitigation

As part of the construction design of the sub-projects involving rooftop power generation on government buildings and SHSs, each building and its structural integrity will be carefully investigated and assessed. The construction design will ensure that the existing structure is capable of bearing additional load, is not damaged and its integrity is not compromised. Any buildings for which this cannot be ensured will be excluded from the Project.

5.3.5. Damages Caused by Falling of Broken Solar Panels and Supporting Structure

The falling of solar panels and their support structure can cause substantial damage in the office buildings and rural houses if damaged and broken by the windstorm. The coastal areas in particular face severe storms and even cyclones with very high wind speeds. This aspect will be carefully assessed during the site-specific ESMPs. This impact has been assessed as having high significance, as shown in **Table 5.4**.

Mitigation

While preparing the construction design, the maximum wind speed in the sub-project area will be considered. The supporting structure will need to be designed adequately to avoid any damage during the wind storms.

5.4. Social Impacts from Sub-project Siting

The generic social impacts of siting of the sub-projects under SSEP are discussed below; more detailed and site-specific social impacts will need to be covered under the respective ESMPs.

5.4.1. Land Acquisition

A large tract of land will be needed for the sub-project involving grid-connected solar power plant. However no land will need to be acquired for the rooftop solar power generation and SHS sub-projects. Land acquisition can potentially cause loss of valuable cultivated land and associated livelihood of the land owners and growers. This in turn can potentially lead to impoverishment in the rural areas where the incidence of poverty is already quite high (see **Section 4.3.8**). This potential impact has been assessed as highly significant, as shown in **Table 5.4**.

Mitigation

The sub-project involving grid-connected solar power plant will only be located within the already acquired land. The sub-project identified at this stage is the one that is located within the Solar Park land for which land has already been acquired by the GoS. For any future land acquisition under SSEP, a RAP or ARAP will need to be prepared (this aspect is further discussed in the RPF given later in the document).

5.4.2. Resettlement Impacts on Encroachers and Others

The sub-project establishment may potentially affect encroachers living on the proposed sites; similarly, some people may lose their assets and or livelihood because of the establishment of the sub-projects. This impact has been assessed as having Medium significance, as shown in **Table 5.4**.

Mitigation

Cash compensation will be paid to all encroachers and people who may lose their livelihood or may be impacted in any other way. The detailed social assessment of each sub-project will cover this aspect. In case of resettlement impacts, a separate RAP or ARAP will need to be prepared (this aspect is further discussed in the RPF given later in the document).

5.4.3. Permanent Loss of Roof Space

The rooftop solar power generation and SHS sub-projects will result in permanent loss of roof space. This loss could be important for some government buildings where rooftop is sometimes used for miscellaneous uses such as living shacks for guards and other employees. However, for the rural electrification sub-project, this loss could be significant since the house roofs are used extensively for a number of purposes.

Significance of this potential impact has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

This impact cannot be mitigated. The beneficiary community particularly the house owners will have to assess the cost and benefit of installing solar panels on their rooftops.

5.5. Environmental Impacts during Construction

The generic environmental impacts associated with the construction activities of the sub-projects under SSEP are discussed below; more detailed and site-specific environmental impacts will need to be covered under the respective ESMPs.

5.5.1. Soil Contamination and Erosion

The construction activities can potentially cause soil contamination and erosion particularly at the sub-project involving grid-connected solar power plant within the Sindh Solar Park but also, to a lesser degree, at the SHS sub-project sites. The construction activities that can cause such impacts include site clearance, excavation for foundations, movement of vehicles and machinery on unpaved tracks, release of waste effluents, release of sewage and other waste water from construction camps, repair of vehicles and equipment in the field, and inadvertent release and or leakage of fuels, oils, and other chemicals. The soil contamination can degrade the soil quality and render it unsuitable for

useful purposes such as cultivation, in addition to contaminating the water particularly the drinking water in the area.

Significance of these impacts has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

All of the above-described potential impacts can adequately be addressed by adopting good construction and environmental practices. The generic mitigation and control measures are provided in the ECoPs (**Annex D**); additional measures, particularly site-specific, will be included in the sub-project-specific ESMPs. The contractor will be required to prepare a pollution prevention plan based upon the ESMP and ECoPs.

5.5.2. Water Contamination

Any waste effluents either released to soil or directly into any water body has the potential to contaminate water as well. The construction activities that can cause such impacts include release of waste effluents, release of sewage and other waste water from construction camps, repair of vehicles and equipment in the field, and inadvertent release and or leakage of fuels, oils, and other chemicals. The construction activities associated with the sub-projects involving rooftop solar power generation and SHSs also have a potential to damage water supply lines, waste water lines, drinking water sources, and water tanks. Water contamination can potentially affect the local population, crops, and livestock.

Significance of these impacts has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

All of the above-described potential impacts can adequately be addressed by adopting good construction and environmental practices. The generic mitigation and control measures are provided in the ECoPs (**Annex D**); additional, site-specific measures will be included in the sub-project-specific ESMPs if needed. The contractor will be required to prepare a pollution prevention plan based upon the ESMP and ECoPs.

5.5.3. Air Pollution including Dust Emissions

The construction activities can potentially cause air pollution including dust emissions particularly at the sub-project involving grid-connected solar power plant within the Sindh Solar Park but also, to a lesser degree, at the rooftop power generation and SHS sub-project sites. The construction activities that can cause such impacts include site clearance, excavation for foundations, operation of construction machinery and vehicles, operation of diesel generators, movement of vehicles and machinery on unpaved tracks, and establishment as well as operation of construction camps. The air pollution dust emissions can cause respiratory diseases in the nearby areas and also damage the crops (in case of dust emissions).

Significance of these impacts has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

All of the above-described potential impacts can adequately be addressed by adopting good construction and environmental practices. The generic mitigation and control measures are provided in the ECoPs (**Annex D**); additional measures, particularly site-specific, will be

included in the sub-project-specific ESMPs as needed. The contractor will be required to prepare a pollution prevention plan based upon the ESMP and ECoPs.

5.5.4. Noise and Vibration

The construction activities will generate noise and vibration that can be quite significant for the office buildings opting for the rooftop solar power generation and also for the rural electrification. The activities that generate noise include operation of construction machinery and vehicles and operation of power generators. The noise can cause nuisance and disturbance to the occupants of the office buildings and nearby communities.

The significance of these impacts has been assessed as Medium for the grid-connected power plant and High for the rooftop as well as rural electrification sub-projects, as shown in **Table 5.4**.

Mitigation

All of the above-described potential impacts can adequately be addressed by adopting good construction and environmental practices. The generic mitigation and control measures are provided in the ECoPs (**Annex D**); additional measures, particularly site-specific, will be included in the sub-project-specific ESMPs as needed. The contractor will be required to prepare a pollution prevention plan based upon the ESMP and ECoPs.

For the sub-projects involving rooftop solar power generation, construction will preferably be carried out after the office hours in consultation with the building occupants/concerned departments. For the rural electrification sub-projects, close liaison with the beneficiary community will be maintained to determine the working hours.

In addition, a GRM will be established at the sites to address the grievances and complaints in an effective and transparent manner.

5.5.5. Spoil Disposal

The construction activities particularly at the grid-connected power plant site will generate spoil and excavated material that if not disposed properly can cause problems such as blocked access, blocked drainage, impacts on other users of the solar park, and aesthetic issues.

Significance of these impacts has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

The contractor will be required to follow the ECoP and dispose the spoil material in a manner not to affect roads and accesses, local drainage, or other users of the solar park. The entire sub-project area will need to be landscaped after the completion of construction works. Additional site-specific measures will be included in the sub-project-specific ESMPs as needed. The contractor will be required to prepare a spoil disposal and landscaping plan based upon the ESMP and ECoPs.

5.5.6. Generation of Solid Waste

The construction activities will generate solid waste that may include domestic wastes from offices and construction camps, wastes from site workshops, disused machinery parts, discarded/excess construction material, packing material, empty oil drums, and the like. Improper disposal of such wastes can potentially contaminate soil and water, cause

disturbance and nuisance to others (building occupants, other users in solar park, nearby communities), generate foul odor, and also spread vector-borne diseases.

Significance of these impacts has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

The contractor will be required to follow the ECoP and dispose the solid waste in a manner not to contaminate soil or water, not to generate foul odor, and not to spread any vector-borne diseases. The contractor will be required to prepare and implement a waste disposal plan based upon the ESMP and ECoPs.

5.5.7. Light Pollution

Lights from the construction sites and camps can potentially affect the rural communities. There are areas in Sindh that are not connected with the electricity grid and even if electricity is available, the lamination levels are generally low. In such areas bright, high intensity lights from the construction sites and camps can be a source of nuisance.

In addition to the above, lights (and other sources of disturbances such as noise) can adversely affect the wildlife (including birds) of the area, particularly the species that stay away from settlements and populated areas (i.e., species that are not adapted to survive near communities). High illumination levels may drive the wildlife species out of their habitats.

Significance of these impacts has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

Shaded lights will be used where needed as far as possible. Use of flood lights will be avoided to the extent possible but without compromising the security concerns. Community liaison will be maintained to address any disturbance and nuisance to the community. GRM will address any related community grievances and complaints.

To address the potential disturbance to the wildlife, first preference will be to avoid areas where such wildlife species and their habitat exist. If unavoidable, then shaded lights will be used and flood lights will be avoided without compromising the security concerns.

5.5.8. Impacts on Building Roofs

The construction activities on the rooftops may potentially damage the buildings, its plumbing and wiring, and cause roof leakage. This could cause serious problems both in the office buildings particularly the old and historical ones, but also in the rural houses where usually no construction codes are employed.

Significance of these impacts has been assessed as High, as shown in **Table 5.4**.

Mitigation

In addition to checking the existing (i.e., pre-construction) condition and strength of the buildings selected for the rooftop and rural electrification sub-projects discussed in **Section 5.3.4**, appropriate construction design and methodology will be employed to ensure that the building, its roof, its water pipes, and its electric wiring are not damaged. The contractor will be made responsible to repair any damaged caused by the construction activities. Appropriate contract clauses will be included in the ESMPs.

5.5.9. Impacts on Wildlife

The construction activities to be carried out at the grid-connected solar power plant to be located inside the Sindh Solar Park can potentially impact the wildlife resources of the area. The construction activities that can affect the wildlife include noise generation, lighting during the nights, improper waste disposal, contamination of soil and water, and human presence in general.

Significance of these impacts has been assessed as Medium, as shown in **Table 5.4**.

Presence of any significant wildlife resources in the area will be confirmed during the baseline studies of the sub-project-specific ESMPs.

Mitigation

All of the above-described impacts can adequately be addressed through implementing the ECoP for the protection of wildlife resources (**Annex D**). Additional measures may be included in the ESMPs as needed and appropriate. The contractor will be made responsible to implement the ECoP and ESMP; appropriate contract clauses will be included in the ESMPs.

5.5.10. Site Restoration

Improper site restoration after the completion of construction activities can potentially cause blocked accesses and roads, blocked drainage, hindrance to power plant O&M, safety hazards for the plant workers, and aesthetic issues.

Significance of these impacts has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

The contractor will be required to restore the site completely, removing all debris, left-over construction material, scrap, spoils, and other wastes. All ditches will be filled and landscaping will be carried out. The contractor will implement the ECoP for this purpose (**Annex D**). The contractor will be made responsible to implement the ECoP and ESMP; appropriate contract clauses will be included in the ESMPs.

5.6. Social Impacts caused by Construction Activities

The generic social impacts associated with the construction activities of the sub-projects under SSEP are discussed below; more detailed and site-specific social impacts will need to be covered under the respective ESMPs.

5.6.1. Employment Opportunities

The construction activities will offer employment opportunities. The solar power plant installation work is quite labor-intensive and a large number of workers from different trades and disciplines would be needed in addition to the technical staff. This is one of the beneficial impacts of the Project and has been assessed as having Medium significance, as shown in **Table 5.4**.

Mitigation

No mitigation is needed for this impact since it is beneficial in nature. It will be ensured that local communities are given preference for these employment opportunities. These employees must be treated equally and equitably according to the labor laws of the Country

and Province; similarly the contractor will not employ any child or bonded labor (**Section 3.2.17**). In addition, a GRM will be established at the site to address the community grievances and complaints in an effective and transparent manner.

In addition, WB Guidance Note will be used to address potential impacts caused by temporary project induced labor influx (please see **Section 3.3.13**).

5.6.2. Blocked Access and Damage to Infrastructure

The construction activities can potentially block local roads and routes, and also cause damage to these roads and other infrastructure. The blocked roads and routes can cause disturbance and hardship to the local population and building occupants. The damages caused to the infrastructure also increase the hardship to the local communities as well as general public.

Significance of this impact has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

The contractor will ensure that local roads and routes are not blocked by the construction and related activities such as material transportation. Similarly building access will also not be affected. If unavoidable, alternate routes/access will be identified in consultation with the local communities/building occupants. For the rooftop solar power generation, the construction works will be carried out after the office hours, in consultation with the building occupants/concerned department.

Damage to the infrastructure will be avoided to the extent possible. The contractor will be contractually required to repair/restore all damaged infrastructure to the original or better condition. The sub-project-specific ESMPs will include contractual clauses to facilitate this. In addition, a GRM will be established at the sites to address the community grievances and complaints in an effective and transparent manner.

5.6.3. Community Health and Safety

The construction activities are likely to pose health and safety risks to the communities and building occupants during the construction phase. These risks include injuries caused by moving machinery and vehicles, falling objects, and falling from heights; electrocution risk; fire hazards; and health issues caused by excessive noise, exhaust emissions, dust, and improper waste disposal. The occupants of the office buildings selected for the rooftop solar power generation and dwellers of the houses selected for rural electrification sub-projects will also face risks of any structural failure of the buildings/houses caused by the construction activities.

Significance of these impacts has been assessed as High, as shown in **Table 5.4**.

Mitigation

The contractor will be required to prepare a community health and safety plan in accordance with the related ECoP as well as WBG's Environment, Health and Safety (EHS) Guidelines - and implement it during the construction phase. Liaison with the community, building occupants and house dwellers will be maintained to inform them of the safety and health risks, about the measures taken by the contractors, and also about the precautions to be observed by them. In addition, a GRM will be established at the sites to address the community grievances and complaints in an effective and transparent manner.

5.6.4. Worker Health and Safety

Much like the health and safety risks to the communities, the construction activities are likely to pose OHS risks to the construction workers during the construction phase. These risks include injuries caused by moving machinery and vehicles, falling objects, and falling from heights; electrocution risk; fire hazards; and health issues caused by excessive noise, exhaust emissions, dust, and improper waste disposal. The workers will also face risks of any structural failure of the buildings/houses caused by the construction activities.

Significance of these impacts has been assessed as High, as shown in **Table 5.4**.

Mitigation

The contractor will be required to prepare an OHS plan in accordance with the related ECoP as well as WBG's EHS Guidelines and implement it during the construction phase. The contractor will conduct OHS trainings on a regular basis. The contractor will also employ trained and qualified personnel for OHS aspects. In addition, WB Guidance Note will be used to address potential impacts caused by temporary project induced labor influx (please see **Section 3.3.13**).

5.6.5. Additional Load on Local Resources

The construction works and camp operation will require supplies such as water, fuel, and camp supplies. Obtaining these supplies from the local sources can exert additional pressure on these sources, which may already be over-exploited and therefore adversely affect the local communities particularly in the remote areas. Any such impact on the local community can increase their hardship and even result in disruption of the construction works.

Significance of these impacts has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

The contractor will be required to obtain supplies including water, fuel, camp supplies, and others in a manner not to affect the local communities. Particularly for obtaining water, the contractor will ensure that its water consumption does not affect the community and in case of a shared water source, an agreement with the community should be made. The sub-project-specific ESMP will identify scarcity of key natural resources particularly drinking water in the area. In addition, a GRM will be established at the sites to address the community grievances and complaints in an effective and transparent manner. More site-specific mitigation measures may be included in the ESMPs and contractor contract as needed.

5.6.6. Social Conflict and Privacy of Women

The influx of construction workers from other parts of the Province/Country can potentially cause conflict between the Project personnel and the local community. This could be because of differences in culture, religion, social norms, acceptable social behavior, and even dress code. In addition, the construction activities can potentially affect the women activities and movement. Any such impacts can be detrimental to the Project since it can potentially cause tension between the Project and local communities and even disruption of construction works.

Significance of these impacts has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

The contractor will prepare and implement a Code of Conduct for all site personnel, in consultation and coordination with the local community. All site personnel will be provided orientation and training on this Code of Conduct. Awareness raising materials such as posters and signage will be used as appropriate. Privacy of women will be respected; routes and places used by them will be avoided as far as possible. Construction camps will be located at least 500 m away from the communities. Entry of the site personnel in the local communities will be minimized to the extent possible/appropriate. Also, liaison with the community will be maintained. In addition, the GRM described earlier will also address community grievances related to social conflict. In addition, WB Guidance Note will be used to address potential impacts caused by temporary project induced labor influx (please see **Section 3.3.13**).

5.6.7. Damage to Sites/Places of Religious/Cultural Significance

No sites of archeological, religious or cultural significance are known to exist at or near the proposed site of the grid-connected solar power plant. Similarly, the rural electrification sub-projects are unlikely to affect any such sites since residential buildings are going to be used for such activities. However, as also stated earlier, some of the office buildings being considered for the rooftop solar power generation are protected under the Sindh Cultural Heritage Act of 1994 (see **Section 3.2.10**). Any construction works on these buildings can potentially damage the historical and cultural heritage of these buildings.

Significance of these impacts has been assessed as High, as shown in **Table 5.4**.

Mitigation

During the detailed field investigations for the preparation of sub-project-specific ESMPs, presence or otherwise of any sites of archeological, religious, historical, or cultural significance at or adjacent to the sub-project sites will be reconfirmed. If possible such sites will be avoided and excluded from the sub-project area. If avoidance is not possible, a PCR management plan will need to be prepared and implemented, in accordance with the WB OP 4.11 (see **Section 3.3.5**). ToRs of PCR Management Plan is given in **Annex E**.

For the culturally protected buildings selected for rooftop solar power generation also, a PCR management plan will need to be prepared and implemented, in accordance with the WB OP 4.11. Permission will be sought from the provincial government for carrying out the Project activities in such buildings.

Chance Find Procedure: In the event of discovery of any site or artefact of archeological, historical, cultural, or religious significance, the contractor shall immediately cease all works in that area and report the find to the SED. Works may not recommence until approval is given by the SED. Upon receiving a report of a chance find, the Archeological Department will be notified and their site visit will be facilitated. Further works will be carried out on such sites only after obtaining clearance from the Archeological Department.

5.7. Impacts from O&M Activities

The generic environmental and social impacts associated with the O&M activities of the sub-projects under SSEP are discussed below; more detailed and site-specific social impacts will need to be covered under the respective ESMPs.

5.7.1. Water Requirements

The solar panels need to be cleaned regularly otherwise the dust and smoke particles deposited on them can substantially reduce the efficiency of these panels and the power output. This is particularly applicable in the Sindh province because of its arid nature and quite infrequent rains. The solar panels in cities such as Karachi and Hyderabad will also be exposed to smoke from vehicle exhaust in addition to dust. Washing with water is the most common method of cleaning the solar panels. However, this water requirement can exert additional pressure on already under-stressed and or scant water resources in the areas including the city of Karachi.

Significance of this impact has been assessed as High, as shown in **Table 5.4**.

Mitigation

Options will be considered to avoid using water for the panel cleaning; cleaning with compressed air will be considered. In case of water cleaning, recycling of water will be considered. Furthermore, it will be ensured that water is obtained in a manner not to affect the existing water usage/users. The actual method of cleaning finally selected for each sub-project will be mentioned in the respective ESMP.

5.7.2. Improper Disposal of Broken/Damaged Solar Panels, Batteries and Supporting Structure

Improper disposal of damaged and or broken parts including solar panels can cause hindrance in O&M activities of the power plant and also cause disturbance and injury risk to the building occupants. Improper disposal of old batteries can also potentially lead to water and soil contamination and also safety risk associated with explosions and or fire.

Significance of this impact has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

An Operations Manual (OM) will need to be prepared for each sub-project under SSEP. This OM will address among other aspects proper handling and disposal of broken/damaged parts including batteries. The sub-project-specific ESMPs will include structure of this OM.

5.7.3. Light Pollution

Lights from the power plants and camps can potentially affect the rural communities. As stated earlier, there are areas in Sindh that are not connected with the electricity grid and even if electricity is available, the lamination levels are generally low. In such areas bright, high intensity lights from the construction sites and camps can be a source of nuisance.

In addition to the above, lights can adversely affect the wildlife (including birds) of the area, particularly the species that stay away from settlements and populated areas (i.e., species that are not adapted to survive near communities). High illumination levels may drive the wildlife species out of their habitats.

Significance of these impacts has been assessed as Medium, as shown in **Table 5.4**.

Mitigation

Shaded lights will be used where needed as far as possible. Use of flood lights will be avoided to the extent possible but without compromising the security concerns.

Community liaison will be maintained to address any disturbance and nuisance to the community. GRM will address any related community grievances and complaints.

5.7.4. Community Health and Safety

During the O&M phase, the community and building occupants will potentially be exposed to safety risks associated with electrocution and injury from falling broken solar panels and other parts.

Significance of this impact has been assessed as High, as shown in **Table 5.4**.

Mitigation

The OM mentioned above will address this potential risk and include procedures and precautions for the safety of the communities/building occupants and also for maintaining liaison with the communities and building occupants and raising their awareness regarding these risks and ways and means to avoid them. The WBG's EHS Guidelines will be used to prepare the OM.

5.7.5. Workers Health and Safety

Much like the health and safety risks for the community, the O&M activities will pose OHS risks to the power plant workers.

Significance of this impact has been assessed as High, as shown in **Table 5.4**.

Mitigation

The OM mentioned above will also address the potential OHS risks and include standard operating procedures, presence of qualified and experienced OHS staff, requirements of regular staff trainings, required tools and equipment as well as personal protective equipment (PPE). The WBG's EHS Guidelines and Guidance Note on Managing the Risks of Adverse Impacts on Communities From Temporary Project Induced Labor Influx (please see **Section 3.3.13**) will be used to prepare the OM. These aspects will be further explained in the sub-project-specific ESMPs.

5.8. Mitigation Plan

The mitigation plan prepared on the basis of impact assessment presented above is given in **Table 5.5**. Similar mitigation plan will need to be included in each ESMP with site- and sub-project-specific mitigation measures.

Table 5.5: Mitigation Plan

	Impact of Various Activities	Mitigation and Enhancement Measure	Responsibility		Timing
			Implementation	Monitoring	
1.	Impact on natural vegetation and forests due to permanent clearing of land for establishing the grid-connected solar power plant	• Compensatory tree plantation (five saplings to be planted for each tree to be felled) will be carried out within the solar park of possible. • Landscaping and plantation will be carried out within the power plant area where possible (one possible location for this plantation is along the boundary wall of the power plant as well as around the entire solar park).	Contractor	PMU; M&E Consultants	Towards the end of construction phase
2.	Impact on wildlife habitats due to permanent clearing of land for establishing the grid-connected solar power plant	• The mitigation described above will address the impacts on wildlife and habitat as well. • High intensity lights will be avoided to the extent possible. Shaded lights will be used. • Additional site-specific mitigation measures may be included in the ESMP as needed.	ESMP Consultants	PMU	During ESMP preparation of sub-projects
3.	GHG emissions from site clearing and other construction activities, materials life cycle	• No mitigation is needed since the net GHG emissions are negligible when compared to other feasible options for power generation. In fact there is likely to be a net decrease in GHG emissions because of power generation from a non-fossil fuel source. • This aspect will be further assessed and quantified during the preparation of sub-project-specific ESMP	- ESMP Consultants	- PMU	- During ESMP preparation of sub-projects
4.	Additional load on rooftops of buildings	• As part of the construction design of the sub-projects involving rooftop power generation on government buildings and SHSs, each building and its structural integrity will be carefully investigated and assessed.	Design Consultants	PMU	During design phase (pre-construction)

	Impact of Various Activities	Mitigation and Enhancement Measure	Responsibility		Timing
			Implementation	Monitoring	
		• The construction design will ensure that the existing structure is capable of bearing additional load, is not damaged and its integrity is not compromised. • Any buildings for which this cannot be ensured will be excluded from the Project.			
5.	Damage caused by solar panels and their supporting structure if broken by windstorms	• While preparing the construction design, the maximum wind speed in the sub-project area will be considered. • The supporting structure will need to be designed adequately to avoid any damage during the wind storms.	Design Consultants	PMU	During design phase (pre-construction)
6.	Land acquisition	• The sub-project involving grid-connected solar power plant will only be located within the already acquired land. • For any future land acquisition under SSEP, a RAP or ARAP will need to be prepared (detailed criteria and procedures are discussed in RPF given later in the document)	PMU	-	During sub-project identification and selection stage
7.	Resettlement impacts on encroachers/squatters and other people who may lose livelihood	• Cash compensation will be paid to all encroachers/squatters and people who may lose their livelihood or may be impacted in any other way.[11] • The detailed social assessment of each sub-project will cover this aspect in detail.	PMU ESMP Consultant	- PMU	Before construction During design phase (pre-construction)

[11] For arable land: One rehabilitation allowance equal to market value of one gross harvest (in addition to crop compensation) for land use loss; and in case of for severe impacts (land loss more than 10 percent of land holding) one severe impact allowance equal to market value of gross harvest of the affected land for one year (inclusive of winter and summer crops and additional to standard crop compensation). For residential/commercial land: Accommodation in available alternate land/ or a self-relocation allowance equivalent to one month of official minimum wage.

	Impact of Various Activities	Mitigation and Enhancement Measure	Responsibility		Timing
			Implementation	Monitoring	
		• In case of minor impacts (such as crop damage, temporary occupying the land), the exact nature, quantum of impact, and associated compensation amounts will be included in the sub-project-specific ESMP. • In case of more significant resettlement impacts causing physical or economic displacement and losses, a separate RAP or ARAP will need to be prepared (detailed criteria and procedures are discussed in RPF given later in the document).			
8.	Permanent loss of roof space (particularly for the rural solar electrification sub-projects)	• The beneficiary community particularly the house owners will be advised to assess the cost and benefit of installing solar panels on their rooftops.	PMU	-	During design phase (pre-construction)
9.	Risk of soil pollution and soil erosion (from construction sites and construction camps)	• The Contractor will need to follow the ECoPs (**Annex D**); • Additional measures, particularly site-specific, will be included in the sub-project-specific ESMPs. • The contractor will be required to prepare a pollution prevention plan based upon the ESMP and ECoPs.	Contractor	PMU; M&E Consultants	During construction phase
10.	Risk of water pollution (from construction sites and construction camps)	• The Contractor will need to follow the ECoPs (**Annex D**); • Additional measures, particularly site-specific, will be included in the sub-project-specific ESMPs. • The contractor will be required to prepare a pollution prevention plan based upon the ESMP and ECoPs.	Contractor	PMU; M&E Consultants	During construction phase
11.	Dust and air pollution from construction activities	• The Contractor will need to follow the ECoPs; • Additional measures, particularly site-specific, will be included in the sub-project-specific ESMPs.	Contractor	PMU; M&E Consultants	During construction phase

	Impact of Various Activities	Mitigation and Enhancement Measure	Responsibility		Timing
			Implementation	Monitoring	
	(from construction sites and construction camps)	• The contractor will be required to prepare a pollution prevention plan based upon the ESMP and ECoPs. • GRM will be established at site			
12.	Noise and vibration from construction activities (grid connected solar power plant) (from construction sites and construction camps)	• The Contractor will need to follow the ECoPs (**Annex D**); • Additional measures, particularly site-specific, will be included in the sub-project-specific ESMPs. • The contractor will be required to prepare a pollution prevention plan based upon the ESMP and ECoPs. • GRM will be established at site	Contractor	PMU; M&E Consultants	During construction phase
13.	Noise and vibration from construction activities (rooftop solar power generation and rural electrification) (from construction sites and construction camps)	• The construction works to be schedules to avoid office working hours. • Work schedule to be prepared in consultation with the building occupants. • The Contractor will need to follow the ECoPs • GRM will be established at site.	Contractor	PMU; M&E Consultants	During construction phase
14.	Light pollution (from construction sites and construction camps)	• Shaded lights to be used where needed and appropriate • Flood lights to be avoided to the extent possible where needed and appropriate (without compromising the security concerns)	Contractor	PMU; M&E Consultants	During construction phase
15.	Generation of spoils (for grid-connected solar power plant)	• The contractor will be required to follow the ECoP and dispose the spoil material in a manner not to affect roads and accesses, local drainage, or other users of the solar park. • The entire sub-project area will need to be landscaped after the completion of construction works.	Contractor	PMU; M&E Consultants	During construction phase

	Impact of Various Activities	Mitigation and Enhancement Measure	Responsibility		Timing
			Implementation	Monitoring	
		• Additional site-specific measures will be included in the sub-project-specific ESMPs as needed. • The contractor will be required to prepare a spoil disposal and landscaping plan based upon the ESMP and ECoPs. • GRM will be established at site.			
16.	Generation of solid waste and hazardous waste (from construction sites and construction camps)	• The contractor will be required to follow the ECoP and dispose the solid waste in a manner not to contaminate soil or water, not to generate foul odor, and not to spread any vector-borne diseases. • The contractor will be required to prepare and implement a waste disposal plan based upon the ESMP and ECoPs. • GRM will be established at site.	Contractor	PMU; M&E Consultants	During construction phase
17.	Impacts on building roofs such as structural damage and water leakage into the building	• Appropriate construction design and methodology will be employed to ensure that the building, its roof, its water pipes, and its electric wiring are not damaged. • The contractor will be made responsible to repair any damaged caused by the construction activities. • Appropriate contract clauses will be included in the ESMPs. • GRM will be established at site.	Contractor	PMU; M&E Consultants	During construction phase
18.	Impact on wildlife (for grid-connected solar power plant)	• The contractor will be required to follow the ECoP for wildlife protection • Additional measures may be included in the ESMPs as needed and appropriate. • The contractor will be made responsible to implement the ECoP and ESMP; appropriate contract clauses will be included in the ESMPs.	Contractor	PMU; M&E Consultants	During construction phase

	Impact of Various Activities	Mitigation and Enhancement Measure	Responsibility		Timing
			Implementation	Monitoring	
19.	Inadequate site restoration (from construction sites and construction camps)	• The contractor will be required to restore the site completely, removing all debris, left-over construction material, scrap, spoils, and other wastes. • All ditches will be filled and landscaping will be carried out. • The contractor will implement the ECoP for this purpose. • The contractor will be made responsible to implement the ECoP and ESMP; appropriate contract clauses will be included in the ESMPs. • GRM will be established at site.	Contractor	PMU; M&E Consultants	During construction phase
20.	Employment opportunities for local communities	• The local communities will be given preference for these employment opportunities. • These employees must be treated equally and equitably according to the labor laws of the Country and Province. • GRM will be established at the site to address the community grievances and complaints in an effective and transparent manner.	Contractor	PMU; M&E Consultants	During construction phase
21.	Impacts on access roads and damages to local infrastructure/existing structures	• The contractor will ensure that local roads and routes are not blocked by the construction and related activities such as material transportation. • Similarly building accesses will also not be affected. • If unavoidable, alternate routes/access will be identified in consultation with the local communities/building occupants. • For the rooftop solar power generation, the construction works will be carried out after the	Contractor	PMU; M&E Consultants	During construction phase

	Impact of Various Activities	Mitigation and Enhancement Measure	Responsibility		Timing
			Implementation	Monitoring	
		office hours, in consultation with the building occupants/concerned department. • Damage to the infrastructure will be avoided to the extent possible. • The contractor will be contractually required to repair/restore all damaged infrastructure to the original or better condition. • The sub-project-specific ESMPs will include contractual clauses to facilitate this. • GRM will be established at the sites.			
22.	Community health and safety from construction traffic and activities	• The contractor will be required to prepare a community health and safety plan in accordance with the related ECoP and implement it during the construction phase. • Liaison with the community, building occupants and house dwellers will be maintained to inform them of the safety and health risks, about the measures taken by the contractors, and also about the precautions to be observed by them. • WBG's EHS Guidelines will be used. • GRM will be established at the sites	Contractor	PMU; M&E Consultants	During construction phase
23.	Workers health and safety	• The contractor will be required to prepare an OHS plan in accordance with the related ECoP and implement it during the construction phase. • The contractor will conduct OHS trainings on a regular basis. • The contractor will also employ trained and qualified personnel for OHS aspects. • WBG's EHS Guidelines and Guidance Note on Labor Influx will be used.	Contractor	PMU; M&E Consultants	During construction phase

	Impact of Various Activities	Mitigation and Enhancement Measure	Responsibility		Timing
			Implementation	Monitoring	
24.	Additional load on local resources	• The contractor will be required to obtain supplies including water, fuel, camp supplies, and others in a manner not to affect the local communities. • Particularly for obtaining water, the contractor will ensure that its water consumption does not affect the community and in case of a shared water source, an agreement with the community should be made. • The sub-project-specific ESMP will identify scarcity of key natural resources particularly drinking water in the area. • GRM will be established at the sites.	Contractor	PMU; M&E Consultants	During construction phase
25.	Social conflict and privacy of women	• The contractor will prepare and implement a Code of Conduct for all site personnel, in consultation and coordination with the local community. • All site personnel will be provided orientation and training on this Code of Conduct. • Awareness raising materials such as posters and signage will be used as appropriate. • Privacy of women will be respected; routes and places used by them will be avoided as far as possible. • Construction camps will be located at least 500 m away from the communities. • Entry of the site personnel in the local communities will be minimized to the extent possible/appropriate. • Liaison with the community will be maintained. • GRM will be established at sites.	Contractor	PMU; M&E Consultants	During construction phase
26.	Damage to sites/places of religious/cultural significance	• During the detailed field investigations for the preparation of sub-project-specific ESMPs,	ESMP Consultants	PMU	Pre- construction phase

	Impact of Various Activities	Mitigation and Enhancement Measure	Responsibility		Timing
			Implementation	Monitoring	
		presence or otherwise of any sites of archeological, religious, historical, or cultural significance at or adjacent to the sub-project sites will be reconfirmed. • If possible such sites will be avoided and excluded from the sub-project area. • If avoidance is not possible, a PCR management plan will need to be prepared and implemented, in accordance with the WB OP 4.11. • For the culturally protected buildings selected for rooftop solar power generation also, a PCR management plan will need to be prepared and implemented • Permission will be sought from the provincial government for carrying out the Project activities in such buildings.			
27.	Water requirements for cleaning the solar panels	• Options will be considered to avoid using water for the panel cleaning; cleaning with compressed air will be considered. • In case of water cleaning, recycling of water will be considered. • It will be ensured that water is obtained in a manner not to affect the existing water usage/users. • The actual method of cleaning finally selected for each sub-project will be mentioned in the respective ESMP.	Design Consultants O&M Staff ESMP Consultant	PMU PMU PMU	O&M Phase
28.	Improper disposal of broken/damaged solar panels, batteries, and supporting structure	• An Operational Manual (OM) will need to be prepared for each sub-project under SSEP. The OM will address among other aspects proper handling and disposal of broken/damaged parts and also batteries.	O&M Staff	PMU	O&M Phase

	Impact of Various Activities	Mitigation and Enhancement Measure	Responsibility		Timing
			Implementation	Monitoring	
29.	Community health and safety risks (electrocution)	• The OM will address this potential risk and include procedures for maintaining liaison with the communities and building occupants and raising their awareness regarding these risks and ways and means to avoid them. • WBG's EHS Guidelines will be used.	O&M Staff		O&M Phase
30.	Workers health and safety during maintenance	• The OM will address the potential OHS risks and include standard operating procedures, presence of qualified and experienced OHS staff, requirements of regular staff trainings, required tools and equipment as well as personal protective equipment (PPE). • WBG's EHS Guidelines will be used.	O&M Staff		O&M Phase

6. Resettlement Policy Framework

This Chapter presents the RPF that has been prepared for all SSEP sub-projects causing resettlement impacts. The exact nature and locations of these sub-projects are not decided yet hence the exact scope and scale of resettlement aspects cannot be determined either. Therefore sub-project-specific resettlement planning cannot be carried out nor can the associated RAPs or ARAP be prepared at this stage. Instead, the present RPF has been prepared that provides a framework to guide the preparation of future RAPs or ARAPs for SSEP sub-projects that can potentially cause resettlement impacts.

6.1. Basic Principles for Resettlement Planning

To meet the requirements of the WB's involuntary resettlement policy and guidelines, the following basic principles will be followed during the resettlement planning and implementation:

- Adverse impacts on PAPs would be avoided or minimized to the extent possible.
- Where the adverse impacts are unavoidable, the PAPs will be compensated.
- Vulnerable groups will be identified and assisted to improve their standard of living.
- The project will make cash compensation to the PAPs for their affected land, structures and other assets.
- The owners of affected structures, in addition to cash compensation for the structure on replacement cost will be allowed to salvage their building material. This applies to the owners including absentee owners of all categories of immovable structures.
- Before taking possession of the acquired land and properties, compensation/ assistance will be made in accordance with the Bank Policy.
- Appropriate GRM will be established at field and project level to ensure speedy resolution of disputes.
- All PAPs are eligible for compensation and livelihood/income restoration irrespective to possession of land title. A title would however be required for payment of compensation for land.
- All compensation will be paid at replacement value for assets without deducting depreciation and salvage value.
- All PAPs and stakeholders will be consulted to improve the design of the project, for preparation of the safeguards documents and over the life of the project.

6.2. Eligibility

The following persons would be eligible for compensation and/or resettlement assistance:

- All land owning affected persons losing land or non-land assets, whether covered by legal title or customary land rights, whether for temporary or permanent acquisition.

- Tenants and sharecroppers, whether registered or not, for all non-land assets, based on prevailing tenancy arrangements;
- Persons losing the use of structures and utilities, including titled and non-titled owners, registered, unregistered, tenants and lease holders plus encroachers and squatters.
- Persons losing business, income and salaries of workers, or a person or business suffering temporary effects, such as disturbance to land, crops, and business operations both permanently and also temporarily during construction;
- Loss of communal property, lands and public infrastructure;
- Vulnerable persons identified through the census/ impact assessment survey/ analysis;
- In case of relocation, all affected persons will receive transitional and other support to re-establish their livelihoods.

6.3. Entitlement for Compensation

To address the resettlement impacts, the present RPF has been prepared to be followed by sub-project-specific RAPs or ARAPs that will be prepared once specific details of the respective sub-projects are known. The RAPs/ARAPs will include the measures to ensure that the PAPs are:

- Informed about their options and rights pertaining to resettlement;
- Consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives;
- Provided prompt and effective compensation at full replacement cost[12] for losses of assets[13] attributable directly to the project.
- Provided assistance (such as moving allowances) during relocation;
- Provided with residential housing, or housing sites, or, as required, agricultural sites for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the old site.
- Offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living;[14]
- Provided with development assistance in addition to compensation, such as land preparation, credit facilities, training, or job opportunities.
- The entitlements given below are applicable for the PAPs losing land, structures, other assets, and incurring income losses. These displaced persons are eligible for rehabilitation subsidies and for the compensation of lost land, structures and

[12] "Replacement cost" is the method of valuation of assets that helps determine the amount sufficient to replace lost assets and cover transaction costs. See further details in Glossary of Terms.
[13] If the residual of the asset being taken is not economically viable, compensation and other resettlement assistance are provided as if the entire asset had been taken;
[14] Support may include short-term jobs, subsistence support/ allowances/ assistance.

utilities along with loss of livelihood. There will also be special provisions for vulnerable displaced persons.

6.3.1. Impacts on Agricultural Land (Permanent Losses)

- Legal/legalizable landowners (including who may have customary rights) are compensated either in cash at replacement cost plus a 15 percent compulsory acquisition surcharge (CAS) free of taxes and transfer costs;
- Leaseholders of public land will receive rehabilitation in cash equivalent to the market value of the gross yield of lost land for the remaining lease years (up to a maximum of three years).
- Encroachers will instead be rehabilitated for land use loss through a special self-relocation allowance equivalent to one year of agricultural income or through the provision of a free or leased replacement.

6.3.2. Impacts on Agricultural Land (Temporary land loss)

Legal/ legalizable owners and tenants or encroachers will receive cash compensation equal to the average market value of each lost harvest for the duration of the loss, and for the restoration of both, cultivable and uncultivable land, to pre-construction conditions. Through specification in the contract agreements contractors will be required to carry out restoration works before handling land back to the original occupiers, or PAPs will be provided with cash to rehabilitate the land.

6.3.3. Severely Displaced Persons

- Vulnerable households, legal/ legalizable owners, tenants or encroachers will be entitled to one vulnerable impact allowance equal to the market value of the harvest of the lost land for one year (summer and winter), in addition to the standard crop compensation.
- The aim of this payment is to assist severely displaced persons to overcome the short term adverse impacts of land and asset loss, and help them to readjust to their changed circumstances while they are making replacement earning arrangements. There will be a need to closely monitor such severely displaced persons. The one-time payment should, at the absolute minimum be adequate to provide them with equivalent level of livelihood than they had previously.
- Other options can be considered, including non-cash based livelihood support and employment, both temporary and permanent. Other additional income restoration measures can be considered based upon the findings of the Social Impact Analysis.

6.3.4. Residential and Commercial Land

- Residential and commercial land will be compensated at replacement value for each category of the PAPs.
- Residential and commercial land owners will be entitled to the following:
    - Legal/ legalizable owners will be compensated by means of either cash compensation for lost land at replacement cost based on the market value of the lost land plus a 15 percent CAS, free of taxes and transfer costs; or in the form of replacement land of comparable value and location as the lost asset.

- Renters are compensated by means of cash compensation equivalent to three months of rent or a value proportionate to the duration of the remaining lease, including any deposits they may lose.
- Encroachers/squatters are compensated through either a self-relocation allowance covering six months of income or the provision of a leased replacement plot in a public owned land area. They will be compensated for the loss of immovable assets, but not for the land that they occupy.

6.3.5. All Other Assets and Incomes

- Structures will be compensated in cash at replacement cost[15] plus 15 percent CAS. There will also be a 10 percent electrification allowance and any transaction costs will be paid. Materials that can be salvaged are allowed to be taken by the owner, even if compensation has been paid for them.
- Renters or leaseholders of a house or structure are entitled to cash compensation equivalent to three months' rent or a value proportionate to the duration of the remaining lease period.
- Crops will be compensated for owners, tenants and sharecroppers based on their agreed shares. The compensation will be the full market rate for one year of harvest including both rabi and kharif seasons.
- Fruit and other productive trees will be compensated based on rates sufficient to cover income replacement for the time needed to re-grow a tree to the productivity of the one lost. Trees used as sources of timber will be compensated for based on the market value of the wood production, having taken due consideration of the future potential value.
- Businesses will be compensated for with cash compensation equal to one year of income for permanent business losses. For temporary losses, cash compensation equal to the period of the interruption of business will be paid up to a maximum of six months or covering the period of income loss based on construction activity.
- Workers and employees will be compensated with cash for lost wages during the period of business interruption, up to a maximum of three months or for the period of disruption.
- Relocation assistance is to be paid for PAPs who are forced to move from their property. The level of the assistance is to be adequate to cover transport costs and also special livelihood expenses for at least one month or based on the severity of impact.
- Community structures and public utilities, including mosques and other religious sites, graveyards, schools, health centers, hospitals, roads, water supply and sewerage lines, will be fully replaced or rehabilitated to ensure their level of provision is, at a minimum, to the pre-project situation.

[15] For the definition of replacement cost, please see Glossary of Terms given in the beginning of the present document.

6.4. Entitlement Matrix

The compensation and rehabilitation entitlements are summarized in the Entitlement Matrix presented in **Table 6.1**. This will be carefully reviewed while preparing the sub-project-specific RAPs and revised as appropriate.

Table 6.1: Entitlement Matrix

Type of Loss	Specification	Affected Persons	Compensation Entitlements[16]
Temporary impacts on arable land (essentially for the construction phase of sub-projects, typically 3-4 months).	Access is not restricted and existing or current land use will remain unchanged	Farmers/ Titleholders	• No compensation for land provided that the land is rehabilitated/ restored to its former quality following completion of works; • Compensation, in cash, for all damaged crops and trees. • Compensation, in cash, for income loss if any for the duration of the temporary impacts.
		Leaseholders *(registered or not)*	• No compensation for land provided that the land is rehabilitated/ restored to its former quality following completion of works; • Compensation, in cash, for all damaged crops and trees. • Compensation, in cash, for income loss if any for the duration of the temporary impacts.
		Sharecroppers *(registered or not)*	• Compensation, in cash, for all damaged crops and trees. • Compensation, in cash, for income loss if any for the duration of the temporary impacts.
		Agricultural workers	• Cash indemnity corresponding to their salary (including portion in kind) for the period of temporary disturbance due to Project activities.
		Squatters	• Compensation, in cash, for all damaged crops and trees, where these are owned by the squatters. • Compensation, in cash, for income loss if any for the duration of the temporary impacts.

[16] Compensation for all assets will be paid to the owner of the asset.

Type of Loss	Specification	Affected Persons	Compensation Entitlements[16]
Permanent impacts on arable land where access is restricted and/or land use will be affected	All adverse effects on land use independent of severity of impact	Farmers/ Titleholders Landowners with customary rights	• Land for land compensation with plots of equal value and productivity to the plots lost; ensuring economic viability of the new land and also ensuring that the PAPs' livelihood is not negatively affected or; • Cash compensation plus 15% CAS for affected land at replacement cost based on market value free of taxes, registration, and transfer costs
		Leaseholders *(registered or not)*	• Renewal of lease contract in other plots of equal value/ productivity of plots lost, or • Cash equivalent to market value of gross yield of affected land for the remaining lease years (up to a maximum of 3 years).
		Sharecroppers *(registered or not)*	• Cash equivalent to market value of the lost harvest share once (temporary impact) or twice (permanent impact). • Provision of livelihood restoration support (i.e., inclusion in the Livelihood Restoration Plan).
		Agricultural workers losing their contract	• Cash indemnity corresponding to their salary (including portions in kind) for the remaining part of the agricultural year. • Provision of livelihood restoration support (i.e., inclusion in the Livelihood Restoration Plan).
		Squatters	• One rehabilitation allowance equal to market value of 1 gross harvest (in addition to crop compensation) for land use loss.
	Additional provisions for severe impacts (Land loss more than 10% of land holding)	Farmers/ Titleholders Leaseholders	• One severe impact allowance equal to market value of gross harvest of the affected land for 1 year (inclusive of winter and summer crop and additional to standard crop compensation).
		Sharecroppers	• One severe impact allowance equal to market value of share

Type of Loss	Specification	Affected Persons	Compensation Entitlements[16]
		(registered or not)	of harvest lost (additional to standard crop compensation)
		Squatters	• One severe impact allowance equal to market value of gross harvest of the affected land for 1 year (inclusive of winter and summer crops and additional to standard crop compensation)
Residential or Commercial Land		Titleholders/ People with customary rights	• Land for land compensation through provision of a plot comparable in value/ location to plot lost or • Cash compensation plus 15% CAS for affected land at full replacement cost free of taxes, registration, and transfer costs.
		Renters/ Leaseholders	• 3 months' rent or a value proportionate to the duration of the remaining lease, including any deposits they may lose.
		Squatters	• Accommodation in available alternate land/ or a self-relocation allowance equivalent to one month of official minimum wage.
Houses/ Structures	Full loss of structures; partial loss of structures; moving minor structure; kiosks and temporary structure	Owners	• Cash compensation at replacement rates for affected structure and other fixed assets free of salvageable materials, depreciation and transaction costs. • In case of partial permanent impacts full cash assistance to restore remaining structure, in addition to compensation at replacement cost for the affected part of the structure.
Houses/ Structures	Full loss of structures; partial loss of structures; moving minor structure; kiosks and temporary structure	Tenants	• Affected tenants will receive cash compensation of a value proportionate to the duration of the remaining lease period, or three months, whichever is higher.
Crops	Crops affected	All PAPs owning crops	• Crop compensation in cash at full market rate for one

Type of Loss	Specification	Affected Persons	Compensation Entitlements[16]
		(including squatters)	harvest (either winter or summer) by default for impacts caused by the Project activities. • All other crop losses will be compensated at market rates based on actual losses.
Trees	Trees affected	All PAPs owning trees (including squatters)	• For timber/ wood trees, the compensation will be at market value of tree's wood content. • Fruit trees: cash compensation based on lost production for the entire period needed to re-establish a tree of equal productivity.
Business/ Employment	Temporary or permanent loss of business or employment	All PAPs (including squatters, agriculture workers)	• Business owner: (i) Cash compensation equal to one year income, if loss is permanent; ii) in case of temporary loss, cash compensation equal to the period of the interruption of business up to a maximum of six months or covering the period of income loss based on construction activity. • Workers/ employees: Indemnity for lost wages for the period of business interruption up to a maximum of three months (to be calculated on the basis of Cost of Basic Needs (CBN), which is currently PKR 3,030 per person per month).
Relocation	Transport and transitional livelihood costs	All PAPs affected by relocation	• Provision of sufficient allowance to cover transport expenses and livelihood expenses for one month (to be calculated on the basis of CBN per person).
Community assets	Mosques, foot bridges, roads, schools, health center	Affected community	• Rehabilitation/ substitution of affected structures/ utilities (i.e., mosques, footbridges, roads, schools, health centers).
Vulnerable PAPs livelihood	Households below poverty line; female headed	All vulnerable PAPs	• Lump sum one time livelihood assistance allowance (to be calculated on the basis of CBN per person) on account of livelihood

Type of Loss	Specification	Affected Persons	Compensation Entitlements[16]
	households; disable persons.		restoration support. • Temporary or permanent employment during construction or operation, where ever feasible. • Provision of one time PKR. 15,000 moving assistance to cover transport expenses, where applicable.
Unidentified Losses	Unanticipated impacts	All PAPs	• Deal appropriately during Project implementation according to the WB OPs.

6.5. Calculation for Compensation Payments

Individual and household compensation will be made in kind and/or in cash (refer to **Table 6.2**). Although the type of compensation may be an individual's choice, compensation in kind will be preferred, if available, when the loss amounts to more than 20 percent of the total loss of assets. Compensations for land and other assets (buildings and structures) are determined as follows:

Table 6.2: Forms of Compensation

Compensation	Notes
Cash Payments	Compensation will be calculated and paid in the national currency. Rates will be based on the market value of land and/or assets when known, or estimated when not known, plus compensation for the value of standing crops.
In-Kind	Compensation may include items such as land, houses, and other buildings, building materials, seedlings, agricultural inputs and financial credits for equipment.
Assistance	Assistance may include moving allowance, transportation and labour.

Land will be valuated following a valuation process and the provisions of RPF. For land valuation, Land Valuation Committees (LVCs) will be formed comprising members from PMU, local administration, Jirga/PAPCs and Project NGO (if any) with a mandate to fix the rates based on market survey and negotiation with the communities.

6.6. Resettlement Planning Process

A separate RAP or ARAP will be prepared for each sub-project involving resettlement impacts and shall be based on the following principles:

- identify possibility of land acquisition and resettlement during screening of sub-projects;
- minimize resettlement through relocation/realignment of the project site, where possible;
- if resettlement is unavoidable, prepare a RAP or ARAP in line with WB OP 4.12;
- undertake meaningful consultation with PAPs;

- ensure PAPs are clearly identified including those with no formal rights;
- restore their livelihood;
- pay compensation in time before land is acquired,
- establish an accessible and culturally sensitive GRM at the sub-project level for handling complaints that may arise as a result of resettlement process; and
- disclose all relevant information.

The PMU may engage consultants for preparing these RAPs/ARAPs. The Project will also engage a third party for validation of RAP implementation.

6.6.1. Social Screening

Early screening will be carried out for every sub-project right after its identification. This will help to select sites where lands will be free from all encumbrances. Resettlement will be avoided or, where this is not possible, then minimized. If resettlement is likely to occur, a social impact assessment (SIA) survey will be conducted to assess the type and magnitude of resettlement impacts. A RAP/ARAP will be prepared based on the detailed design of the proposed sub-project by following the principle laid down in the present RPF. The RAP/ARAP with a detailed compensation and/or rehabilitation plan will be implemented before access to the land for civil works is allowed.

A rapid social and resettlement impacts screening exercise of indicative sub-projects will be conducted to identify possible adverse social impacts. Efforts will be made to avoid, minimize, and/or mitigate/compensate resettlement impacts and a screening mechanism will be laid down. This will allow the possibility to exclude certain activities/sub-projects if their environmental or social impacts are significant.

The involuntary resettlement screening checklist will be filled to examine the status of land acquisition, ownership, number of owners/ PAPs, land use category, magnitude of impact on the livelihood and type/ nature and magnitude of resettlement impacts. The involuntary resettlement screening checklist is provided in **Annex F** of this document.

Sub-project Category Classification Guidelines

Based on the screening data on the extent of likely impacts, the sub-project safeguard requirements will be categorized as follows:

- Significant impact – If as a result of the sub-project, 200 or more people may experience major impacts, that is, being physically moved from housing, or losing 10 percent or more of their productive (income-generating) assets, a full scale RAP will need to be prepared to commensurate the impacts;
- Non-significant impact – If as a result of the sub-project, less than 200 people will be physically displaced from housing or lose less than 10 percent of their productive (income-generating) assets, an ARAP will need to be prepared to commensurate the impacts;
- No impact– If the sub-project does not require permanent/or temporary land acquisition, and there are no impacts including the loss of land, structures, crops and trees, businesses or income (livelihood), RAP/ARAP will not be prepared. However, this category of sub-projects may include insignificant/temporary social

impacts which are generally mitigated as a part of construction activities in consultation with the PAPs.

Thus, any sub-project that may cause significant resettlement impacts (Category A) will require a comprehensive RAP, while in case of Category B sub-project, an ARAP will be required. In case of Category C sub-project, the temporary/ minor impacts are generally mitigated during the project implementation as a part the contractors' contract.

6.6.2. Cut-off Date

The cut-off date shall be set to prevent false claims for compensation or rehabilitation. Normally, this cut-off date is the date when the census begins. Compensation eligibility will be limited by a cut-off date for each sub-project on the day of the beginning of the census survey for the impact assessment in order to avoid an influx of outsiders. Each affected person will be identified and issued with an identification which confirms their presence on the proposed site of a sub-project prior to the cut-off date. The cut-off date will be announced through local means of communication including face-to-face communication with communities. Any persons who would settle/or build assets on encroached lands in the affected areas after the cut-off date will not be eligible for compensation.

6.6.3. RAP/ARAP Preparation

The RAP/ARAP preparation activities will be initiated as part of the preparation of each new sub-project involving resettlement impacts. The requirement will be to take the completed detailed design of proposed sub-project and carry out a measurement survey and enumeration. The ESMP Consultants will acquire map of the land from the Revenue Department and overlay sub-project detailed design with clear demarcation of government land, and also carryout demarcation on the ground in the presence of local community representatives in a transparent manner to avoid any confusion. After assessment of all impacts of a sub-project, a RAP or ARAP will be prepared to compensate/mitigate the identified impacts. Any unforeseen or additional impacts will be mitigated in the light of principles and procedures laid down in the present RPF. The RAP/ARAP preparation will entail the following steps:

- **Description of sub-project:** The following sub-project information/data would be needed to prepare sub-project-specific RAPs/ARAPs:
  - Objective of sub-project
  - Location of sub-project and detailed design with a clear demarcation of the project footprint.
  - Activities involved during implementation (e.g., construction)
  - Activities involved during operation and maintenance
  - Need of any land take (project component wise requirement of land covering both permanent and temporary acquisition)
  - Detailed GIS maps
  - Description of implementing agency
  - Implementation schedule
  - Manpower requirements.

- **Socioeconomic Survey:** A socio-economic survey of 25 percent project affected households (AHs) will be carried out to provide a detailed socio-economic profile of the population in the Project areas. The information gathered will focus on:
  - household composition and demography;
  - ethnicity, religion and language;
  - education;
  - livelihood patterns and income baseline;
  - land ownership patterns;
  - displaced persons income levels and expenditure patterns;
  - poverty levels of the area;
  - household possessions;
  - agriculture and cropping patterns (if agriculture is practiced in that area);
  - livestock;
  - housing;
  - gender analysis;
  - available social/public amenities;
  - cultural, religious and other structures;
  - migration;
  - credit availability and banking facilities;
  - specific impacts on the poor, women and other vulnerable groups
  - displaced persons' views on the sub-project and various resettlement and rehabilitation options.
  - Any legacy issues such as court cases and disputes pertaining to acquisition (or sale/purchase) of land for the industrial zones or existing connective transport infrastructure.
- The data will be gender disaggregated to identify specific gender related issues. The survey will be used to investigate the PAPs' socio-economic condition, identify the Project impacts on PAPs and to establish a benchmark for monitoring and evaluating the implementation of a sub-project's compensation and rehabilitation program.
- **Census Survey:** A census of all AHs will be undertaken based on the categorizations in the entitlement matrix. The Census will determine the exact number of AHs/PAPs and how they will be affected by the specific impacts of a sub-project. The Census will also identify all severely and vulnerable AHs.[17]
- **Impacts Assessment and Inventory:** This task will be based on a Detailed Measurement Survey (DMS) which identifies the nature and magnitude of loss. The survey will include all losses including encroached land (residential and agricultural), immovable structures, communal, public and cultural/religious

[17] For the definition of vulnerable AH, please see Glossary of Terms.

facilities, crops, trees and business incomes and wages. The impact assessment will also include a survey of compensation rates as detailed above and also the incomes of the AHs.

- **Gender Impacts, Social Inclusion and Mitigation Measures:** The RAP/ARAP will include measures ensuring that the socio-economic needs and priorities of women and other marginalized groups are identified, addressed and mitigated. The gender provisions will be incorporated to safeguard the specific needs and problems of women, displaced persons or other marginalized during sub-project implementation. The socio-economic data gathered will be gender-disaggregated. Gender roles will be analyzed and the needs, aspirations and priorities of women will be taken into consideration during consultation and preparing mitigation measures and reported in the RAP/ARAP. Female staff will be hired to collect data and assist women in consultations, resettlement options and activities where appropriate. Female household heads will be registered as the recipients of compensation and rehabilitation measures due to their households. Women and marginalized groups will be included in the consultation process through meetings and will be encouraged to participate in the RAP planning and implementation process. Due consideration will be given to complaints and grievances lodged by women and marginalized PAPs following the procedures outlined in this RPF.
- **Stakeholder Consultation:** Consultations will be carried out particularly with affected persons, beneficiaries and other key stakeholders during preparation and implementation of each RAP. The timing and nature of these consultations will vary depending upon the implementation program. Sub-project specific stakeholders will be identified through the initial SIA of each sub-project. Stakeholder consultations will be carried out during the preparation of the sub-project through community meetings, focus group discussions and interviews of key informants for their views and recommendations for the sub-project preparation and implementation. These recommendations will be included in RAP and with description of actions defined to address them.
- Specific consultations will be carried out with the PAPs of each sub-project to identify their needs and preferences for compensation and rehabilitation measures. In this regard the affected persons, including the displaced persons, will be thoroughly informed on the results of the census and impact assessment and their preferences for compensation and other resettlement assistance will be given due consideration. The processes and mechanisms ensuring the active involvement of PAPs and other stakeholders will be detailed in the RAPs, with the list of participants, the location, date and minutes of consultation meetings.
- To ensure involvement of resettlers and host communities, the sub-project-specific RAPs/ARAPs will need to include the following:
    - a description of the strategy for consultation with and participation of resettlers and hosts in the design and implementation of the resettlement activities;
    - a summary of the views expressed and how these views were taken into account in preparing the resettlement plan;
    - a review of the resettlement alternatives presented and the choices made by displaced persons regarding options available to them, including choices related to forms of compensation and resettlement assistance, to relocating

as individuals, families, or as parts of preexisting communities or kinship groups, to sustaining existing patterns of group organization, and to retaining access to cultural property (e.g. places of worship, pilgrimage centers, cemeteries); and

- institutionalized arrangements by which displaced people can communicate their concerns to project authorities throughout planning and implementation, and measures to ensure that such vulnerable groups as IP, ethnic minorities, the landless, and women are adequately represented.

- **Valuation of Assets.** Land if acquired for the Project will be valued at the replacement cost of land of approximately equal type and quality determined through replacement cost survey for the period of no more than one year preceding the cut-off date for the Project.
- Buildings and other structures will be valued based on precise measurement, quality and measurement of materials and will be calculated based on replacement cost (i.e., cost of new building materials and labor) with no depreciation for age and deduction for salvageable materials, sufficient to cover the cost of materials and labor.
- Crops will be valued at the current market rates for the net harvest actually lost. Trees will be compensated on the basis of their local market values to reflect replacement income. The cost of wood trees will be calculated based on the average volume of wood produced, quality of wood size classes, as determined by girth, diameter at breast height or volume. Fruit bearing trees will be compensated based on the compensation for loss of fruit trees at current market value depending on type and productive age of the fruits trees and market value of the produce for the time required to grow a tree of equivalent productive capacity.
- **Resettlement Entitlement and Policy Matrix:** An entitlement matrix consistent with the RPF will be developed. For the restoration of the living standards of the PAP, provision will be made so that people should be provided proper compensation and assistance to restore their livelihoods.
- **Implementation Arrangements:** For effective implementation, RAP/ARAP will describe the implementation arrangements. Identification of critical path actions, preparation of RAP implementation arrangements, compensation procedures and resettlement process will be described for an efficient and smooth implementation of RAP.
- **Preparation of Monitoring, Evaluation and Reporting Plan:** The mitigation measures are effective only if properly monitored. For this purpose, proper Monitoring, Evaluation and Reporting plan will be prepared.
- **GRM:** Under the GRM, RAP/ARAP will describe the options available to affected persons for grievance redressal they may have about the process, the identification of eligible people for compensation, the valuation and compensation and any other complaints they may have against the entire process. The GRM will be consistent with the provisions of RPF.
- **Cost Estimates:** The RAP/ARAP preparation and implementation costs, including cost of compensation, various eligible allowances, monitoring & evaluation, grievances redress and LAR administration, as well as contingencies, will be

estimated and included in the RAP/ARAP and will be considered an integral part of Project cost.

- Cost estimation will be made during preparation of RAP/ARAP. The RAPs/ARAPs will include a budget section indicating (i) unit compensation rates for all affected items and allowances, (ii) methodology followed for the computation of unit compensation rates, and (iii) a cost table for all compensation expenses including administrative costs and contingencies.
- **RAP/ARAP Compilation.** Subsequent to the tasks described above, RAP/ARAP will be compiled documenting the process and outcome of the resettlement assessment. The RAPs/ARAPs may need to be updated to take into account changes in the final designs or any unforeseen or additional impacts during the construction phase. The RAPs/ARAPs should be updated (i) on the completion of detailed engineering design but prior to the award of civil works contracts and (ii) during the sub-project civil works where design changes during construction result in changes to the resettlement impacts. Land will not be possessed until all amended RAPs/ARAPs or addendum to a RAP/ARAP get approved by the WB, payments made and PAPs vacate the land within the agreed notice period, mentioned in the RAP/ARAP of a sub-project. The RAPs/ARAPs will include a time bound program which is related to the date that the land is required for construction purposes. The RAP/ARAP will include an entitlement matrix spelling out the exact amount of compensation to be paid to each household against each type of eligibility and loss. RAPs/ARAP will also detail resettlement and rehabilitation strategy, their implementation and institutional arrangements, M&E requirements, documentation protocols, and a GRM. Each RAP/ARAP will also include details of the resettlement impacts, a livelihood restoration plan, estimates for compensation and assistance, list of PAPs with their respective resettlement impact and associated compensation. The structure of RAP/ARAP is provided in Annex G of this document.

All RAPs/ARAPs prepared for SSEP sub-projects will need to be cleared by the WB. The executive summary of each approved RAP/ARAP will be translated in Urdu and available for public review at suitable locations including project office, SED, offices of the concerned government department/agency. RAPs/ARAPs and Urdu translations of their executive summaries will be placed on the official websites of GoS and SED.

6.7. RAP/ARAP Implementation

The key details of RAP and ARAP implementation including institutional arrangements, monitoring, documentation and reporting, capacity building needs, and GRM are discussed in the next Chapter.

7. Implementation Arrangements

This Chapter presents the implementation arrangements for environmental, resettlement, and social assessment of the sub-projects under SSEP.

7.1. Institutional Arrangements

The Project will be implemented by the Sindh Energy Department (SED), . A PSC comprising of Additional Chief Secretary (ACS), the Secretary of Energy Department, Secretary of P&DD, and the Director, Alternative Energy Department will supervise the implementation of the Project activities.

PMU will be established within SED for the implementation of activities. The PMU will support the PSC. The PMU will be adequately staffed with competent professionals. In addition to the technical staff, each PMU will include an Environmental Specialist, a Social Development Specialist, a Contract Administration Specialist, and a Financial Management Specialist (please see ToRs of the environmental and social development specialists in **Annex H**). The PMU will be responsible for overall coordination, internal/external processing of all approvals including PC-I, procurement and implementation of civil works, preparation and implementation of ESMPs, procurement and management of consultant services, operating special account and financial management.

SED will engage a consulting firm (ESMP Consultants) to prepare and implement ESMPs and RAPs/ARAPs for individual sub-projects under SSEP. The ESMP Consultants, working under the supervision and monitoring of the Environmental and Social Development specialists, will ensure that all relevant agencies involved in the implementation of ESMP and RAPs/ARAPs are: (a) fully informed of ESMPs', RAPs'/ARAPs' and the WB Policy's requirements; and (b) ensure ESMP and RAP/ARAP implementation at field level by providing Province/District-level offices with the directions needed to ensure effective synergy and task coordination between PMU, and relevant District departments. The ESMP Consultants will maintain close liaison and coordination with PMU, and concerned Departments to ensure smooth preparation and implementation of ESMP. The ESMP Consultants will include specialists from various disciplines including EA/management, social development, resettlement, and communication/consultation.

SED will also engage monitoring and evaluation (M&E) Consultants to monitor the progress of various aspects of the Project including environmental and social issues during the project implementation and evaluate its impacts after its completion. The M&E Consultants will also monitor the implementation of ESMF, ESMPs, RAPs/ARAPs, and Checklists.

The contractors will be required to employ dedicated environmental and social development specialists as part of their field teams.

Additional institutional arrangements may be described in the sub-project-specific ESMPs and RAPs/ARAPs as appropriate and needed.

7.2. Environmental and Social Assessment of Sub-projects

This Section defines the need of detailed environmental and social assessment to be carried out for each sub-project under SSEP.

7.2.1. Reconnaissance Site Visit

As soon as a sub-project under SSEP is identified and its location and salient design features are known, the environmental and social specialists of the PMU and ESMP Consultants will carry out a reconnaissance site visit. The purpose of this visit will be to initiate the environmental and social assessment of the sub-project, to assess the baseline conditions of the area, to identify the key environmental resources and social features of the area, to identify any environmental and or social sensitivity of the area, to determine presence of any environmental and or social hotspots in the area, and to identify any potential environmental, social and or resettlement impacts of the sub-project. The Checklists given in **Annex F** will be filled for each sub-project based upon the findings and observations of the reconnaissance visit.

7.2.2. Environmental and Social Screening of Sub-projects

The next step would to screen each sub-project based upon the Checklist filled as described above and to categorize the sub-project. In general the criteria mentioned in **Table 7.1** will be followed to determine the category of sub-projects and level of screening/assessment required for environmental and social impacts.

Table 7.1: Screening Criteria for Environmental and Social Impacts

Category A Sub-projects (Full EIA Required)	Category B Sub-projects (IEE/ESMP Required; RAP/ARAP Required in case of Resettlement Impacts))	Category C Sub-projects (Mitigation Checklist Required)
Sub-projects: having significant irreversible and widespread impacts; OR involving significant degradation of forestry of sensitive natural habitat; OR requiring an EIA according to PEPA regulations	Sub-projects potentially causing low to moderate level of negative but reversible and localized impacts (such as grid connected solar power plants up to 50MW; rooftop solar power generation)	Sub-projects having only minor impacts (such as SHSs)

If the screening process concludes that the sub-project is likely to have significant and or irreversible negative environmental and or social impacts (Category A sub-project; see **Table 7.1**), the sub-project will be excluded from SSEP. If the screening process concludes that the sub-project is likely to have low to moderate level of negative impacts (Category B sub-project; see **Table 7.1**), an ESMP will be prepared prior to initiating the sub-project. In case the screening of the sub-project identifies any resettlement impacts, RAP or ARAP will be prepared for such sub-project prior to initiating its implementation, in accordance with the procedure discussed in **Chapter 6**. For all other sub-projects potentially causing low level of environmental and or social impacts, the only assessment required will be the screening carried out with the help of the checklists provided in **Annex F**.

7.2.3. Preparing ESMPs

For each sub-project potentially causing low to moderate level of negative impacts, an ESMP will need to be prepared as specified in **Section 7.2.2** above. Since a number of such ESMPs will be prepared under SSEP, SED may opt to engage consultants (ESMP Consultants) for this task. SED's environmental and social development specialists will supervise the ESMP Consultants during this task. The ESMP Consultants will be required to engage specialists from various disciplines including environment, social development, consultations, communications, and others. The key steps of ESMP preparation will include:

- review of the sub-project details,
- review of secondary literature including the present ESMF,
- scoping,
- detailed field data collection on key environmental and social parameters,
- impact assessment,
- stakeholder consultations, and
- ESMP compilation.

These steps are further defined in the ESMP ToRs given in **Annex I**.

7.2.4. Preparation of RAPs/ARAPs

Preparation of RAPs and ARAPs will be carried out as detailed in the RPF discussed in the previous Chapter.

7.2.5. Review of ESMPs, RAPs/ARAPs, and Checklists

The Checklists, RAPs/ARAPs, and ESMPs prepared for various sub-projects will be reviewed by the environmental and social development specialists of the Project. These documents will be shared with the WB also for their review and clearance.

7.2.6. Disclosure of ESMPs, RAPs/ARAPs, and Checklists

The approved ESMPs and RAPs/ARAPs for the Category B sub-projects and filled Checklists for Category C sub-projects will need to be disclosed as specified in **Section 3.3.11**. The approved ESMPs, RAPs/ARAPs, and Checklists will be placed on the official website of the GoS and SED. These documents will also be sent to the WB for disclosure.

7.3. Environmental, Social, and Resettlement Monitoring

The objective of monitoring of ESMF, ESMP, and RAP/ARAP implementation is to ensure that various elements and tasks specified in these documents are carried out as planned and to identify implementation problems and successes as early as possible so that the implementation arrangements can be adjusted if needed. For the proposed Project, two types of monitoring will be carried out: internal monitoring; and external monitoring. The internal monitoring is to be carried out by the Environmental and Social Development Specialists of PMU. The external/independent monitoring is to be carried out by the M&E Consultants to be hired by SED for the Project. The PMU will prepare the ToRs for the

M&E Consultants before ESMF implementation begins; these ToRs will be cleared by the Bank.

7.3.1. Internal Monitoring

Implementation of the present ESMF as well as preparation and implementation of each subsequent sub-project-specific ESMP and RAP/ARAP will be monitored along with the status of resolution of all complaints (with details) and also the consultation plan. Internal monitoring will be carried out routinely by the social and environmental specialists of PMU, with the help of Mitigation Plan given in **Table 7.2**. Results of internal monitoring will be compiled and shared with the PSC, PMU, and the Bank through monthly and quarterly progress reports (QPRs). Indicators for the internal monitoring will be those related to process, immediate outputs and results. Further details of monitoring needs will be included in the sub-project-specific ESMPs and RAPs/ARAPs.

7.3.2. External Monitoring

External monitoring will need to be carried out for the entire process of ESMF implementation as well as ESMP and RAP/ARAP preparation and implementation including impacts and outcome indicators; these indicators will be specified in ESMPs and RAPs/ARAPs. External monitoring will be initiated by the beginning of the first ESMP and RAP/ARAP preparation, and its results will be communicated to PMU and the Bank through quarterly and annual reports. If required by the PMU, monthly and six-monthly reports may also be produced. The external monitoring will be done through reviewing: i) the ESMF implementation and associated reports; ii) ESMP preparation process; iii) RAP/ARAP preparation process; iv) verifying the internal ESMP implementation reports of the PMU and ESMP Consultants; iv) verifying the internal RAP/ARAP implementation reports of the PMU and ESMP Consultants; v) interviewing a random sample of stakeholders including community members in the field; vi) observing the functioning of the ESMP and RAP/ARAP implementation at all levels to assess its effectiveness and compliance with the ESMPs, RAPs/ARAPs, and ESMF; and vii) checking the type of grievance issues and the functioning of the GRM. The M&E Consultants will advise PMU regarding possible improvements needed in preparation and implementation of the ESMPs and RAPs/ARAPs.

The M&E Consultants will also assess the status of sub-project affected vulnerable groups such as female headed households, disabled/elderly, and families below the poverty line and socially isolated. The M&E Consultants will consider indicators in M&E of sub-project ESMPs such as waste generation, air pollution, dust generation, noise generation, blocked accesses, employment opportunities for the local population, and grievance procedures. For RAP/ARAP implementation, the indicators will relate to aspects such as payment of compensation, livelihood restoration, complaints raised regarding compensation and associated issues, and outstanding complaints regarding compensation and associated issues.

The M&E Consultants will review the status of the ESMP and RAP/ARAP preparation and implementation in the light of the policy, principles, targets, budget and duration that had been laid down in the present ESMF. The key tasks during monitoring will include:

- Develop specific monitoring indicators for undertaking M&E for ESMP preparation and implementation including the implementation of mitigation plan, monitoring plan, capacity building plan, reporting and documentation, GRM

functioning and effectiveness, community participation, consultation, and disclosure;

- Develop specific monitoring indicators for undertaking M&E for RAP/ARAP preparation and implementation including the assessment of resettlement impacts, determination of compensation amounts for each PAP, monitoring plan, capacity building plan, reporting and documentation, GRM functioning and effectiveness, community participation, consultation, and disclosure;
- Review results of internal monitoring and verify reports through random checks in the field.
- Review and verify the progress of ESMP implementation and prepare semi-annual reports for the PMU.
- Review and verify the progress of RAP/ARAP implementation and prepare semi-annual reports for the PMU.
- Evaluate and assess the adequacy of the mitigation measures proposed in the mitigation plan given in ESMPs.
- Evaluate and assess the adequacy of the compensation amounts and other assistance provided to the PAPs detailed in sub-project-specific RAPs/ARAPs.
- Evaluate and assess the adequacy and effectiveness of the consultative process with the communities, particularly with PAPs, vulnerable stakeholders, including the adequacy and effectiveness of grievance procedures and legal redress available to the affected parties, and dissemination of information.
- Evaluate and assess the adequacy and effectiveness of GRM; its recording, reporting and processing time and its redressal;
- Evaluate and assess the adequacy and effectiveness of the institutional arrangements, PMU, and Project Consultants in ESMP and RAP/ARAP implementation;
- Assessment of the ESMF, ESMP, and RAP/ARAP implementation efficiency, effectiveness, impact and sustainability for drawing lessons for future environmental and social management.

7.4. Capacity Building

7.4.1. Assessment of the Current Capacity with GoS and SED

Various departments within the GoS have been implementing WB-funded projects for past several years; including the Sindh Water Sector Improvement Program, Sindh Disaster and Climate Resilience Enhancement Project, and Sindh Barrages Project. Many departments, such as the Irrigation Department, have in-house environmental and social management capacity. However, SED lacks this in-house capacity and it has no dedicated staff to manage environmental and or social aspects of its projects and other activities. In view of this deficiency, intensive capacity building activities have been proposed under SSEP.

7.4.2. Capacity Building under SSEP

Capacity building will be needed to ensure that the objectives and procedures, and roles and responsibilities of various entities pertaining to ESMF, ESMPs, and RAPs/ARAPs are

well understood across the board. To this end, trainings will be conducted for SED, PMU, consultants, and contractors. Mainly the ESMP Consultants will be responsible for this activity.

The trainings will cover various aspects of ESMF implementation and also ESMP and RAP/ARAP preparation and implementation, including national regulatory requirements, WB safeguard policies and requirements, roles and responsibilities of various entities involved in ESMP and RAP/ARAP implementation, monitoring, public consultation, documentation, and GRM.

The trainings will be provided to all staff of the relevant entities, including SED, PMU, ESMP Consultants, M&E Consultants, contractor, and others. Various training modules will need to be prepared catering the needs of each entity. Trainings will be an on-going activity and will be carried out regularly preferably at the SED office but also in the field. Contractors will be required to provide trainings on environmental, social, and OHS aspects to its staff and workers.

Most of the trainings will be conducted by the staff of the ESMP Consultants however some of the trainings can also be out sourced. Further details may be included in the sub-project-specific ESMPs and RAPs/ARAPs.

The capacity building plan for the environmental and social aspects of SSEP is presented below.

Table 7.2: Environmental and Social Trainings

Contents	Participants	Responsibility	Schedule
General environmental and socioeconomic awareness; Environmental and social sensitivity of the project area; Need of environmental and social assessment/management; Key ESMF aspects	Personnel of the SED; PMU	PMU	Prior to the start of the project activities. (To be repeated as needed.)
Key ESMF aspects ESMP preparation procedure RAP/ARAP preparation procedure	ESMP Consultants	PMU; ESMP Consultants	Prior to the start of the project activities. (To be repeated as needed.)
General environmental and socioeconomic awareness; Environmental and social sensitivity of the project area; ESMP implementation; RAP/ARAP implementation; Mitigation measures; Community issues and workers' code of conduct; Grievance Mechanism; Awareness of transmissible diseases Social and cultural values.	PMU; ESMP Consultants; M&E Consultants selected contractors' crew	ESMP Consultants	Prior to the start of the field activities. (To be repeated as needed.)
ESMP; Waste disposal; OHS GRM	Construction crew	Contractors	Prior to the start of the construction activities. (To be repeated as

Contents	Participants	Responsibility	Schedule
			needed.)
Road safety; Defensive driving/; Waste disposal; Cultural values and social sensitivity.	Drivers;	Contractors	Before and during the field operations. (To be repeated as needed.)
Camp operation; Waste disposal; OHS Natural resource conservation; Housekeeping.	Camp staff	Contractors	Before and during the field operations. (To be repeated as needed.)
Community Health and Safety	Community	ESMP Consultants	Before and during the field operations. (To be repeated as needed.)
Restoration requirements; Waste disposal.	Restoration teams	Contractors	Before the start of the restoration activities.

7.5. Grievance Redress Mechanism

A GRM will be established at the Project level to facilitate amicable and timely resolution of complaints and grievances of the stakeholders including local communities regarding the social, environmental, and resettlement aspects of the Project.

Under the GRM, Grievance Redress Committees (GRCs) will be formed comprising a PMU representative (preferably the Social Development Specialist), a representative of the contractor, and a community representative – a member of the local administration may also be included if deemed necessary/useful. Owing to the nature of the Project, a number of GRCs may be needed.

Under the GRM, community complaint registers will be maintained by the PMU and kept at various site offices. All complaints and grievances will be logged in these registers along with details including date of complaint, name and address of complainant, and description of complaint. The GRC will then fill additional details in the register including the corrective action needed, timeframe for corrective action to be taken, and person/project entity responsible for corrective action. Once the corrective action is implemented, the complainant will be informed and the GRC will document the associated details in the register including the description of action take, date of action completion, views of the complainant regarding the corrective action, and any residual grievance.

The GRM will be established and operated in a transparent and participatory manner. Complete details of the GRM including its procedures, actions planned, and action taken will be widely disseminated particularly among the local communities, the GRM registers will remain accessible to communities and other stakeholders, and complete information of the corrective actions taken in response to the grievances will be shared with the stakeholders particularly the complainant and related community.

The GRM will be gender responsive, culturally appropriate, and readily accessible to the stakeholders at no cost and without retribution. The step-wise process of the proposed GRM is summarized below.

Stage 1: When a grievance arises, the affected person may contact directly with the contractor/PMU/ESMP Consultants to resolve the issue of concern. If the issue is successfully resolved, no further follow-up is required.

Stage 2: If no solution can be found at Stage 1, the affected person(s) may submit an oral or written complaint to the GRC. The GRC will log the complaint along with relevant details in the community complaint register. The affected person(s) can also approach GRC without going through the Stage 1 described above. For each complaint, the GRC must investigate the complaint, assess its appropriateness/eligibility, and identify an appropriate solution. It will provide a clear response within five working days to the complainant, PMU and Contractor (where relevant). The GRC will, as appropriate, instruct the responsible entity to take corrective actions. The GRC will review the responsible entity's response and undertake additional monitoring as needed. During the complaint investigation, the GRC will work in close consultation with the Contractors, the ESMP Consultants, PMU, and other relevant agencies. The responsible entity should implement the redress solution and convey the outcome to the GRC within seven working days.

Stage 3: If no solution can be identified by the GRC or if the complainant is not satisfied with the suggested solution under Stage 2, the GRC will organize, within two weeks, a multi-stakeholder meeting under the auspices of the PMU, where all relevant stakeholders (i.e., the complainant, PMU, ESMP Consultants, contractor, and relevant local government offices) will be invited. The meeting should result in a solution acceptable to all, and identify responsibilities and an action plan. The agreed action thus determined should be implemented within seven working days (if additional time is needed to implement the corrective action, it should be discussed and decided during the meeting).

Stage 4: If the multi-stakeholder hearing process is not successful, the GRC will inform the PMU. The PD will then organize a special meeting to address the problem and identify a solution.

Stage 5: If the affected person/complainant is still not satisfied with the reply in Stage 4, he or she can pursue judicial proceedings. In such cases, the PMU will also inform the Bank Team of persistent problems and/or where solutions need to be found at higher levels of government.

Implementing the GRC's decision will be a contractual binding on the contractor.

7.6. Documentation and Reporting

The entire process of ESMF implementation as well as ESMP and RAP/ARAP preparation and implementation will need to be properly documented and reported. This will include consultations, surveys and data collection carried out during ESMP and RAP/ARAP preparation, ESMP and RAP/ARAP compilation, implementation of resettlement plan, mitigation plan, monitoring plan, training plan, consultation records, GRM record, and minutes of site meetings. The ESMP Consultants will prepare quarterly reports covering the implementation of the present ESMF as well as preparation and implementation progress of each ESMP and RAP/ARAP. Similarly, separate reports will be prepared for internal as well as external monitoring discussed earlier. The key reports to be prepared by the Project Consultants are listed in **Table 7.4**.

Table 7.3: Reporting Milestones and Timeline

Deliverables	Main Responsibility	Assisted by	Timeline
Inception report including detailed work plan	ESMP Consultants	-	Thirty days before mobilization
Monthly Progress Report (covering status of implementation of ESMF as well as preparation and implementation of ESMPs and RAPs/ARAPs; and GRM data)	ESMP Consultants	PMU	Second week of the subsequent month
QPR (covering status of implementation of ESMF as well as preparation and implementation of ESMPs and RAPs/ARAPs including monitoring reports, training reports, and GRM data)	ESMP Consultants	PMU	Second week of the subsequent quarter
Quarterly Internal Monitoring Report	PMU	-	Second week of the subsequent quarter
Six-monthly External Monitoring Report	M&E Consultants	PMU	Two weeks after completion of reporting period
Mid Term Review Report – ESMF, ESMP and RAP/ARAP implementation and corrective action plan.	ESMP Consultants	PMU	After nine months of mobilization
Project Completion: Evaluation report of ESMF, ESMP and RAP/ARAP implementation including recommendations for future projects.	ESMP Consultants	PMU	One month before contract closing.

7.7. Inclusion of Relevant Components of ESMP in Contract Documents

The ESMF and sub-project-ESMPs along with the ECoPs will be included in the contractors' bid documents. The technical specifications of the bid documents will clearly state that contractor will need to comply with the mitigation measures provided in ESMPs and ECoPs; WBG EHS General Guidelines; and NEQS.

7.7.1. BOQs in Bid Documents

The following items will be included in the bills of quantities (BOQs) of bid documents

- Preparation and implementation of Contractor's Environmental Action Plan in compliance with ESMPs, WBG EHS Guidelines and NEQS.
- Provision of an Environmental Officer and an OHS Officer (for five years)

After award of the contract and before mobilization, the Contractor will need to prepare 'Contractor's Environmental Action Plan' with site specific mitigation measures for approval by PMU.

The PMU will ensure the contractors and their subcontractors carry out their responsibility of implementing the mitigation measures, monitoring plan as well as other environmental and safety measures.

7.7.2. Payment Mile Stones

Payments to contractors would be linked to environmental performance, measured by completion of the prescribed environmental and social mitigation measures. Contractors would be required to join forces with the executing agency, PMU, supervising consultants and local population for the mitigation of adverse impacts of the Project. For effective implementation of the proposed mitigation and monitoring measures they will be required to employ trained and experienced environmental management staff. In addition, for any non-compliance causing damages or material harm to the natural environment, public or private property or resources, the contractor will be required to either remediate / rectify any such damages in a timeframe specified by and agreed with the engineer, or pay for the cost (as assessed by PMU) of contracting a third party to carry out the remediation work.

7.8. Budget and Financing

The cost of implementation of the present ESMF has been estimated to be **USD 1.32 million** as presented below; the costs of implementation of each ESMP are not known at this stage and hence these are not covered here. This will be covered under overall cost of the Project.

Table 7.4: Budget for Implementation of ESMF

	Description	Unit	Quantity	Unite Rate (USD)	Item Total (USD)
1.	Environmental and Social Development Specialists in PMU	Years	5	50,000	250,000
2.	ESMP Consultants engaged by PMU	Lump-sum	1		600,000
3.	Environmental and Social Development Specialists in M&E Consultants	Lump-sum	1		250,000
4.	Training programs	Lump-sum	1		100,000
5.	Contingency (10% of above)				120,000
6.	**Total**				**1,320,000**
7.	Implementation of ESMPs and RAPs/ARAPs	Not known at this stage.			

8. Consultation and Disclosure

This Chapter describes the process and outcomes of the initial consultations carried out with some stakeholders during preparation of the present ESMF. Also provided in this Chapter is a framework for the consultations to be carried out during Project implementation. Finally, disclosure requirements for the present ESMF and subsequent sub-project-specific ESMPs are described at the end of the Chapter.

8.1. Objectives of Consultations

Stakeholder consultations (or public consultation) during the environmental, resettlement, and social assessment process is an important element of project planning. It increases the authenticity and acceptability of the assessments, and can enhance the quality of decisions making as well. Stakeholder consultation/participation during various stages of developmental projects helps improve the decision making and ultimately leads towards sustainable development.

Stakeholder consultation is a two-way process. For stakeholders, the consultation process is an opportunity to obtain project information, to raise issues and concerns, and ask questions. For the project proponents, the consultation process offers opportunity to understand the stakeholders and their concerns about the project, their needs and aspirations, and also their suggestions that can potentially help shape the project. Listening to stakeholder concerns and feedback can be a valuable source of information that can improve project design and outcomes and help the project proponent to identify and control external risks. It can also form the basis for future collaboration and partnerships.

The national/provincial legislation and WB safeguard policies require consultations to be carried out particularly with the affected communities as part of the environmental and social assessment process. The consultations carried out while preparing the present ESMF and reported in this Chapter as well as those planned while preparing sub-project-specific ESMPs meet these requirements.

Specific objectives of the consultation process that has been initiated while preparing the present ESMF are listed below.

- developing and maintaining communication links between the project proponents and stakeholders,
- sharing of information with stakeholders on the proposed Project and sub-project activities and provide key project information to the stakeholders, and to solicit their views on the project and its potential or perceived impacts particularly resettlement impacts,
- understanding the stakeholders' concerns regarding various aspects of the project, including the existing situation, construction works and the potential impacts of the construction-related activities and operation of the sub-project;
- receiving feedback on environmental, resettlement, and social impacts and verifying their significance;
- ensuring that views and concerns of the stakeholders are incorporated into the project design and implementation as much as possible with the objectives of reducing or offsetting negative impacts and enhancing benefits of the proposed Project.

- managing expectations and misconceptions related to the project;
- obtaining local and indigenous knowledge about the people living in the nearby areas of project area;
- interaction with the project affected population and other stakeholders for the collection of primary and secondary data on people and their condition;
- engaging stakeholders for maximization of the project benefits.

8.2. Stakeholder Identification

Stakeholders are considered to be individuals or organizations which have an interest in the proposed Project or knowledge that would provide insight into issues or affect decision making related to the proposed Project.

On the basis of interest and role criteria there are two types of stakeholders for the proposed Project as described below.

8.2.1. Primary Stakeholders

The primary stakeholders (also called direct stakeholders) are the grass-root stakeholders, such as PAPs and general public including women residing in the Project area. These are the people who are directly exposed to the Project's impacts though in most cases they may not be receiving any direct benefit from the Project.

8.2.2. Secondary Stakeholders

The secondary stakeholders (also called institutional stakeholders) are the people, department, institutions, and/or organizations that may not be directly affected by the Project however they may influence the Project and its design. They include Project proponent (GoS and SED in case of the present Project), other concerned departments that may have a role during various phases of the Project, regulatory agencies such as EPA, other relevant departments such as Communication and Works Department, Revenue Department, NGOs, the broader interested communities including academia and journalists, and general public.

8.3. Consultation Process during Project Preparation

During the Project and ESMF preparation the GoS through SED organized a two-day consultative workshop in Karachi. A wide range of participants were invited in this workshop including various government departments and agencies, technical experts, communities, academia, and journalists. During the Workshop, various details of the proposed Project including its objectives and key elements were shared with the participants. A detailed question-answer session was held towards the end of the Workshop where the participants provided their comments, shared their concerns, and also offered recommendations.

8.4. Consultation and Participation during Project Implementation

The stakeholder consultation and engagement is an ongoing process and will continue throughout the Project's implementation. The ongoing consultation process could be scheduled on a regular basis with the stakeholders including but not limited to the

concerned government departments, local administration, and the community representatives from the proposed Project area.

The overarching goal of consultations and community engagement is to support and facilitate the Project and ESMF, ESMP, and RAP/ARAP implementation, to maintain friendly relationships with the communities, to reduce conflicts and Project opposition, to effectively address grievances, and to increase Project's acceptability. Stakeholder consultations and participation will take place during implementation through the following means:

- GRM at the community level
- Awareness campaign for all stakeholders,
- Informal consultations during sub-project implementation; and
- Formal interactions through periodic workshops, consultation sessions with wider stakeholders especially institutional ones such as other Government Departments and relevant NGOs.

Periodically, the PMU may also hold formal workshops to consult a wide range of stakeholders, communities, members of GRCs, relevant line departments, and NGOs on Project activities, ESMF, ESMP, and RAP/ARAP implementation, any outstanding issues, views and concerns of the communities, and ways and means to address them. Proceedings of these workshops will be recorded and widely disseminated and also included in the QPRs.

See **Table 8.1** for the consultations to be carried out during Project implementation.

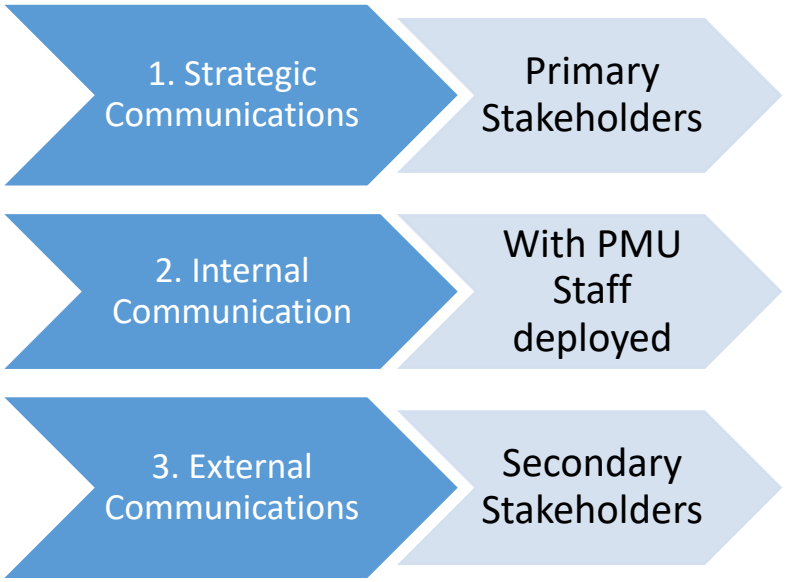
Table 8.1: Consultation and Participation Framework

Description	Target Stakeholders	Timing	Responsibility
• Stakeholder consultations as part of the preparation of each sub-project-specific ESMP and RAP/ARAP	• Primary stakeholders particularly communities • Secondary stakeholders	During preparation of each ESMP	ESMP Consultants
• Public awareness campaigns/ scoping sessions to share the ESMPs and RAPs/ARAPs with the PAPs, communities and other stakeholders. • Location: various places in project area	• Communities within sub-project area, general public; and line departments/ agencies.	Commencing with the preparation of first ESMP; to be continued thereafter	PMU/ ESMP Consultants
• Consultations with the communities during each ESMP and RAP/ARAP implementation • Location: various places in project area	• Communities at/around sub-project area	Before commencement of sub-project activities.	PMU and ESMP Consultants
• Establishment of GRM and GRCs • Location: various places in project area	• Communities at/around sub-project area	Before commencement of sub-project activities.	PMU and ESMP Consultants

Description	Target Stakeholders	Timing	Responsibility
• Grievance redress • Location: various places in project area	• PMU staff; consultants; relevant line departments; and communities (as needed).	Sub-project implementation Stage	PMU and ESMP Consultants
• Informal consultations and discussions. • Location: various places in project area	• Communities at/around sub-project area	Sub-project implementation Stage	PMU and ESMP Consultants; contractor
• Consultations with the communities during internal monitoring • Location: various places in project area	• Communities at/around sub-project area	Construction Stage	PMU and ESMP Consultants
• Fortnightly meetings at project sites • Location: Site offices	• PMU staff; consultants; and communities (as needed).	Construction Stage	PMU and ESMP Consultants
• Consultations with the Communities during the Independent Monitoring • Location: various places in project area	• Communities at/around sub-project area	Construction Stage	M&E Consultants
• Consultation workshops to review ESMF/ESMP and RAP/ARAP implementation, any outstanding issues and grievances, views and concerns of communities; and actions needed to address them. • Location: site offices within project area.	• Communities at/around sub-project area; relevant line department; relevant NGOs	Six-monthly during implementation phase	PMU and ESMP Consultants
• Consultations with the Communities relating to the leftover tasks • Location: various places in project area.	• Communities at/around sub-project area	After completion of sub-projects	PMU and ESMP Consultants
• Consultations with the communities during the site visits by the WB Review Missions. • Location: various places in project area.	• PMU; Communities at/around sub-project area	Construction/ Operation Stage	PMU; WB Mission

Overall communications framework will be a key pathway for consultations. The Project will use a three-pronged communications platform aimed at internal and external communications as shown in the **Figure 8.1** below.

Figure 8.1: Communications Framework and Levels of Engagement



8.5. Disclosure

The present ESMF will be disclosed through official websites of GoS and SED and will also be sent to WB for disclosure. The executive summary of ESMF will be translated in to Urdu and will be disclosed through the above-mentioned websites and will be made available to the affected communities. The Urdu version of the executive summary will be made available to the communities also within the Project area at site offices. Once the sub-project-specific ESMPs and RAPs/ARAPs are prepared and approved, they will be disclosed in a similar manner.

Annex A. Wildlife Protected Areas in Sindh

Protected Area Name	Area	Classification
Bijoro Chach	121 hectare (ha)	Wildlife Sanctuary
Cut Munarki Chach	405 ha	Wildlife Sanctuary
Deh Akro/Nara Canal	20,000 ha	Wildlife Sanctuary
Deh Jangisar	314 ha	Game Reserve
Deh Khalifa	429 ha	Game Reserve
Deh Sahib Saman	349 ha	Game Reserve
Dhoung Block	2,098 ha	Wildlife Sanctuary
Dograyon lake	648 ha	Wildlife Sanctuary
Dosu Forest	2,312 ha	Game Reserve
Drigh Lake	164 ha	Wildlife Sanctuary
Ghamot	27,283 ha	Game Reserve
Ghondak Dhoro	31 ha	Wildlife Sanctuary
Gullel Khon	40 ha	Wildlife Sanctuary
Gulsher Dhand	24 ha	Wildlife Sanctuary
Hab Dam	27,219 ha	Wildlife Sanctuary
Hadero lake	1,321 ha	Wildlife Sanctuary
Hala	954 ha	Game Reserve
Haleji Lake	1,704 ha	Wildlife Sanctuary
Hawks Bay/Sandspit Beaches	324 ha	Wildlife Sanctuary
Hilaya	324 ha	Wildlife Sanctuary
Indus River	44,200 ha	Game Reserve
Keti Bunder South	8,948 ha	Wildlife Sanctuary
Keti Bunder North	23,040 ha	Wildlife Sanctuary
Khadi	81 ha	Wildlife Sanctuary
Khairpur Game Reserve	Not Recorded	Unclassified
Khanpur	Not Recorded	Unclassified
Khat Dhoro	11 ha	Wildlife Sanctuary
Khipro	3,885 ha	Game Reserve
Kinjhar (Kain) Lake	13,468 ha	Wildlife Sanctuary
Kirthar	308,733 ha	National Park
Kot dinghano	30 ha	Wildlife Sanctuary
Lakht	101 ha	Wildlife Sanctuary
Langh (lungh) Lake	19 ha	Wildlife Sanctuary
Mahal Kohistan	70,577 ha	Wildlife Sanctuary
Mejiran	24 ha	Wildlife Sanctuary
Mando Dero	1,234 ha	Game Reserve
Marho kohn	162 ha	Wildlife Sanctuary
Miani Dhand	57 ha	Wildlife Sanctuary
Mirpur Sakro	777 ha	Game Reserve
Mubahat Dero	16 ha	Wildlife Sanctuary
Munarki	12 ha	Wildlife Sanctuary
Nara	109,966 ha	Game Reserve
Nara Desert	223,590 ha	Wildlife Sanctuary
Norang	243 ha	Wildlife Sanctuary
Pai	1,969 ha	Game Reserve

Protected Area Name	Area	Classification
Pir Mahfooz Game Reserve	Not Recorded	Unclassified
Pir Pagara Game Reserve	Not Recorded	Unclassified
Runn of Kutch	320,463 ha	Wildlife Sanctuary
Sadnani	84 ha	Wildlife Sanctuary
Samno Dhand	23 ha	Wildlife Sanctuary
Shah Lanko	61 ha	Wildlife Sanctuary
Surjan, Sumbak, Eri & Hothiano	40,632 ha	Game Reserve
Takkar	43,513 ha	Wildlife Sanctuary
Tando Matha Khan	5,343 ha	Game Reserve

Source: Guidelines for Sensitive and Critical Areas. Government of Pakistan, 1997.

Annex B. Archeological Sites in Sindh

	Description	Location
1	Ruins of old city.	Badin
2	Tomb of Yar Muhammad Khan Kalhora and its adjoining Masjid near Khudabad.	Dadu
3	Jami Masjid, Khudabad.	Dadu
4	Rani Fort.	Dadu
5	Amri Mounds.	Dadu
6	Lakhomir-ji-Mari, Deh Nang opposite Police outpost, Sehwan.	Dadu
7	Damb Buthi, Deh Narpirar at the source of the pirari (spring), south of Jhangara, Sehwan, Dadu.	Dadu
8	Piyaroli Mari, Deh Shouk near pir Gaji Shah, Johi, Dadu.	Dadu
9	Ali Murad village mounds, Deh Bahlil Shah, Johi, Dadu.	Dadu
10	Nasumji Buthi, Deh Karchat Mahal, Kohistan, Dadu.	Dadu
11	Kohtrass Buthi, Deh Karchat about 8 miles south-west of village of Karchat on road from Thana Bula Khan to Taung, Dadu.	Dadu
12	Othamjo Buthi Deh Karchat or river Baran on the way from the Arabjo Thano to Wahi village north-west of Bachani sandhi, Mahal, Kohistan.	Dadu
13	Lohamjodaro, Deh Palha at a distance of 30 chains from Railway Station but not within railway limits, Dadu.	Dadu
14	Pandhi Wahi village mounds, Deh Wahi, Johi, Dadu.	Dadu
15	Sehwan Fort, Sehwan, Dadu.	Dadu
16	Ancient Mound, Deh Wahi Pandhi, Johi, Dadu.	Dadu
17	Ancient Mound, Deh Wahi Pandhi, Johi, Dadu.	Dadu
18	Tomb of Ghulam Shah Kalhora, Hyderabad.	Hyderabad
19	Boundary Wall of Pucca Fort, Hyderabad.	Hyderabad
20	Old office of Mirs, Hyderabad Fort, Hyderabad.	Hyderabad
21	Tajar (Treasury) of Mirs, Hyderabad Fort, Hyderabad.	Hyderabad
22	Tomb of Ghulam Nabi Khan Kalhora, Hyderabad.	Hyderabad
23	Buddhist Stupa, (Guja) a few miles from Tando Muhammad Khan.	Hyderabad
24	Haram of Talpur Mirs, Hyderabad.	Hyderabad
25	Enclosure containing Tombs of Talpur Mirs, Hyderabad.	Hyderabad
26	Tower (Now used as water tank), Hyderabad Fort, Hyderabad.	Hyderabad
27	Two Mosques and a Tomb, Tando Fazal, Hyderabad.	Hyderabad
28	Tomb of Sarfaraz Khan Kalhora, Hyderabad.	Hyderabad
29	Nasar-ji- Mosque, Mohalla Jhambhas, Nasarpur, Hyderabad.	Hyderabad
30	Kiraiji Masjid, Mohalla Misri, Nasarpur, Hyderabad.	Hyderabad
31	Mai Khairiji Masjid, Mohalla Memon, Hyderabad.	Hyderabad
32	Mosque of Mirs, Hyderabad, ward “E”, Hyderabad.	Hyderabad
33	Enclosure containing Tombs of Talpur Mirs, Hyderabad.	Hyderabad
34	Wazir Mansion, birthplace of Quaid-e-Azam Muhammad Ali Jinnah, Karachi new Naham Road, Bundar quarters, Kharadar.	Karachi
35	Chaukhandi Tombs, near Landhi on National Highway, Karachi.	Karachi
36	Lakho Shaikh (Baluch) Graveyard, Kharkhro, Karachi.	Karachi
37	Khaliq Dina Hall and Library, M.A. Jinnah Road, Karachi.	Karachi
38	Jam Bijar Fort (or Banbhore), Mirpur Sakro, Karachi.	Karachi
39	Frere Hall, Karachi.	Karachi
40	Flag Staff House (Quaid-e- Azam House Museum), Karachi.	Karachi
41	Mausoleum of the Quaid-e-Azam Muhammad Ali Jinnah, Karachi.	Karachi
42	Diji ki Takri mound, remains of earliest fortified town, Deh Ghaunro near Kot Diji Fort. Khairpur.	Khairpur
43	Fort at Kot Diji, Kot Diji, Khairpur.	Khairpur
44	Maro Waro Dhoro mound situated on sand hill, Deh Naro Dhoro 2 miles east of Tando Masti Khan, Khairpur.	Khairpur
45	Jhukar mound, Mithadaro, Larkana.	Larkana

	Description	Location
46	Moenjodaro, Buddhist monastery and prehistoric remains around Moenjodaro, Larkana.	Larkana
47	Moenjodaro, Buddhist Stupa and prehistoric remains underneath, Moenjodaro, Larkana.	Larkana
48	Tajjar Building, Jinnah Bagh, Larkana.	Larkana
49	Tomb of Shah Baharo, Larkana.	Larkana
50	Square Tower, near Dhamrao, Larkana.	Larkana
51	Dhamrao Dero (three groups), Deh Dhamrao, Deh 67 Nasrat.	Larkana
52	Buddhist Stupa, Village Mir Rukan, Nawabshah.	Nawabshah
53	Tomb of Nur Muhammad Kalhora, Deh of Village Nur Muhammad, 17 miles from Daulatpur, Nawabshah.	Nawabshah
54	Qubbo Mir Shahadad, Shahpur, Nawabshah.	Nawabshah
55	Bhiro Bham Mound, Tepa Chibore, Nawabshah.	Nawabshah
56	Brahmanabad (Mansura) locally known as Dalo Raja-ji-Nagri, Jamara, Tehsil Sinjhoro. Deh Dalore, Sanghar.	Sanghar
57	Mound Thulh, Deh Kot Bujar, Sanghar.	Sanghar
58	Graveyard, Tehsil Shahdadpur, Sanghar.	Sanghar
59	Mir Masum's Minar and tomb, Sukkur.	Sukkur
60	Satyan-jo-than, Rohri, Sukkur.	Sukkur
61	Bakkar Fort entire area including the walls and tombs of Hazrat Sadruddin Muhammad (occupied by the Army), between Lands down and Sukkur bridges, Sukkur.	Sukkur
62	Mumalji Mari, mound, Taluka Ghotki, Deh Mathelo, Sukkur.	Sukkur
63	Stone Tool Factory area Rohri, Sukkur.	Sukkur
64	Birth place of Akbar the Great (Small Building 9' x 9') near the town of Umerkot, Tharparkar.	Tharparkar
65	Buddhist Stupa (Kahujodaro), Mirpurkhas, Tharparkar.	Tharparkar
66	A stone mosque with white marble pillars, Bhodesar, Tharparkar.	Tharparkar
67	Temple-I, Bhodesar, Tharparkar.	Tharparkar
68	Temple-II, Bhodesar, Tharparkar.	Tharparkar
69	Fort Naokot, Tharparkar.	Tharparkar
70	Fort Umerkot, Tharparkar.	Tharparkar
71	Gori Temple, 14 miles north-west of Virawah, Tharparkar.	Tharparkar
72	Temple-IV, Bhodesar, Tharparkar.	Tharparkar
73	Mound at Bhiro, Sherwah, Tharparkar.	Tharparkar
74	Mound at Shadi Pali, Deh Khuda Bux, Tharparkar.	Tharparkar
75	Jain Temple, Virawah, Tharparkar.	Tharparkar
76	Brick Tomb of Arzi Khokhar, Ghitori, Goth, Deh No. 24.	Tharparkar
77	Tomb of Mir Khan s/o Karam Khan Talpur, Ghitori Goth, Deh 24	Tharparkar
78	Tomb of Mir Jado, Ghitori Goth, Deh No. 24, Tharparkar.	Tharparkar
79	Tomb of Mir Murad Khan, Ghitori Goth, Deh No. 24.	Tharparkar
80	Tomb of Musa Khan, Ghitori Goth, Deh No. 24, Tharparkar.	Tharparkar
81	Tomb of Mir Raio, Ghitori Goth, Deh No. 24, Tharparkar.	Tharparkar
82	Tomb of Shaheed Kapri Baloch, Ghitori Goth, Deh No. 24.	Tharparkar
83	A tomb (name not known) north-west of Shaheed Kapri Baluch, Ghitori Goth, Deh No. 24, Tharparkar.	Tharparkar
84	Tomb of bricks, (name not known), Ghitori Goth, Deh No. 24.	Tharparkar
85	Stone tomb west of S. No. 82 above (name not known), Ghitori Goth, Deh No. 24, Tharparkar.	Tharparkar
86	Tombs of Mir Fateh Khan and Mir Mirza Khan, Ghitori Goth, Deh 24.	Tharparkar
87	Tomb of ladies of Mir dynasty, Ghitori Goth, Deh No. 24.	Tharparkar
88	Tomb of ladies of Mir dynasty, Ghitori Goth, Deh No. 24.	Tharparkar
89	Tomb of Aulia Pir Ghitori Badshah Qureshi, Ghitori Goth, Deh No. 24.	Tharparkar
90	Tomb and a Mosque, Ghitori Goth, Deh No. 24, Tharparkar.	Tharparkar
91	Old ruined Mosque, Ghitori Goth, Deh No. 24, Tharparkar.	Tharparkar
92	Brick dome to the north-east of tomb of Mubarak Khan (tomb of Fateh Khan's sister), Makli Hill, Thatta.	Thatta

	Description	Location
93	Tomb of Mubarak Khan son of Jam Nizamuddin, Makli Hill.	Thatta
94	Tomb and compound wall of yellow stone to the south of Jam Nizamuddin, Makli Hill, Thatta.	Thatta
95	Tomb and enclosure to the south-west of S. No. 92. Makli Hill.	Thatta
96	Tomb and enclosure to the west of the above tomb S. No. 93, Makli Hill.	Thatta
97	Brick dome to the south of the tomb S. No 94, above Makli Hill.	Thatta
98	Sultan Ibrahim and other tombs also but wrongly known a Amir Khalil Khan's tomb, Makli Hill, Thatta.	Thatta
99	Tomb and compound wall of yellow stone to the south of Mirza Muhammad Baqi Tarkhan tomb (wrongly called Mirza Isa Khan's tomb), Makli Hill, Thatta.	Thatta
100	Brick enclosure of Mirza Baqi Baig Uzbak's tomb, south of the tomb of Nawab Isa Khan the younger, Makli Hill, Thatta.	Thatta
101	Dabgir Masjid, Makli Hill, Thatta.	Thatta
102	Graveyard, Makli Hill, Thatta.	Thatta
103	Goth Raja Malik graveyard known as Maqam Qadar Shah, Deh Raja Malik, Thatta.	Thatta
104	Sonda graveyard, village Sonda, Thatta.	Thatta
105	Jam Nizmuddin's tomb, Makli Hill, Thatta.	Thatta
106	Baradari, Makli Hill, Thatta.	Thatta
107	Tomb of Amir Sultan Muhammad son of Amir Hajika, Makli hill.	Thatta
108	Tomb of Nawab Isa Khan, the younger Makli Hill, Thatta.	Thatta
109	Mirza Tughral Baig's tomb, Makli Hill, Thatta.	Thatta
110	Tomb of Mirza Jani and Mirza Ghazi Baig, Makli Hill, Thatta.	Thatta
111	Stone enclosure containing tombs of Nawab Isa Khan, Makli Hill.	Thatta
112	Mirza Muhammad Baqi Tarkhan's tomb (wrongly called Mirza Isa Khan's tomb) Makli Hill, Thatta.	Thatta
113	Stone tomb with a dome on stone pillars by the side Mirza Jani Baig's tomb, Makli Hill Thatta.	Thatta
114	Brick masjid and enclosure near Nawab Shurfa Khan's tomb (supposed to be the tomb of Sayyed Amir Khan), Makli Hill.	Thatta
115	Stone tomb with enclosure to the south of tomb of Mirza Muhammad Baqi Tarkhan, Makli Hill, Thatta.	Thatta
116	Tomb of Mirza Muhammad Isa Turkhan I, Makli Hill, Thatta.	Thatta
117	Brick tomb near the tomb of Qulia pir, Makli Hill, Thatta.	Thatta
118	Tomb with superstructure on stone pillars to the north of tomb of Jam Nizamuddin, Makli Hill, Thatta.	Thatta
119	Brick structure to the north of tomb of Jam Nizamuddin, Makli Hill.	Thatta
120	Two pavilions on stone pillars over the tombs to the southwest of tomb of Jam Nizamuddin. One is the tomb of Jam Sikandar Shah, Makli Hill.	Thatta
121	Kalan Kot, Makli Hill, Thatta.	Thatta
122	Nawab Amir Khan's mosque, Makli Hill, Thatta.	Thatta
123	Building with two domes near the Civil Hospital, Thatta, Makli Hill.	Thatta
124	Jama Masjid, Makli Hill, Thatta.	Thatta
125	Sasian-Jo-Takar (Mirpur Sakro), Thatta.	Thatta
126	Jama Masjid, Thatta.	Thatta
	National Monuments	Karachi
127	Mausoleum of the Quaid-e-Azam Muhammad Ali Jinnah.	Karachi
128	Wazir Mansion, Quaid-e-Azam's birth place, Karachi.	Karachi
129	Khaliq Dina Public Hal and Library, Karachi.	Karachi
130	Flag Staff House (Quaid-e-Azam House Museum), Karachi.	Karachi
	World heritage monuments on UNESCO list.	
131	Mohenjodaro.	Larkana
132	Makli Hill.	Thatta
	Buildings declared as "Protected Heritage" by the GoS (Under the Sindh Cultural Heritage (Preservation) Act of 1994)	
133	Shrine of Shah Abdul Latif Bhitai, Bhitshah, Hyderabad.	Hyderabad
134	Mukhi Mahal, Fort Incline, Hyderabad.	Hyderabad

	Description	Location
135	Besent Lodge, near Post Office, Saddar, Hyderabad.	Hyderabad
136	Holmsteal Hall, Fort, Hyderabad.	Hyderabad
137	Hyderabad Fort, Hyderabad.	Hyderabad
138	Victoria Mansion, Abdullah Haroon (Victoria) Road, Karachi.	Karachi
139	Jahangir Kothari Mansion, Abdullah Haroon (Victoria) Road, Karachi.	Karachi
140	Krishna Mansion, Inverarity Road, Karachi.	Karachi
141	Lotia & Partners Building, Zaibunnisa (Elphinstone Street/Inverarity Road, Karachi.	Karachi
142	Excelsior Hotel, Zaibunnisa (Elphinstone) Street, Karachi.	Karachi
143	Ekanic Building, Zaibunnisa (Elphinstone) Street, Karachi.	Karachi
144	Speechly Building, Zaibunnisa (Elphinstone) Street, Karachi.	Karachi
145	Service Building, Zaibunnisa (Elphinstone) Street, Karachi.	Karachi
146	Allah Rakhi Begum Building, Zaibunnisa (Elphinstone) Street, Karachi.	Karachi
147	Nusserwanjee Building, Zaibunnisa (Elphinstone) Street, Karachi.	Karachi
148	Hashim Chambers Building, Zaibunnisa (Elphinstone) Street, Karachi.	Karachi
149	Suleman Umber Building, Zaibunnisa (Elphinstone) Street, Karachi.	Karachi
150	Victoria Furnishing Mart, Zaibunnisa (Elphinstone) Street/Dundas Street, Karachi.	Karachi
151	Old Ilaco House, Zaibunnisa (Elphinstone) Street, Karachi.	Karachi
152	Mohammad Ali Building, Zaibunnisa (Elphinstone) Street.	Karachi
153	Fazal Manzil, Parr Street Opp Zaibunnisa (Elphinstone) Street, Karachi.	Karachi
154	Hasan Ali Building, Zaibunnisa (Elphinstone) Street/Shahrah-e-Iraq (Clarke Street), Karachi.	Karachi
155	Karim Mansion, Shahrah-e-Iraq (Clarke Street), Karachi.	Karachi
156	Sir Jahangir Kothari Building, Raja Ghazanfar Ali Road (Somerset Street) / Shahrah-e- Iraq (Clarke Street), Karachi.	Karachi
157	Nabi Manzil, Woodburn Street/Stalker Street, Karachi.	Karachi
158	Rangoonwala Building, Zaibunnisa (Elphinstone) Street/Woodburn Street, Karachi.	Karachi
159	Muljee Building, Zaibunnisa (Elpinstone) Street, Karachi.	Karachi
160	Rainbow House Building, Zaibunnisa (Elpinstone) Street/Albert Street.	Karachi
161	Kanji Wasti Building, Albert Street off Zaibunnisa (Elpinstone) Street.	Karachi
162	Emes Building, Zaibunnisa (Elphinstone) Street, Karachi.	Karachi
163	Abu Building, Zaibunnisa Street, Karachi.	Karachi
164	Sunderji Hameji Building, Albert Street/Stalker Street, Karachi.	Karachi
165	Abubakaer Building, Albert Street off Zaibunnisa Street, Karachi.	Karachi
166	Haji Yunus Building, Lane off Bohra Street, Karachi.	Karachi
167	Kanji Kara Building, Bohra Street off Raja Ghazanfar Ali Road.	Karachi
168	Salamwala Building, Bohra Street off Raja Ghazanfar Ali Road (Somerset Street), Karachi.	Karachi
169	Gopaldas Building, Raja Ghazanfar Ali Road (Somerset Street)/Albert Street, Karachi.	Karachi
170	Abdul Aziz Building, Raja Ghazanfar Ali Road (Somerset Street)/Albert Street, Karachi.	Karachi
171	Haji Abu Trust Building, Raja Ghazanfar Ali Road (Somerset Street).	Karachi
172	Saleh M. Sttar Manzil, Building, Raja Ghazanfar Ali Road (Somerset Street)/Woodburn Street, Karachi.	Karachi
173	United Bank Building, Raja Ghazanfar Ali Road (Somerset Street).	Karachi
174	Habib Bank Building, Raja Ghazanfar Ali Road (Somerset Street) Woodburn Street, Karachi.	Karachi
175	Shirin Karimbai Jivaji Building, Raja Ghazanfar Ali Road (Somerset Street/Woodburn Street, Karachi.	Karachi
176	Khadija Bai Building, Bohra Street/Furquharson Street, Karachi.	Karachi
177	Tahirali Asgharali Ghatila Building, Bohra Street/Furquharson Street.	Karachi
178	A. Mossajee Manzil, Raja Ghazanfar Ali Road, Somerset Street Bohra Street, Karachi.	Karachi
179	Khyber Hotel, Zaibunnisa (Elphinstone) Street /Preedy Street.	Karachi

	Description	Location
180	Edulji Dinshaw Dispensary, Preedy Street, Karachi.	Karachi
181	Mandviwala Building, Preedy Street, Karachi.	Karachi
182	Rawalpindiwala Building, Preedy Street, Karachi.	Karachi
183	Biramji Building, Preedy Street/Dr. Daudpota Road, (Frere Street).	Karachi
184	Empress Market Building, Preedy Street, Karachi.	Karachi
185	Sheikh Fida Ali Building, Dr. Daudpota Road (Frere Street) Bohra Street, Karachi.	Karachi
186	Faiz-i-Hussaini Building, Dr. Daudpota Road (Frere Street).	Karachi
187	Parsi Dar-e-Meher, Dr. Daudpota Road (Frere Street).	Karachi
188	Gol Wala Building, Dr. Daudpota Road (Frere Street), Karachi.	Karachi
189	Ismail D. Adam Soomar Building, Dr. Daudpota Road (Frere Street) / Woodburn Street.	Karachi
190	Golgoldenwala Building, Dr. Daudpota Road (Frere Street), Karachi	Karachi
191	Aijiwala Building, Sharah-e-Iraq (Clarke Street)/Dr. Daudpota Road.	Karachi
192	Haryanawala Building, Syedna Burhanuddin Road (Mansfield Street) Market Lane.	Karachi
193	Captain House, Sharah-e-Iraq (Clarke Street), Karachi.	Karachi
194	Dossalani Terrace, Syedna Burhanuddin Road (Mansfield Street)/Malvery Street.	Karachi
195	Jama Masjid Qasaban, Karam Ali Talpur Road (Napier Street).	Karachi
196	Adbul Wahid Building, Karam Ali Talpur Road (Napier Street).	Karachi
197	Farid Mansion, Raja Ghazanfar Ali Road (Somerset Street).	Karachi
198	Haji Yunus Building, Raja Ghazanfar Ali Road (Somerset Street).	Karachi
199	Haque Building, Raja Ghazanfar Ali Road (Somerset Street) Sheikhchand Street.	Karachi
200	Katchi Memon Masjid, Raja Ghazanfar Ali Road (Somerset Street).	Karachi
201	Sir Abdullah Haroon Building, Raja Ghazanfar Ali Road (Somerset Street) Karachi.	Karachi
202	Palia House, Raja Ghazanfar Ali Road (Somerset Street).	Karachi
203	Abdullah Haroon Trust Building, Raja Ghazanfar Ali Road (Somerset Street), Karachi.	Karachi
204	Khawaja Manzil, Raja Ghazanfar Ali Road (Somerset Street).	Karachi
205	Lali Bai Building, Raja Ghazanfar Ali Road (Somerset Street), Blenkin Street, Karachi.	Karachi
206	Olympia Building, Raja Ghazanfar Ali Road, (Somerset Street).	Karachi
207	Medina Building, Raja Ghazanfar Ali Road, Somerset Street.	Karachi
208	Duarte Mansion, Karam Ali Talpur Road (Napier Street)/Inverarity Road.	Karachi
209	Braganza House, Karam Ali Talpur Road (Napier Street).	Karachi
210	Sega Building, Karam Ali Talpur Road (Napier Street)/Inverarity Road.	Karachi
211	St. Xavier's School, Syedna Burhanudding Road (Mansfield Street).	Karachi
212	Baweja Building, Karam Ali Talpur Road, (Napier Street).	Karachi
213	Merewether Tower, I. I. Chundrigar (McLeod) Road/M.A Jinnah (Bunder) Road, Karachi.	Karachi
214	Rustomji Building, I. I. Chundrigar (McLeod) Road / M.A Jinnah (Bunder) Road, Karachi.	Karachi
215	Shikarpuri Cloth Market, M.A. Jinnah (Bunder) Road.	Karachi
216	New Cloth Market, M.A. Jinnah (Bunder) Road/ Slaeh Mohammad Road.	Karachi
217	Standard Chartered Bank, I.I. Chundrigar (McLeod) Road.	Karachi
218	State Bank of Pakistan, M.A. Jinnah (Bunder) Road /Talpur Road.	Karachi
219	Nisar Bungalows (Police Quarters), Shahrah-e-Liaquat (Frere Road).	Karachi
220	Overseas Chamber of Commerce, Talpur Road (wood Street).	Karachi
221	Standard Insurance House, I. I. Chundrigar (McLeod) Road.	Karachi
222	Karachi Chamber of Commerce, Aiwan-e-Tijarat (Nicoll) Road/Shahrah-e-Liaquat (Frere Road), Karachi.	Karachi
223	Rawalpindi Wala Building, Aiwan-e-Tijarat (Nicoll) Road.	Karachi
224	Lotia Chambers, Aiwan-e-Tijrarat 9Nicoll) Road, Karachi.	Karachi
225	Ferozpurwala Chamber, M.A. Jinnah (Bunder) Road.	Karachi

	Description	Location
226	Feroze House, M.A. Jinnah (Bunder) Road/Serai Road.	Karachi
227	Rubab Chambers, Serai Road, Karachi.	Karachi
228	Lotia Building, Serai Road, Karachi.	Karachi
229	Rawalpindiwala Building, Serai Road, Karachi.	Karachi
230	School Building, Serai Road, Karachi.	Karachi
231	Kulsum Bai Building, Serai Road, Karachi.	Karachi
232	Hassaini Arcade, Serai Road, Karachi.	Karachi
233	Muhammadi Mansion, Serai Road, Karachi.	Karachi
234	Mandi Wala Building M.A. Jinnah (Bunder) Road, Karachi.	Karachi
235	Dadabhoy Centre, M.A. Jinnah (Bunder) Road, Karachi.	Karachi
236	Sheikh Electric Market, M.A. Jinnah (Bunder) Road, Karachi.	Karachi
237	Salim Centre, M.A. Jinnah (Bunder) Road, Karachi.	Karachi
238	Mercantile Bank Building, M.A. Jinnah (Bunder) Karachi.	Karachi
239	Hafiz Chamber, M.A. Jinnah (Bunder) Karachi.	Karachi
240	Asia Building, M.A. Jinnah (Bunder) Karachi.	Karachi
241	Kamil Chambers, Altaf Hussain (Napier) Road, Karachi.	Karachi
242	Sindh Provincial Cooperative Bank, Serai Road, Karachi.	Karachi
243	Safiabai Sughrabai Building, Shahrah-e-Liaquat (Frere Road)/Serai Road), Karachi.	Karachi
244	Safiabai Sughrabai Building, Shahrah-e-Liaquat (Frere Road), Karachi.	Karachi
245	Yusufali Albibhai Building, Sharah-e-Liaquat (Frere Road).	Karachi
246	S. M. Science College, Shahrah-e-Liaquat (Frere Road)/Aiwan-e-Tijarat (Nicoll) Road.	Karachi
247	Sindh Madrassah Mosque (Sunni), Shahrah-e-Liaquat (Frere Road)/Aiwan-e-Tijarat, (Nicoll) Road, Karachi.	Karachi
248	Sindh Madrassah Building Shahrah-e-Liaquat (Frere Road)/Aiwan-e-Tijarat (Nicoll) Road	Karachi
249	Sindh Madrassah Mosque (Shia), Shahrah-e-Liaquat (Frere Road)/Aiwan-e-Tijarat, (Nicoll) Road, Karachi.	Karachi
250	Sindh Madrassah Library (Originally Principal's Residence), Shahrah-e-Liaquat (Frere Road)/Aiwan-e-Tijarat (Nicoll) Road, Karachi.	Karachi
251	Sindh Madrassah Primary School, Shahrah-e-Liaquat (Frere Road)/Aiwan-e-Tijarat, (Nicoll) Road, Karachi.	Karachi
252	Sindh Madrassah Housing (Hospital), Shahrah-e-Liaquat (Frere Road)/Aiwan-e-Tijarat, (Nicoll) Road, Karachi.	Karachi
253	Haji Abdullah Haroon Waqf Building, Hasrat Mohani (Grant) Road.	Karachi
254	Devadas Building, Altaf Husain (Napier) Road, Karachi.	Karachi
255	Cotton Exchange Building, I. I. Chundrigar (McLeod) Road.	Karachi
256	Hanifji Building, Altaf Hussain (Napier) Road, Karachi.	Karachi
257	Yusuf Ali Building, Altaf Husain (Napier) Road, Karachi.	Karachi
258	Burhani Building, Shahrah-e-Liaquat (Frere Road)/Altaf Hussain (Napier) Road, Karachi.	Karachi
259	Alvi Building, Altaf Hussain (Napier) Road)/Shahrah-e-Liaquat (Frere Road), Karachi.	Karachi
260	Essai Ibrahim Building, M.A. Jinnah (Bunder Road, Karachi.	Karachi
261	Sheikha Hussain, M.A. Jinnah (Bunder) Road/Nanakwara Road.	Karachi
262	Tahirbhoy Muhammadali Building, Nanakwara Road (Campbell Street).	Karachi
263	Moris Wala Building, M.A. Jinnah (Bunder) Road, Karachi.	Karachi
264	Shri Narayan Temple, M.A. Jinnah (Bunder) Road, Karachi.	Karachi
265	Al-Saeedia Trading Company Building, Sharah-e-Liaquat (Frere Road).	Karachi
266	Adamjee Building, Qutram Road, Karachi.	Karachi
267	Railway Bungalow # 73, I. I. Chundrigar (McLeod) Road/Outram Road.	Karachi
268	Dhramshalla Building, Outram Road, Karachi.	Karachi
269	Cibbon & Mamooji Building, Shahrah-e-Liaquat (Frere Road)/Hassanali Effendi Road.	Karachi
270	Hyderabad Building, Shahrah-e-Liaquat (Frere Road)/Hassanali Effendi Road, Karachi.	Karachi

	Description	Location
271	Jhumra Autos Building, Dr. Zaiuddin Ahmed Road.	Karachi
272	Noor Manzil, Dr. Ziauddin Ahmed Road, Karachi.	Karachi
273	Salma Manzil, Mills Street/Faiz M. Fateh Ali Road, Karachi.	Karachi
274	Lotia Building, Mills Street/Faiz M. Fateh Ali Road, Karachi.	Karachi
275	Razia Zakia Mansion, Shahrah-e-Liaquat (Frere Road) / Jai Ram Road, Karachi.	Karachi
276	Lakshmi Chand Building, Jai Ram Road, off Outram Road.	Karachi
277	Kamil Mansion, Jai Ram Road, off Outram Road, Karachi.	Karachi
278	Prince Offset Printmaker' Building Kanji Tulsi Das Street.	Karachi
279	Fine Publishers' Building, Dr. Ziauddin Ahmed (Kutchery) Road,	Karachi
280	Faiz-e-Hussaini Building, Dr. Ziauddin Ahmed (Kutchery) Road.	Karachi
281	Menghraj Dwarkadas Building, Outram Road/Narain Road.	Karachi
282	Kanji Building, Bellasis Street/Narain Road, Karachi.	Karachi
283	Ibrahim Moosabhai Building, Bellasis Street/Narain Road.	Karachi
284	Adamjee Building, Dr. Ziauddin Ahmed (Kutchery) Road, Karachi.	Karachi
285	Aziz Manzil, Dr. Ziauddin Ahmed (Kutchery) Road, Karachi.	Karachi
286	Metharam Hostel Building, Dr. Ziauddin Ahmed (Kutchery) Road.	Karachi
287	D. J. College (Geology & Math Department) Originally Principal's Bungalow) Dr. Ziauddin Ahmed Road, Karachi.	Karachi
288	C.T.O Compound (Building # 1), Muhammad Bin Qaim (Burns) Road /I. I. Chundrigar, (McLeod) Road, Karachi.	Karachi
289	Mazaar of Pir Mangho, Mangho Pir Road, Karachi.	Karachi
290	St. Patrick's Church, Saddar, Karachi.	Karachi
291	Holy Trinity Church, Fatima Jinnah Road, Karachi.	Karachi
292	C.M.S. Church, Nistar Road, Karachi.	Karachi
293	Collectors' Kuteheri, Club Road, Karachi.	Karachi
294	Honeymoon Lodge, Korangi Road, Karachi.	Karachi
295	Zoological Garden, Nishtar Road, Karachi.	Karachi
296	St. Paul's Church-Keamari, Karachi.	Karachi
297	St, Paul's Church-Manora, Karachi.	Karachi
298	Cantonment Station, Dr. Daudpota Road, Karachi.	Karachi
299	City Courts, M.A. Jinnah Road, Karachi.	Karachi
300	St. Andrew's Church, Saddar, Karachi.	Karachi
301	Parsi Dare Meher, Dr. Daudpota Road, Karachi.	Karachi
302	Methodist Church, Sagheer Shaheed Road, Karachi.	Karachi
303	Edulji Dinshaw Dispensary, Daddar, Karachi.	Karachi
304	Sindh Club, Adbullah Haroon Road, Karachi.	Karachi
305	Sindh Maddressah-tul-Islam, Shahrah-e-Liaquat, Karachi.	Karachi
306	Max Denso Hall, M.A. Jinnah Road, Karachi.	Karachi
307	Victoria Museum, M.R. Kiyani Road Karachi.	Karachi
308	Jaffer Fadoo Dispensary, Agha Khan Road, Karachi.	Karachi
309	Karachi Central Jail, Bahadur Yar Jung Road, Karachi.	Karachi
310	Ghulam Hoosain Khalikdina Hall, M.A. Jinnah Road, Karachi.	Karachi
311	Karachi Port Trust, M.A. Jinnah Road, Karachi.	Karachi
312	Clifton Promenade, Clifton, Karachi.	Karachi
313	St. Anthony's Chapel, Manora, Karachi.	Karachi
314	Hindu Gymkhana, Sarwar Shaheed Road, Karachi.	Karachi
315	Sindh High Court, Court Road, Karachi.	Karachi
316	KMC Head Office, M.A. Jinnah Road, Karachi.	Karachi
317	Mohatta Palace (Qasr-e-Fatima), Clifton, Karachi.	Karachi
318	New Sindh Assembly Building, Court Road, Karachi.	Karachi
319	Old Sindh Assembly (NJV School), M.A. Jinnah Road, Karachi.	Karachi
320	Katrak Mansion, Adbullah Haroon Road, Karachi.	Karachi
321	Bristol Hotel, Sunnyside Road, Civil Lines, Karachi.	Karachi
322	Old Cantonment Board Building, Karachi.	Karachi
323	Barach, near old Cantonment Board Building, Karachi.	Karachi
324	Karachi Port Trust, Head Office Building, Eduljee Dinshaw Road.	Karachi
325	Harbour Master's House, Manora, Karachi.	Karachi

	Description	Location
326	Deputy Conservator's House, Manora, Karachi.	Karachi
327	Saint Paul Church, Manora, Karachi.	Karachi
328	Watch Tower, Manora, Karachi.	Karachi
329	Flag Mast, Manora, Karachi.	Karachi
330	Karachi Port Trust, Officers Club, Manora, Karachi.	Karachi
331	Observatory, Manora, Karachi.	Karachi
332	Water Truff, near Hardding Bridge, Karachi.	Karachi
333	Hindu Temple, Manora, Karachi.	Karachi
334	Christ Church, near Jackson Police Station Keamari.	Karachi
335	Hindu Ghat at Native Jetty Bridqe, Karachi.	Karachi
336	Variawa Chamber 14, Sunnysie Road, Belqrave Terrace Road.	Karachi
337	Variawa Building, I. I. Chundrigar Road, Karachi.	Karachi
338	Shrine of Adbul Shah Gazi, Clifton, Karachi.	Karachi
339	Shrine of Schal Sarmast, Darazah, Khairpur.	Khairpur
340	Faiz Mahal (Adjacent to Sachal Sarmast Khairpur Public Library), Mall Road, Khairpur.	Khairpur
341	Wood carved door and residential house owned by Evacuee Trust Property Board, Takar Bazar.	Sukkur

Source: Guidelines for Sensitive and Critical Areas. Government of Pakistan, 1997.

Annex C. Environmental Code of Practice

Introduction

The objective of the ECoPs is to address all potential and general construction related impacts during implementation of the Project (the Project). The ECoPs will provide guidelines for best operating practices and environmental management guidelines to be followed by the contractors for sustainable management of all environmental issues. These ECoPs shall be annexed to the general conditions of all the contracts, including subcontracts, carried out under the Project.

The list of ECoPs prepared for the Project is given below.

- ECoP 1: Waste Management
- ECoP 2: Fuels and Hazardous Goods Management
- ECoP 3: Water Resources Management
- ECoP 4: Drainage Management
- ECoP 5: Soil Quality Management
- ECoP 6: Erosion and Sediment Control
- ECoP 7: Top Soil Management
- ECoP 8: Topography and Landscaping
- ECoP 9: Air Quality Management
- ECoP 10: Noise and Vibration Management
- ECoP 11: Protection of Flora
- ECoP 12: Protection of Fauna
- ECoP 13: Road Transport and Road Traffic Management
- ECoP 14: Construction Camp Management
- ECoP 15: Cultural and Religious Issues
- ECoP 16: Workers Health and Safety

Contractors will prepare site specific management plans, namely Construction Environmental Management Plan (CEMP), in compliance with WB and GoP guidelines and based on the guidance given in the ECoPs. The CEMP will form the part of the contract documents and will be used as monitoring tool for compliance. It is mandatory for the main contractors procured directly by the Project to include these ECoPs in their subcontracts. Violation of the compliance requirements will be treated as non-compliance leading to the corrections or otherwise imposing penalty on the contractors.

ECoP 1: Waste Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
General Waste	Soil and water pollution from the improper management of wastes and excess materials from the construction sites.	The Contractor shall • Develop site specific waste management plan for various specific waste streams (e.g., reusable waste, flammable waste, construction debris, food waste etc.) prior to commencing of construction and submit to supervision consultant for approval. • Organize disposal of all wastes generated during construction in the designated disposal sites approved by the Project. • Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach. • Segregate and reuse or recycle all the wastes, wherever practical. • Vehicles transporting solid waste shall be covered with tarps or nets to prevent spilling waste along the route. • Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process. • Provide refuse containers at each worksite. • Request suppliers to minimize packaging where practicable. • Place a high emphasis on good housekeeping practices. • Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary storage of all wastes before transportation and final disposal. • Potable water should be supplied in bulk containers to reduce the quantity of plastic waste (plastic bottles). Plastic bag use should be avoided.
Hazardous Waste	Health hazards and environmental impacts due to improper waste management practices	The Contractor shall • Collect chemical wastes in 200 liter drums (or similar sealed container), appropriately labeled for safe transport to an approved chemical waste depot. • Store, transport and handle all chemicals avoiding potential environmental pollution. • Store all hazardous wastes appropriately in bunded areas away from water courses. • Make available Material Safety Data Sheets (MSDSs) for hazardous materials on-site during construction. • Collect hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations. • Construct concrete or other impermeable flooring to prevent seepage in case of spills.

ECoP 2: Fuels and Hazardous Goods Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Fuels and hazardous goods.	Materials used in construction have a potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals and hazardous goods/materials on-site, and potential spills from these goods may harm the environment or health of construction workers.	The Contractor shall • Prepare spill control procedures and submit them for supervision consultant approval. • Train the relevant construction personnel in handling of fuels and spill control procedures. • Store dangerous goods in bunded areas on top of a sealed plastic sheet away from watercourses. • Refueling shall occur only within bunded areas. • Store and use fuels in accordance with MSDSs. Make available MSDS for chemicals and dangerous goods on-site. • Transport waste of dangerous goods, which cannot be recycled, to a designated disposal site. • Provide absorbent and containment material (e.g., absorbent matting) where hazardous material are used and stored; and ensure personnel trained in the correct use. • Provide protective clothing, safety boots, helmets, masks, gloves, goggles, to the construction personnel, appropriate to materials in use. • Make sure all containers, drums, and tanks that are used for storage are in good condition and are labeled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur. • Store and use fuels in accordance with MSDSs. • Store all liquid fuels in fully bunded storage containers, with appropriate volumes, a roof, a collection point and appropriate filling/decanting point. • Store hazardous materials above flood level considered for construction purposes • Put containers and drums in temporary storages in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area shall preferably slope or drain to a safe collection area in the event of a spill. • Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution. • Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials.

ECoP 3: Water Resources Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Hazardous material and Waste	Water pollution from the storage, handling and disposal of hazardous materials and general construction waste, and accidental spillage	The Contractor shall • Follow the management guidelines proposed in ECoPs 1 and 2. • Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways or storm water systems.
Discharge from construction sites	Construction activities, sewerages from construction sites and work camps may affect the surface water quality. The construction works will modify groundcover and topography changing the surface water drainage patterns of the area. These changes in hydrological regime lead to increased rate of runoff, increase in sediment and contaminant loading, increased flooding, and effect habitat of fish and other aquatic biology.	The Contractor shall • Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials. • Install temporary sediment basins, where appropriate, to capture sediment-laden run-off from site. • Divert runoff from undisturbed areas around the construction site. • Stockpile materials away from drainage lines • Prevent all solid and liquid wastes entering waterways by collecting solid waste, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting where possible and transport to an approved waste disposal site or recycling depot. • Wash out ready-mix concrete agitators and concrete handling equipment at washing facilities off site or into approved bunded areas on site. Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This should be done in every exit of each construction vehicle to ensure the local roads are kept clean.
Soil erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	The Contractor shall • Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion. • Ensure that roads used by construction vehicles are swept regularly to remove dust and sediment. • Water the loose material stockpiles, access roads and bare soils on an as required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds).
Drinking water	Untreated surface water is not suitable for drinking purposes due to presence of suspended solids and ecoli.	The Contractor Shall • Provide the drinking water that meets NEQS standards. Drinking water to be chlorinated at source, and ensure presence of residual chlorine 0.1 ~ 0.25 ppm as minimum after 30 minutes of chlorine contact time.

ECoP 4: Drainage Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Excavation and earth works, and construction yards	Lack of proper drainage for rainwater/liquid waste or wastewater owing to the construction activities harms environment in terms of water and soil contamination, and mosquito growth.	The Contractor shall • Prepare drainage management procedures and submit them for supervision consultant approval. • Prepare a program to prevent/avoid standing waters, which supervision consultant will verify in advance and confirm during implementation. • Provide alternative drainage for rainwater if the construction works/earth-fillings cut the established drainage line. • Establish local drainage line with appropriate silt collector and silt screen for rainwater or wastewater connecting to the existing established drainage lines already there. • Rehabilitate road drainage structures immediately if damaged by contractors' road transports. • Build new drainage lines as appropriate and required for wastewater from construction yards connecting to the available nearby recipient water bodies. Ensure wastewater quality conforms to NEQS, before it is being discharged into the recipient water bodies. • Ensure that there will be no water stagnation at the construction sites and camps. • Provide appropriate silt collector and silt screen at the inlet and manholes and periodically clean the drainage system to avoid drainage congestion. • Protect natural slopes of drainage channels to ensure adequate storm water drains. • Regularly inspect and maintain all drainage channels to assess and alleviate any drainage congestion problem.
Ponding of water	Health hazards due to mosquito breeding	• Do not allow ponding of water especially near the waste storage areas and construction camps. • Discard all the storage containers that are capable of storing of water, after use or store them in inverted position.

ECoP 5: Soil Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Storage of hazardous and toxic chemicals	Spillage of hazardous and toxic chemicals will contaminate the soils	The Contractor shall • Strictly manage the wastes management plans proposed in ECoP1 and storage of materials in ECoP2. • Construct appropriate spill contaminant facilities for all fuel storage areas. • Establish and maintain a hazardous material register detailing the location and quantities of hazardous substances including the storage, and their disposals. • Train personnel and implement safe work practices for minimizing the risk of spillage. • Identify the cause of contamination, if it is reported, and contain the area of contamination. The impact may be contained by isolating the source or implementing controls around the affected site. • Remediate the contaminated land using the most appropriate available method.
Construction material stock piles	Erosion from construction material stockpiles may contaminate the soils	The Contractor shall • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds.

ECoP 6: Erosion and Sediment Control

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Clearing of construction sites	Cleared areas and slopes are susceptible for erosion of top soils, which affects the growth of vegetation and causes ecological imbalance.	The Contractor shall • Prepare site specific erosion and sediment control measures and submit them for supervision consultant approval. • Reinstate and protect cleared areas as soon as possible. • Cover unused area of disturbed or exposed surfaces immediately with mulch/grass turf/tree plantations.
Construction activities and material stockpiles	The impact of soil erosion are (i) Increased run off and sedimentation causing a greater flood hazard to the downstream, and (ii) destruction of aquatic environment by erosion and/or deposition of sediment damaging the spawning grounds of fish	The Contractor shall • Locate stockpiles away from drainage lines. • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds. • Remove debris from drainage paths and sediment control structures. • Cover the loose sediments of construction material and water them if required. • Divert natural runoff around construction areas prior to any site disturbance. • Install protective measures on site prior to construction, for example, sediment traps. • Install 'cut off drains' on large cut/fill batter slopes to control water runoff speed and hence erosion. • Observe the performance of drainage structures and erosion controls during rain and modify as required.
Soil erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	The Contractor shall • Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion. • Ensure that roads used by construction vehicles are swept regularly to remove sediment. • Water the material stockpiles, access roads and bare soils on an as required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds).

ECoP 7: Top Soil Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Land clearing and earth works	Earthworks will impact the fertile top soils that are enriched with nutrients required for plant growth or agricultural development.	The Contractor shall • Strip the top soil to a depth of 15 cm and store in stock piles of height not exceeding 2m. • Remove unwanted materials from top soil like grass, roots of trees and similar others. • The stockpiles will be done in slopes of 2:1 to reduce surface runoff and enhance percolation through the mass of stored soil. • Locate topsoil stockpiles in areas outside drainage lines and protect from erosion. • Construct diversion channels and silt fences around the topsoil stockpiles to prevent erosion and loss of topsoil. • Spread the topsoil to maintain the physico-chemical and biological activity of the soil. The stored top soil will be utilized for covering all disturbed area and along the proposed plantation sites. • Prior to the re-spreading of topsoil, the ground surface will be ripped to assist the bunding of the soil layers, water penetration and revegetation
Transport	Vehicular movement outside Project area or temporary access roads will affect the soil fertility of the agricultural lands	• Limit equipment and vehicular movements to within the approved construction zone. • Plan construction access to make use, if possible, of the final road alignment.

ECoP 8: Topography and Landscaping

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Land clearing and earth works	Construction activities especially earthworks will change topography and disturb the natural rainwater/flood water drainage as well as will change the local landscape.	The Contractor shall • Prepare landscaping and plantation plan and submit the plan for supervision consultant approval. • Ensure the topography of the final surface of all raised lands (construction yards, approach roads and rails, access roads, etc.) are conducive to enhance natural draining of rainwater/flood water. • Keep the final or finished surface of all the raised lands free from any kind of depression that causes water logging. • Undertake mitigation measures for erosion control/prevention by grass-turfing and tree plantation, where there is a possibility of rain-cut that will change the shape of topography. • Cover immediately the uncovered open surface that has no use of construction activities with grass-cover and tree plantation to prevent soil erosion and bring improved landscaping. • Reinstate the natural landscape of the ancillary construction sites after completion of works.

ECoP 9: Air Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels.	The Contractor shall • Prepare air quality management plan (under the Pollution Prevention Plan) and submit the plan for supervision consultant approval. • Fit vehicles with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition. • Operate the vehicles in a fuel efficient manner. • Cover hauls vehicles carrying dusty materials moving outside the construction site. • Impose speed limits on all vehicle movement at the worksite to reduce dust emissions. • Control the movement of construction traffic. • Water construction materials prior to loading and transport. • Service all vehicles regularly to minimize emissions. • Limit the idling time of vehicles not more than 2 minutes.
Construction machinery	Air quality can be adversely affected by emissions from machinery and combustion of fuels.	The Contractor shall • Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition in accordance with the specifications defined by their manufacturers to maximize combustion efficiency and minimize the contaminant emissions. Proof or maintenance register shall be required by the equipment suppliers and contractors/subcontractors. • Focus special attention on containing the emissions from generators. • Machinery causing excess pollution (e.g. visible smoke) will be banned from construction sites. • Service all equipment regularly to minimize emissions. • Provide filtering systems, duct collectors or humidification or other techniques (as applicable) to the concrete batching and mixing plant to control the particle emissions in all its stages, including unloading, collection, aggregate handling, cement dumping, circulation of trucks and machinery inside the installations.
Construction activities	Dust generation from construction sites, material stockpiles and access roads is a nuisance in the environment and can be a health hazard, and also can affect the local crops;	The Contractor shall • Water the material stockpiles, access roads and bare soils on an as required basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g. high winds). Stored materials such as gravel and sand shall be covered and confined to avoid their being wind-drifted. • Minimize the extent and period of exposure of the bare surfaces. • Restore disturbed areas as soon as practicable by vegetation/grass-turfing.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Store the cement in silos and minimize the emissions from silos by equipping them with filters. • Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations. • Not water as dust suppression on potentially contaminated areas so that a liquid waste stream will be generated. • Crushing of rocky and aggregate materials shall be wet-crushed, or performed with particle emission control systems. • Not permit the burning of solid waste.

ECoP 10: Noise and Vibration Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Noise quality will be deteriorated due to vehicular traffic	The Contractor shall • Prepare a noise and vibration management plan (under the Pollution Prevention Plan) and submit the plan for supervision consultant approval. • Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures. • Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc. • Organize the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise on the work site.
Construction machinery	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor shall • Appropriately site all noise generating activities to avoid noise pollution to local residents. • Use the quietest available plant and equipment. • Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures. Equipment suppliers and contractors shall present proof of maintenance register of their equipment. • Install acoustic enclosures around generators to reduce noise levels. • Fit high efficiency mufflers to appropriate construction equipment. • Avoid the unnecessary use of alarms, horns and sirens.
Construction activity	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor shall • Notify adjacent landholders prior any typical noise events outside of daylight hours. • Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions. • Employ best available work practices on-site to minimize occupational noise levels. • Install temporary noise control barriers where appropriate. • Notify affected people if major noisy activities will be undertaken, e.g. blasting. • Plan activities on site and deliveries to and from site to minimize impact. • Monitor and analyze noise and vibration results and adjust construction practices as required. • Avoid undertaking the noisiest activities, where possible, when working at night near the residential areas.

ECoP 11: Protection of Flora

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Vegetation clearance	Local flora are important to provide shelters for the birds, offer fruits and/or timber/fire wood, protect soil erosion and overall keep the environment very friendly to human-living. As such damage to flora has wide range of adverse environmental impacts.	The Contractor shall • Prepare a plan for protection of flora and submit the plan for supervision consultant approval. • Minimize disturbance to surrounding vegetation. • Use appropriate type and minimum size of machine to avoid disturbance to adjacent vegetation. • Get approval from supervision consultant for clearance of vegetation. • Make selective and careful pruning of trees where possible to reduce need of tree removal. • Control noxious weeds by disposing of at designated dump site or burn on site. • Clear only the vegetation that needs to be cleared in accordance with the engineering plans and designs. These measures are applicable to both the construction areas as well as to any associated activities such as sites for stockpiles, disposal of fill a, etc. • Not burn off cleared vegetation – where feasible, chip or mulch and reuse it for the rehabilitation of affected areas, temporary access tracks or landscaping. Mulch provides a seed source, can limit embankment erosion, retains soil moisture and nutrients, and encourages re-growth and protection from weeds. • Return topsoil and mulched vegetation (in areas of native vegetation) to approximately the same area of the roadside it came from. • Avoid work within the drip-line of trees to prevent damage to the tree roots and compacting the soil. • Minimize the length of time the ground is exposed or excavation left open by clearing and re-vegetate the area at the earliest practically possible. • Ensure excavation works occur progressively and re-vegetation done at the earliest • Provide adequate knowledge to the workers regarding nature protection and the need of avoid felling trees during construction • Supply appropriate fuel in the work camps to prevent fuel wood collection.

ECoP 12: Protection of Fauna

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities	The location of construction activities can result in the loss of wild life habitat and habitat quality	The Contractor shall • Prepare a plan for protection of fauna and submit the plan for supervision consultant approval. • Limit the construction works within the designated sites allocated to the contractors. • check the site for animals trapped in, or in danger from site works and use a qualified person to relocate the animal.
	Impact on migratory birds, its habitat and its active nests	The Contractor shall • Not be permitted to destruct active nests or eggs of migratory birds. • Minimize the tree removal during the bird breeding season. If works must be continued during the bird breeding season, a nest survey will be conducted by a qualified biologist prior to commence of works to identify and locate active nests. • If bird nests are located/ detected within the ledges and roadside embankments then those areas should be avoided. • Petroleum products should not come in contact with the natural and sensitive ecosystems. Contractor must minimize the release of oil, oil wastes or any other substances harmful to migratory birds' habitats, to any waters, wetlands or any areas frequented by migratory birds.
Vegetation clearance	Clearance of vegetation may impact shelter, feeding and/or breeding and/or physical destruction and severing of habitat areas	The Contractor shall • Restrict the tree removal to the minimum numbers required. • Relocate hollows, where appropriate. • Fell the hollow bearing trees in a manner which reduces the potential for fauna mortality. Felled trees will be inspected after felling for fauna and if identified and readily accessible will be removed and relocated or rendered assistance if injured. After felling, hollow bearing trees will remain unmoved overnight to allow animals to move of their own volition.
Night time lighting	Lighting from construction sites and construction camps may affect the visibility of night time migratory birds that use the moon and stars for navigation during their migrations.	The Contractor shall • Use lower wattage flat lens fixtures that direct light down and reduce glare, thus reducing light pollution, • Avoid flood lights unless they are absolutely required. • Use motion sensitive lighting to minimize unneeded lighting. • Use, if possible, green lights that are considered as bird's friendly lighting instead of white or red colored lights. • Install light shades or plan the direction of lights to reduce light spilling outside the construction area.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction camps	Illegal poaching	The Contractor shall • Provide adequate knowledge to the workers regarding protection of flora and fauna, and relevant government regulations and punishments for illegal poaching. • Ensure that staff and Subcontractors are trained and empowered to identify, address and report potential environmental problems.

ECoP 13: Road Transport and Road Traffic Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Increased traffic use of road by construction vehicles will affect the movement of normal road traffics and the safety of the road-users.	The Contractor shall • Prepare a traffic management plan and submit the plan for supervision consultant approval. • Strictly follow the Project's 'Traffic Management Plan' and work with close coordination with the Traffic Management Unit. • Prepare and submit additional traffic plan, if any of his traffic routes are not covered in the Project's Traffic Management Plan, and requires traffic diversion and management. • Include in the traffic plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, temporary road, temporary bridges temporary diversions, necessary barricades, warning signs / lights, road signs etc. • Provide signs at strategic locations of the roads complying with the schedules of signs contained in the Pakistan Traffic Regulations.
	Accidents and spillage of fuels and chemicals	The Contractor shall • Restrict truck deliveries, where practicable, to day time working hours. • Restrict the transport of oversize loads. • Operate vehicles, if possible, to non-peak periods to minimize traffic disruptions. • Enforce on-site speed limit.

ECoP 14: Construction Camp Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Siting and Location of construction camps	Campsites for construction workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.	The Contractor shall • Prepare a construction camp management plan and submit the plan for supervision consultant's approval. • Locate the construction camps within the designed sites or at areas which are acceptable from environmental, cultural or social point of view; and approved by the supervision consultant. • Consider the location of construction camps away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities. • Submit to the supervision consultant for approval a detailed layout plan for the development of the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, and drainage

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		facilities, prior to the development of the construction camps. • Local authorities responsible for health, religious and security shall be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters.
Construction Camp Facilities	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	Contractor shall provide the following facilities in the campsites • Adequate housing for all workers. • Safe and reliable water supply, which should meet NEQS. Drinking water to be chlorinated at source, and ensure presence of residual chlorine 0.1 ~ 0.25 ppm as minimum after 30 minutes of chlorine contact time (World Health Organization -WHO guideline). • Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. Provide separate latrines and bathing places for males and females with total isolation by location. The minimum number of toilet facilities required is one toilet for every ten persons. • Treatment facilities for sewerage of toilet and domestic wastes. • Storm water drainage facilities. • Paved internal roads. • Provide child crèches for women working construction site. The crèche should have facilities for dormitory, kitchen, indoor and outdoor play area. Schools should be attached to these crèches so that children are not deprived of education whose mothers are construction workers. • Provide in-house community/common entertainment facilities. Dependence of local entertainment outlets by the construction camps to be discouraged/prohibited to the extent possible.
Disposal of waste	Management of wastes is crucial to minimize impacts on the environment	The Contractor shall • Ensure proper collection and disposal of solid wastes within the construction camps. • Insist waste separation by source; organic wastes in one container and inorganic wastes in another container at household level. • Store inorganic wastes in a safe place within the household and clear organic wastes on daily basis to waste collector. Establish waste collection, transportation and disposal systems with the manpower and equipment/vehicles needed. • Do not establish site specific landfill sites. All solid waste will be collected and removed from the work camps and disposed in approval waste disposal sites.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Fuel supplies for cooking purposes	Illegal sourcing of fuel wood by construction workers will impact the natural flora and fauna	The Contractor shall • Provide fuel to the construction camps for their domestic purpose, in order to discourage them to use fuel wood or other biomass. • Made available alternative fuels like natural gas or kerosene on ration to the workforce to prevent them using biomass for cooking. • Conduct awareness campaigns to educate workers on preserving the protecting the biodiversity and wildlife of the Project area, and relevant government regulations and punishments on wildlife protection.
Health and Hygiene	There will be a potential for diseases to be transmitted including malaria, exacerbated by inadequate health and safety practices. There will be an increased risk of work crews spreading sexually transmitted infections (STIs) and Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS).	The Contractor shall • Provide adequate health care facilities within construction sites. • Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint fulltime designated first aider or nurse. • Provide ambulance facility for the laborers during emergency to be transported to nearest hospitals. • Initial health screening of the laborers coming from outside areas. • Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work. • Provide HIV awareness programming, including STIs and HIV information, education and communication for all workers on regular basis. • Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form. Regular mosquito repellant sprays during rainy season in offices and construction camps and yards. • Not dispose food waste openly as that will attract rats and stray dogs. • Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers. Place display boards at strategic locations within the camps containing messages on best hygienic practices.
Safety	In adequate safety facilities to the construction camps may create security problems and fire hazards	The Contractor shall • Provide appropriate security personnel (police or private security guards) and enclosures to prevent unauthorized entry in to the camp area. • Maintain register to keep a track on a head count of persons present in the camp at any given time. • Encourage use of flameproof material for the construction of labor housing / site office. Also, ensure that these houses/rooms are of

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		sound construction and capable of withstanding wind storms/cyclones. • Provide appropriate type of firefighting equipment suitable for the construction camps • Display emergency contact numbers clearly and prominently at strategic places in camps. • Communicate the roles and responsibilities of laborers in case of emergency in the monthly meetings with contractors.
Site Restoration	Restoration of the construction camps to original condition requires demolition of construction camps.	The Contractor shall • Dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates at the completion of the construction work. • Dismantle camps in phases and as the work gets decreased and not wait for the entire work to be completed. • Give prior notice to the laborers before demolishing their camps/units. • Maintain the noise levels within the national standards during demolition activities. • Different contractors should be hired to demolish different structures to promote recycling or reuse of demolished material. • Reuse the demolition debris to a maximum extent. Dispose remaining debris at the designated waste disposal site. • Handover the construction camps with all built facilities as it is if agreement between both parties (contactor and land-owner) has been made so. • Restore the site to its condition prior to commencement of the works or to an agreed condition with the landowner.

ECoP 15: Cultural and Religious Issues

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities near religious and cultural sites	Disturbance from construction works to the cultural and religious sites, and contractors lack of knowledge on cultural issues cause social disturbances.	The Contractor shall • Communicate to the public through community consultation regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restriction. • Not block access to cultural and religious sites, wherever possible. • Restrict all construction activities within the foot prints of the construction sites. • Stop construction works that produce noise (particularly during prayer time) should there be any mosque/religious/educational institutions close to the construction sites and users make objections. • Take special care and use appropriate equipment when working next to a cultural/religious institution. • Stop work immediately and notify the site manager if, during construction, an archaeological or burial site is discovered. It is an offence to recommence work in the vicinity of the site until approval to continue is given. • Provide separate prayer facilities to the construction workers. • Show appropriate behavior with all construction workers especially women and elderly people. • Allow the workers to participate in praying during construction time. • Resolve cultural issues in consultation with local leaders and supervision consultants. • Establish a mechanism that allows local people to raise grievances arising from the construction process. • Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works so as to maintain effective surveillance over public health, social and security matters.

ECoP 16: Worker Health and Safety

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Best practices	Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g. noise, dust, chemicals, construction material, solid waste, waste water, vector transmitted diseases etc.), (ii) risk factors resulting from human behavior (e.g. STD, HIV etc.) and (iii) road accidents from construction traffic.	The Contractor shall • Prepare an OHS plan and submit the plan for supervision consultant's approval. • Implement suitable safety standards for all workers and site visitors which should not be less than those laid down on the international standards (e.g. International Labor Office guideline on 'Safety and Health in Construction; WBG's 'Environmental Health and Safety Guidelines') and contractor's own national standards or statutory regulations, in addition to complying with Pakistan standards. • Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas. • Provide personal protection equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty ones and replacing them with the damaged ones. • Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job. • Appoint an EHS manager to look after the health and safety of the workers. • Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works and establishment of construction camps so as to maintain effective surveillance over public health, social and security matters.
	Child and pregnant labor	The Contractor shall • Not hire children of less than 14 years of age and pregnant women or women who delivered a child within 8 preceding weeks.
Accidents	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	The Contractor shall • Ensure health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations should be easily accessible throughout the place of work. • Document and report occupational accidents, diseases, and incidents. • Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards, in a manner consistent with good international industry practice. • Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Provide awareness to the construction drivers to strictly follow the driving rules. • Provide adequate lighting in the construction area, inside the tunnels, inside the powerhouse cavern and along the roads.
Construction Camps	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	The Contractor shall provide the following facilities in the campsites to improve health and hygienic conditions as mentioned in ECoP 16 Construction Camp Management • Adequate ventilation facilities • Safe and reliable water supply. • Hygienic sanitary facilities and sewerage system. • Treatment facilities for sewerage of toilet and domestic wastes • Storm water drainage facilities. • Recreational and social facilities • Safe storage facilities for petroleum and other chemicals in accordance with ECoP 2 • Solid waste collection and disposal system in accordance with ECoP1. • Arrangement for trainings • Paved internal roads. • Security fence at least 2 m height. • Sick bay and first aid facilities
Water and sanitation facilities at the construction sites	Lack of Water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.	The contractor shall • Provide portable toilets at the construction sites, if about 25 people are working the whole day for a month. Location of portable facilities should be at least 6 m away from storm drain system and surface waters. These portable toilets should be cleaned once a day and all the sewerage should be pumped from the collection tank once a day and should be brought to the common septic tank for further treatment. • Provide safe drinking water facilities to the construction workers at all the construction sites.
Other ECoPs	Potential risks on health and hygiene of construction workers and general public	The Contractor shall follow the following ECoPs to reduce health risks to the construction workers and nearby community • ECoP 2: Fuels and Hazardous Goods Management • ECoP 4: Drainage Management • ECoP 10: Air Quality Management • ECoP 11: Noise and Vibration Management • ECoP 13: Road Transport and Road Traffic Management
Trainings	Lack of awareness and basic knowledge in health care among the construction workforce, make them susceptible to potential diseases.	The Contractor shall • Train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of STIs HIV/AIDS. • Train all construction workers in general health and safety matters, and on the specific hazards of their work. Training should consist of basic hazard awareness, site specific hazards, safe

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. • Implement malaria, HIV/AIDS and STI education campaign targeting all workers hired, international and national, female and male, skilled, semi- and unskilled occupations, at the time of recruitment and thereafter pursued throughout the construction phase on ongoing and regular basis. This should be complemented by easy access to condoms at the workplace as well as to voluntary counseling and testing.

Annex D. Terms of Reference of PCR Management Plan

Background and Project Overview

The **SSEP** aims to support the deployment of solar power in Sindh Province spanning three market segments: utility-scale, distributed generation, and at household level. Public funding shall be used to leverage private sector investment and/or expertise in the three segments, with an emphasis on long-term sustainability, developing domestic solar PV experience, and the emergence of self-sustaining markets. Under this Proposed Program, the WB would provide IDA to the GoS for the following:

(a) Utility-Scale Solar: a series of Solar Parks to leverage private sector development of up to 400 MW of solar PV through the use of competitive bidding, starting with an initial 50 MW project that would launch the first international solar auction in Pakistan;

(b) Distributed Solar: installation of at least 15 MW of distributed solar PV on the rooftops and other available space on and around public sector buildings in Sindh;

(c) Solar Home Systems (SHSs): scaling up of the provision of SHS by commercial SSPs in areas with low access to electricity, reaching at least 250,000 households ; and

(d) Technical Assistance and Capacity Building: a range of capacity building and TA activities to support the design and implementation of the Project.

Although focused on Sindh Province, the Project is explicitly designed to provide national benefits by demonstrating new approaches that can be replicated in other provinces. The Project will introduce and showcase international best practice with renewable energy auctions, reduce the headline cost of solar deployment, create sustainable business models for potential replication in other provinces, build institutional and private sector capacity, and identify opportunities for future renewable energy deployment that address issues of grid integration. In the context of potential new investment in fossil fuel-fired generation capacity, and lack of conviction over the long-term role and integration of renewable energy, the Project is designed to help steer Pakistan towards a lower carbon path to development. The WB will also actively disseminate the experience and lessons learned from the Project with the aim of encouraging replication and expansion at the federal level and in other provinces.

Objective of the PCR Management plan

The prime objective of the PCR Management Plan is to ensure protection of the archeologically-, culturally-, religiously- and or historically important buildings and sites (i.e., cultural heritage) that can be potentially affected by the Project activities. In particular, the protected historical buildings in the Province that may be selected to install the rooftop solar power systems under the Project. These buildings are protected under the Sindh Cultural Heritage (Preservation) Act of 1994. The Plan needs to include avoidance and mitigation measures to protect the buildings/sites from any damage ensuring that their cultural heritage significance is not compromised in any manner – in compliance with the above mentioned Act as well as WB OP 4.11.

PCR Management Plan Preparation

For SSEP, an ESMF has been prepared that provides generic impact assessment for the overall Project but also specifies detailed impact assessment criteria and requirements for individual sub-projects. The ESMF calls for preparing PCR Management Plan for each sub-project that can potentially cause negative impacts on cultural heritage particularly buildings that are protected under the Sindh Cultural Heritage (Preservation) Act of 1994. The specific objectives of PCR Management Plan are:

- To identify regulatory as well as WB policy requirements for cultural heritage aspects
- To conduct stakeholder consultations
- To identify the potential impacts of the sub-project on the protected buildings particularly their aspects related to cultural heritage and to recommend appropriate control/mitigation measures
- To prepare a management plan to provide mechanism for the implementation of mitigation and control measures
- To propose monitoring requirements for mitigation and control measures relating to cultural heritage aspects
- To specify institutional arrangements and appropriate roles and responsibilities of all implementing agencies and outline the necessary reporting procedures for managing and monitoring cultural heritage aspects related to sub-projects;
- To determine the training, capacity building and TA needed to successfully implement the provisions of the PCR Management Plan;
- To establish the Project funding required to implement the PCR Management Plan requirements;
- To ensure disclosure of Project information and undertake public consultation as well as describe GRM to address complaints.

The PCR Management Plan will need to comply with the Sindh Cultural Heritage (Preservation) Act of 1994 as well as the WB OPs particularly OP 4.11.

Specific Tasks for the Consultant

General tasks needed to complete PCR Management Plan include the research, interviews, field work, identification of mitigation and control measures, and other tasks as described below.

- A detailed description of the sub-project, its components (especially those funding sub-projects), and implementation arrangements, with a focus on how sub-projects will be identified, prepared, approved and implemented, and on how funds will flow to approved sub-projects.
- A detailed description of the cultural heritage importance of the sub-project; its historical, cultural, archeological, and or religious significance, the protection status vis-à-vis the national and provincial laws.
- An understanding of the legislative, regulatory and administrative regime relating to cultural heritage and its protection.

- Detailed assessment of negative impacts of such sub-projects on the cultural heritage, identification of mitigation measures for each type of impact. Screening criteria, impact management mechanisms, processes and tools would need to be provided for each negative impact.
- An understanding of the institutional needs for implementing the PCR Management Plan. This should include a review of the authority and capability of implementing agency and their capacity to manage and monitor implementation of the PCR Management Plan. The analysis may extend to management procedures and training, staffing, budgeting, and financial support needed for implementation of PCR Management Plan requirements. ToR for staff should be provided in an Annex.
- A GRM needs to be defined and presented in detail.
- A training and capacity building program for implementing agency for implementing the PCR Management Plan.
- A plan for monitoring the implementation and effectiveness of the mitigation measures. This should include monitoring approach, protocols, tools and processes for monitoring. Technical arrangements for implementing the monitoring plan need to be outlined.
- Assist implementing agencies in carrying-out the public consultation and disclosure process for the PCR Management Plan.
- A budget for implementing the PCR Management Plan.
- Description of objective, process and outcome of stakeholder consultations carried out during PCR Management Plan preparation.

Proposed / Indicative Structure of PCR Management Plan

The proposed structure of the PCR Management Plan is as follows:

- **Executive Summary:** This should provide a general summary of the PCR Management Plan contents and key findings, in a vocabulary that is easily understood by the public at large. It should be clear and concisely all aspects of the report.
- **Introduction:** An introduction describing purpose, objectives, principles and methodology of the PCR Management Plan. This section should introduce the sub-project proponents, the study team, and provide other relevant information. The layout of PCR Management Plan should also be described to facilitate its use.
- **Sub-project Description:** A description of the sub-project, with an emphasis on component(s) that will finance sub-projects. The sub-project description should include background and purpose of the project; components of the project with emphasis on those components that will finance sub-projects; anticipated types of sub-projects; and types that will be excluded from financing; project target areas; project coordination and implementation arrangements including details of institutional arrangements for managing the sub-project cycle; and annual reporting and performance review requirements.
- **Regulatory and Policy Requirements:** This section describes the Bank safeguard policies applicable to the cultural heritage aspects of sub-project as well as relevant

national environmental and social legal requirements as indicated in various legislation, regulations and guidelines relevant to the sub-project and PCR Management Plan. It should state how such requirements will be complied. It should also identify gaps between national regulatory requirements and the Bank's safeguard policies. It should also list national institutions that would be involved in reviewing and approving sub-projects.

- **Baseline Conditions:** Assess the cultural heritage dimensions of the sub-project (e.g., protected buildings) including any changes anticipated before the sub-project commences. Data should be relevant to decisions about sub-project location, design, operation, and or mitigatory measures. Collect secondary and primary data on cultural heritage aspects of the sub-project. Study current and proposed development activities within the sub-project area but not directly connected to the project.

- **PCR Management:** This section describes the needs and the requirements of national/provincial laws (particularly, the Sindh Cultural Heritage (Preservation) Act of 1994) and WB safeguards policies (particularly OP 4.11) applicable to the Project. It should give description of the possible site-specific adverse effects, planned mitigation measures and how they will be implemented. This section should also highlight program for monitoring negative as well as positive effects. It should also assign responsibility for implementing PCR Management Plan. A GRM will also be defined in the Chapter. Capacity building needs pertaining to the cultural heritage aspects will also be addressed in this Chapter. Also provided in this Chapter will be the cost estimates for the PCR Management Plan implementation.

- **Stakeholder consultations:** This section will describe the objective, process, and outcome of the stakeholder consultations carried out during the PCR Management Plan preparation.

Annex E. Screening Checklists

A. Environmental and Social Screening Checklist

Number of Sub-project:

Proposing Agency:

Sub-project Location:

Sub-project Objective:

Sub-project description (describe here sub-project components and their dimensions/quantum, construction and O&M activities, major construction material required with approximate quantities, and other pertinent details) (Use extra pages if needed):

Environmental and social setting (describe here the key environmental and social features (land form, land use, water bodies, flora and fauna, settlements, roads, railway lines, any public buildings, schools, hospitals, graveyards, etc.) of the area where the sub-project would be implemented (Use extra pages if needed):

Estimated Cost:

Proposed Date of Commencement of Work:

Technical Drawing/Specifications Reviewed (circle answer): Yes __
No __

I. Sub-project Related Issues

	Issues	None	Minor/ Small	Moderate/ Medium	Significant/ Large	Mitigation Measures	Residual Impacts/Notes
A.	**Zoning and Land Use Planning**						
1	Will the sub-project affect land use zoning and planning or conflict with prevalent land use patterns?						
2	Will the sub-project involve significant land disturbance or site clearance?						
3	Will the sub-project land be subject to potential encroachment by urban or industrial use or located in an area intended for urban or industrial development?						
B	Utilities and Facilities						
4	Will the sub-project require the setting up of ancillary facilities?						
5	Will the sub-project make significant demands on utilities and services?						
6	Will the sub-project require significant levels of accommodation or service amenities to support the workforce during construction (e.g., contractor will need more than 20 workers)?						
C	Water and Soil Contamination						
7	Will the sub-project require large amounts of raw materials or construction materials?						
8	Will the sub-project generate large amounts of residual wastes,						

	Issues	None	Minor/ Small	Moderate/ Medium	Significant/ Large	Mitigation Measures	Residual Impacts/Notes
	construction material waste or cause soil erosion?						
9	Will the sub-project result in potential soil or water contamination (e.g., from oil, grease and fuel from equipment yards)?						
10	Will the sub-project lead to contamination of ground and surface waters by herbicides for vegetation control and chemicals (e.g., calcium chloride) for dust control?						
11	Will the sub-project lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?						
12	Will the sub-project involve the use of chemicals or solvents?						
13	Will the sub-project lead to the destruction of vegetation and soil in the right-of-way, borrow pits, waste dumps, and equipment yards?						
14	Will the sub-project lead to the creation of stagnant water bodies in borrow pits, quarries, etc., encouraging for mosquito breeding and other disease vectors?						

	Issues	None	Minor/ Small	Moderate/ Medium	Significant/ Large	Mitigation Measures	Residual Impacts/Notes
D.	**Noise and Air Pollution Hazardous Substances**						
15	Will the sub-project increase the levels of harmful air emissions?						
16	Will the sub-project increase ambient noise levels?						
17	Will the sub-project involve the storage, handling or transport of hazardous substances?						
E.	**Fauna and Flora**						
18	Will the sub-project involve the disturbance or modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?						
19	Will the sub-project lead to the destruction or damage of terrestrial or aquatic ecosystems or endangered species directly or by induced development?						
20	Will the sub-project lead to the disruption/destruction of wildlife through interruption of migratory routes, disturbance of wildlife habitats, and noise-related problems?						
F.	**Destruction/Disruption of Land and Vegetation**						
21	Will the sub-project lead to unplanned use of the infrastructure being developed?						

	Issues	None	Minor/ Small	Moderate/ Medium	Significant/ Large	Mitigation Measures	Residual Impacts/Notes
22	Will the sub-project lead to long-term or semi-permanent destruction of soils in cleared areas not suited for agriculture?						
23	Will the sub-project lead to the interruption of subsoil and overland drainage patterns (in areas of cuts and fills)?						
24	Will the sub-project lead to landslides, slumps, slips and other mass movements in road cuts?						
25.	Will the sub-project lead to erosion of lands receiving concentrated outflow carried by covered or open drains?						
26	Will the sub-project lead to long-term or semi-permanent destruction of soils in cleared areas not suited for agriculture?						
27	Will the sub-project lead to health hazards and interference of plant growth adjacent to roads by dust raised and blown by vehicles?						
G.	**Cultural Property**						
28	Will the sub-project have an impact on archaeological or historical sites, including historic urban areas?						
29	Will the sub-project have an impact on religious monuments, structures and/or cemeteries?						

	Issues	None	Minor/ Small	Moderate/ Medium	Significant/ Large	Mitigation Measures	Residual Impacts/Notes
30	Have Chance Finds procedures been prepared for use in the sub-project?						
H.	**Expropriation and Social Disturbance**						
31	Will the sub-project involve land expropriation or demolition of existing structures?						
32	Will the sub-project lead to induced settlements by workers and others causing social and economic disruption?						
33	Will the sub-project lead to environmental and social disturbance by construction camps?						

II. Siting Related Issues

	Issues	Yes	No	Don't Know	Mitigation Measures	Residual Impacts/Notes
1	Does the sub-project require land acquisition?					
2	Will the sub-project negatively impact livelihoods [Note: Describe separately if YES]					
3	Is the sub project located on land with contested ownership?					
4	Is the sub-project located in an area with security problems					
5	Is the sub-project located on land reclaimed from floods (the ownership here may be contested)					

	Issues	Yes	No	Don't Know	Mitigation Measures	Residual Impacts/Notes
6	Is the sub-project located in an area with designated natural reserves?					
7	Is the sub-project located in an area with unique natural features?					
8	Is the sub-project located in an area with endangered or conservation-worthy ecosystems, fauna or flora?					
9	Is the sub-project located in an area falling within 500 meters of national forests, protected areas, wilderness areas, wetlands, biodiversity, critical habitats, or sites of historical or cultural importance?					
10	Is the sub-project located in an area which would create a barrier for the movement of conservation-worthy wildlife or livestock?					
11	Is the sub-project located close to groundwater sources, surface water bodies, water courses or wetlands?					
12	Is the sub-project located in an area with designated cultural properties such as archaeological, historical and/or religious sites?					
13	Is the sub-project in an area with religious monuments, structures and/or cemeteries?					
14	Is the project located in an area from where people have been displaced?					
15	Is the project in a politically sensitive area?					
16	Is the sub-project in a polluted or contaminated area?					
17	Is the sub-project located in an area of high visual and landscape quality?					

	Issues	Yes	No	Don't Know	Mitigation Measures	Residual Impacts/Notes
18	Is the sub-project located in an area susceptible to landslides or erosion?					
19	Is the sub-project located in an area of seismic faults?					
20	Is the sub-project located in a densely populated area?					
21	Is the sub-project located on prime agricultural land?					
22	Is the sub-project located in an area of tourist importance?					
23	Is the sub-project located near a waste dump?					
24	Does the sub-project have access to potable water?					
25	Is the sub-project located far (1-2 kms) from accessible roads?					
26	Is the sub-project located in an area with a wastewater network?					
27	Is the sub-project located in the urban plan of the city?					
28	Is the sub-project located outside the land use plan?					

Signed by Safeguard Focal Person: _____

Title: _____

Date: _____

Signed by Project Manager: Name: _____

Title: _____

Date: _____

B. Screening Checklist for Resettlement Impacts

Date _____

I. Identification

Name of specialist_____ Name of project _____

Location: _____District_____ Sub-district _____

Project categorization (A, B or C):[18] _____

II. Checklist

Potential Impacts	Yes (Tick)	No (Tick)	Expected	Remarks
Does the sub-project involve any physical construction work, i.e., rehabilitation/ augmentation, reconstruction or new construction? Also specify in "remarks" column.				
Does the sub-project involve impacts on land, crops, trees, assets and people, if "Yes" try to quantify the impacts and check following items. If "No" impacts, explain the situation in "remarks" and move to section 2.				
Potential impacts				
- Land (quantify and describe types of land & in "remarks column".				
- Government or state owned land free of occupation (agriculture or settlement)				
Private land				
- Residential				
- Commercial				
- Agriculture				
- Communal				
- Others (specify in "remarks").				
Land-based assets:				
- Residential structures				
- Commercial structures (specify in "remarks")				
- Agri./farm structures (specify in "remarks")				
- Community structures (specify)				
- Public utilities (specify in "remarks")				
- Others (specify in "remarks")				
Agriculture related impacts				
- Crops and vegetables (specify types and cropping area in "remarks)				
- Trees (specify number and types in "remarks")				

[18] Category A (significant impacts): 200 or more people physically displaced from housing or losing more than 10 percent of their productive assets (income generating). Category B: Impacts not significant, resettlement plan required. Category C: No impact.

Potential Impacts	Yes (Tick)	No (Tick)	Expected	Remarks
- Others (specify in "remarks")				
Project Affected Persons (PAPs)				
- Number of PAPs o Males o Females				
- Titled land owners/				
- Customary rights				
- Tenants and sharecroppers				
- Leaseholders				
- Agriculture wage laborers				
- Encroachers and squatters (specify in remarks column)				
- Vulnerable PAPs (e.g. women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in "remarks".				
Others (specify in "remarks")				
Section 2				
Are there any tribal people, indigenous or other minority groups affected by land acquisition or project activities; If "Yes" check the following items				
- Indigenous groups (specify groups in "remarks").				
- Describe nature of impacts				
- Tribal People (specify tribes in "remarks" Describe nature of impact				
- Minority groups (specify in "remarks"). Describe nature of impacts				
- Other (specify….)				

Annex F. RAP/ARAP Structure

The suggested structure of the sub-project-specific RAPs is given below.

i) **Executive Summary**

This non-technical executive summary will provide brief description of the sub-project, its resettlement impacts, entitlement and eligibility criteria, estimates of compensation and assistance, and finally results of stakeholder consultations.

ii) **Introduction**

This Chapter will introduce the RAP and describe its objective, scope, methodology of preparation, and document structure.

iii) **Project Description**

Provide a description of the sub-project to place the RAP in the relevant context. This would include a summary of the background to the overall project and the different components, focusing on Component II. The description will then provide greater details of the specific sub-project for which the RAP is being prepared.

iv) **Government of Pakistan's Legal and Institutional Guidelines and Requirements:**

This Chapter will present a review of the national and provincial laws governing land acquisition and other assets. It shall also look at the various land tenure and ownership systems in Pakistan especially in Sindh, the different legal instruments regarding government and individual acquisitions and resettlement and compensation policies. The RAP shall describe any discrepancies identified in the different legal instruments. The RAP shall also identify the legally mandated institutions associated with these legal instruments and their respective roles. This should be at all levels where implementation of project activities is likely to take place. Particular attention should be given to local institutions and structures at the project site(s). The institutional arrangements will include implementation and monitoring mechanisms that ensure inclusiveness and participation of all affected people, groups and communities.

v) **World Bank Safeguards Policies**

The RAP shall spell out the WB's policy on Involuntary Resettlement (OP 4.12) and assess how this applies in the specific case of Component 2 of the Project. The RAP shall present the gaps between the WB safeguard policy on involuntary resettlement and the GoP Legislations. Practical measures and recommendations to bridge the gap between the two sources of legislations should be explored.

vi) **Baseline Conditions**

This Chapter of the RAP will require an estimated number and types of people likely to be affected or displaced by the sub-project activities. The different categories of affected persons may include those who may be losing legal title to land and those without legal title but who use the land for economic activities or for residential purposes. There may be those who may be losing temporary access to property or business sites. These are only examples of those who are likely to be affected through displacement. The RAP will identify the right categories based on the impacts noted or expected. The RAP will present findings from a social and economic survey at the proposed sites for the sub-project activities. The survey will cover information on the social structure, economic activities,

social characterization of potential affected persons, and the numbers likely to be involved, the different social institutions, social capital and mechanism for social cohesion, and any legacy issues pertaining to land acquisition and associated activities. This information will serve as critical baseline data for a future M&E activities.

vii) **Eligibility Criteria for various Categories of Affected People**

The RAP Consultants will determine the method for setting a cut-off date for eligibility for compensation and also as a means for making this information (on cut-off date) reach the wider public. In addition, the RAP Consultants will determine the compensation type for the different categories, losses and affected persons. These may include persons affected by land acquisition, rights of access to resources or properties such as housing, businesses, water sources, loss of livelihood, and loss of cultural properties. The RAP shall take particular note of the multidimensional impact of the sub-project and factor that into the analysis especially with regard to different sites and different forms of social impacts. The RAP shall pay particular attention to the different forms of impacts as a result of the nature of the sub-project and explore the relevant issues appropriately. The criteria for compensation should be in line with national legal requirements and provisions, WB OP 4.12, social sustainability and poverty reduction factors and fairness to avoid conflict and dissatisfaction. The section should also identify and document the unit of compensation that is whether individuals, families or groups and indicate the scenarios or cases for the application of each unit of analysis or a combination of units where appropriate.

viii) **Entitlement Matrix for proposed Resettlement and Compensation Policy**

Following from the above, the RAP shall develop a matrix that presents the type of compensation that each identified PAP will be entitled to and a rationale as part of the matrix explaining the reasoning behind the entitlement.

ix) **Methods for Valuing Affected Assets**

This Chapter shall describe in detail the methods used in valuing those assets that will be eligible for compensation either as per national or WB policy on Involuntary Resettlement (OP 4.12). This process should capture the methodology for taking of inventory of assets, values assigned and agreement reached with each identified PAP and consider inflationary realities in the final determination of values. The RAP shall include a clear statement alluding to the possibility of revised values should there be major discrepancies between dates for value determination and actual date for payments. Valuing of assets should be a process of engagement with PAPs and not an imposition. The RAP shall demonstrate that the methods used for the exercise in its entirety were fully participatory and acceptable to all stakeholders.

x) **Resettlement Impacts**

This Chapter will detail the resettlement impacts to be caused by the sub-project. The details will include various types of resettlement impacts with quantification; complete list of PAPs will be provided in an annex. The Chapter will also provide overall estimates for the resettlement compensations to be paid to the PAPs; compensation amount for each PAP will be provided in the above-mentioned annex. The Chapter will also include the Livelihood Restoration Plan.

xi) **Organizational Arrangements and Procedures for Delivery of Entitlements**

The RAP will describe the process for organizational arrangements, responsibilities and roles. It will describe the Project and sub-project based institutional structure required for

implementing all aspects of the resettlement process. Key staff positions and their roles will be presented (detailed ToRs of positions can be presented in an annex). The RAP will describe the approval processes for the various stages of the compensation work including the various actors and their roles and responsibilities. This section will also spell out the actual process for delivering the entitlement including the roles for the different agencies and reporting formats.

xii) **Consultation with and participation of Affected People**

The RAP will provide process and outcome of consultation and participation by the PAPs in the resettlement planning and implementation process until they have received their entitlements. This process should be elaborate and clear to avoid and minimize confusion and suspicion. This could be done according to the different levels of consultations, the expected outcome form the different stages of the consultation and participation approach that would be adopted. The RAP should categorically emphasize the importance of documentation for the consultation and participation process for RAPs. The record of consultation and participation for the RAP should be attached as an annex to the final RAP. As part of this, the consultant will develop a program for the disclosure of the RAP to facilitate the work of the client on this matter. The responsibility for both the disclosure and dissemination however lies with the client.

xiii) **Grievance Redress Mechanisms**

A GRM should be outlined in this section with clear roles, timelines, procedures and responsibilities. It should also describe the options available to PAPs for grievance redress during the resettlement process. The RAP shall indicate how these would be disseminated and accessible in a way that is clear and comprehensible to the PAPs. The GRM should also have an in-built monitoring mechanism to check on responsiveness to complaints or grievances lodged. The different forms of receiving the complaints should be clearly described together with the different stages of going through the process. In addition, the redress mechanism shall indicate alternatives, in case the proposed mechanism, for any reason, does not respond to all grievances and complaints

xiv) **Budget and Funding Arrangements**

The RAP should clearly state the sources of funding for its implementation and payment of compensation and assistance, an overall cost estimates for resettlement including for monitoring of the resettlement activities. The financial responsibility of the relevant stakeholders, where applicable, should be categorically stated to avoid ambiguity of source of funds for resettlement activities. These budgets should take into consideration inflationary tendencies.

xv) **Monitoring Arrangements**

The RAP shall provide an appropriate monitoring framework. Methodologies for monitoring should be spelled out. The roles of different players like the PAPs, civil society, and local government authorities among others, in the implementation and monitoring process will need to be clarified. The RAP shall develop, as part of this, a template for monitoring with indicators based on the main issues identified and spelt out in the RPF.

xvi) **Implementation Schedule**

To avoid confusion with cut-off dates and other time lines especially because compensation will have to be paid prior to commencement of any civil works, it is important for the RAP to set out implementation schedule for the resettlement.

Annex G. Terms of Reference for Key Project Staff

Environment Specialist

The Environment Specialist will be responsible for the implementation of the environmental aspects of the ESMF and sub-project-specific ESMPs. The Environment Specialist jointly with the Social Development Specialist will supervise the ESMP Consultants to ensure timely preparation of sub-project-specific ESMPs and their effective implementation. Specifically, the Environment Specialist's responsibilities will include:

- Ensure implementation of environmental aspects of the ESMF
- Ensure and supervise preparation and implementation of ESMPs.
- Supervise and monitor ESMP Consultants for all tasks defined in the ESMF particularly preparation and implementation of ESMPs
- Review the ESMPs prepared by ESMP Consultants
- Review the progress reports prepared by ESMP Consultants
- Review the monitoring reports prepared by the M&E Consultants.
- Carrying out frequent field visits and conduct monitoring for ESMP implementation;
- Identifying and preparing training materials on ESMP preparation and implementation;
- Conduct/manage ESMP trainings for the PMU personnel;
- Managing the GRM;
- Preparing QPRs for submission to WB and other stakeholders as defined in the ESMF and sub-project specific ESMPs.

The Environment Specialist will ensure that the project remains compliant to the following WB OPs and guidelines:

- OP 4.01 Environmental Assessment
- OP 4.04 Natural Habitat
- OP 4.36 Forests
- OP 4.11 Physical Cultural Resources
- Bank’s Policy on AI

Qualification: The Environment Specialist should be Masters in Environmental Sciences/Engineering and have experience of five years in preparing and implementation of environmental studies (EIAs, IEEs, ESMPs) for the WB funded projects.

Social Development Specialist

The Social Development Specialist will be responsible for the implementation of the social aspects of the ESMF and sub-project-specific ESMPs. The Social Development Specialist

jointly with the Environment Specialist will supervise the ESMP Consultants to ensure timely preparation of sub-project-specific ESMPs and their effective implementation. Specifically, the Social Development Specialist's responsibilities will include:

- Ensure implementation of social aspects of the ESMF
- Ensure and supervise preparation and implementation of ESMPs.
- Supervise and monitor ESMP Consultants for all tasks defined in the ESMF particularly preparation and implementation of ESMPs
- Review the ESMPs prepared by ESMP Consultants
- Review the progress reports prepared by ESMP Consultants
- Review the monitoring reports prepared by the M&E Consultants.
- Carrying out frequent field visits and conduct monitoring for ESMP implementation;
- Identifying and preparing training materials on ESMP preparation and implementation;
- Conduct/manage ESMP trainings for the PMU personnel;
- Managing the GRM;
- Preparing QPRs for submission to WB and other stakeholders as defined in the ESMF and sub-project specific ESMPs.

The Social Development Specialist will ensure that the project remains compliant to the following WB OPs and guidelines:

- OP / BP 4.01 Environmental Assessment
- OP / BP 4.12 Involuntary Resettlement
- OP 4.10 Indigenous Peoples
- Bank’s Policy on AI

Qualification: The Social Development Specialist should be Masters in Social Sciences or Resettlement Studies and have experience of five years in preparing and implementation of social and resettlement studies (SIA and RAPs) for the WB funded projects.

Annex I. Terms of Reference for ESMP Preparation

Background and Project Overview

[text to be added]

Applicable Safeguard Policies

The proposed Project intends to finance a variety of sub-projects covering wide range of activities that are have the potential to cause negative environmental and social impacts. Therefore, OP/BP 4.01 is triggered. However, most of these impacts are likely to moderate in intensity, reversible, localized and temporary in nature. Therefore, the Project has been classified as environmental category **B** project.

ESMP Preparation

For SSEP, an ESMF has been prepared that provides generic impact assessment for the overall Project but also specifies detailed impact assessment criteria and requirements for individual sub-projects. The ESMF calls for preparing ESMP for each sub-project that can potentially cause low to moderate level of negative impacts. The specific objectives of ESMP are:

- To determine environmental and socio-economic characteristics and impacts of the project including baseline conditions;
- To identify regulatory as well as policy requirements for environmental and social aspects
- To conduct stakeholder consultations
- To identify the potential impacts of the sub-project on environment and people and to recommend appropriate mitigation measures
- To prepare ESMP to provide implementation mechanism for the implementation of environmental and social requirements
- To propose monitoring requirements for environmental and social aspects
- To specify institutional arrangements and appropriate roles and responsibilities of all implementing agencies and outline the necessary reporting procedures for managing and monitoring environmental and social concerns related to sub-projects;
- To determine the training, capacity building and TA needed to successfully implement the provisions of the ESMP;
- To establish the Project funding required to implement the ESMP requirements;
- To ensure disclose Project information and undertake public consultation as well as describe GRM to address complaints.

The ESMP will need to comply with the WB OPs for '**Category B**' projects. The consultants will also make use of the WBG Environmental, Health, and Safety Guidelines. While preparing ESMPs, "Guidance in Involuntary Resettlement Sourcebook (2005) Box

3.1 for Suggested Compensation Guidelines for Temporary Acquisition of Assets" will also be used.

Specific Tasks for the Consultant

The Consultant is required to prepare ESMPs as per principles and objectives stated in the ESMF. General tasks needed to complete ESMP include the research, interviews, field work and other tasks as described below:

- A detailed description of the sub-project, its components (especially those funding sub-projects), and implementation arrangements, with a focus on how sub-projects will be identified, prepared, approved and implemented, and on how funds will flow to approved sub-projects.
- An understanding of the legislative, regulatory and administrative regime (e.g. pollution control, environmental management, protection of cultural heritage, etc.) that the project will operate within, with a focus on requirements that will apply to the planning, approval and implementation of sub-projects.
- Detailed assessment of possible environmental and social impacts of such sub-projects, identification of mitigation measures for each type of impact. Screening criteria, impact management mechanisms, processes and tools would need to be provided for each environmental and social impact. On social aspects, this must outline the land requirements and mechanisms for meeting these, impacts on livelihoods, community participation and consultations and inclusion of marginalized groups especially women.
- An understanding of the institutional needs for implementing the ESMP. This should include a review of the authority and capability of implementing agency and their capacity to manage and monitor ESMP implementation. The analysis may extend to management procedures and training, staffing, operation and maintenance training, budgeting, and financial support needed for implementation of ESMP requirements. ToR for staff should be provided in an Annex.
- A GRM needs to be defined and presented in detail.
- A training and capacity building program for implementing agency for implementing the ESMP.
- A monitoring plan for monitoring environmental and social mitigation measures. This should include monitoring approach, protocols, tools and processes for monitoring. Technical arrangements for implementing the monitoring plan need to be outlined.
- Assist implementing agencies in carrying-out the public consultation and disclosure process for the ESMP and the envisaged related environmental and social impacts of the selected project investments.
- A budget for implementing the ESMP.
- Description of objective, process and outcome of stakeholder consultations carried out during ESMP preparation.

Proposed / Indicative Structure of ESMP

The proposed structure of the ESMP is as follows:

- Executive Summary: This should provide a general summary of the ESMP contents and key findings, in a vocabulary that is easily understood by the public at large. It should be clear and concisely all aspects of the report.
- Introduction: An introduction describing the ESMP purpose, objectives, principles and methodology. This section should introduce the project proponents, the study team, and provide other relevant information. The layout of ESMP should also be described to facilitate its use.
- Sub-project Description: A description of the sub-project, with an emphasis on component(s) that will finance sub-projects. The sub-project description should include background and purpose of the project; components of the project with emphasis on those components that will finance sub-projects; anticipated types of sub-projects; and types that will be excluded from financing; project target areas; project coordination and implementation arrangements including details of institutional arrangements for managing the sub-project cycle; and annual reporting and performance review requirements.
- Environmental and Social Management Requirements: This section describes the Bank safeguard policies applicable to the project and its sub-projects as well as relevant national environmental and social legal requirements as indicated in various legislation, regulations and guidelines relevant to the project and ESMP. It should state how such requirements will be complied. It should also identify gaps between national regulatory requirements and the Bank's safeguard. It should also list national institutions that would be involved in reviewing and approving sub-projects.
- Environmental and Socio-Economic Baseline Conditions: Assess the dimensions of the study area and review relevant physical, biological, land-use, and socioeconomic conditions, including any changes anticipated before the project commences. Data should be relevant to decisions about project location, design, operation, or mitigatory measures. Collect secondary and primary data on physical environment, biological environment and social environment. Study current and proposed development activities within the project area but not directly connected to the project. Also, analyze the trends in the key environmental and social parameters of the area.
- ESMP: This section describes the needs and the requirements of individual safeguards policies applicable to the Project. It should give description of the possible site-specific adverse effects, planned mitigation measures and how they will be implemented. This section should also highlight program for monitoring negative as well as positive effects. It should also assign responsibility for implementing ESMP. A GRM will also be defined in the Chapter. Capacity building needs pertaining to the environmental and social management will also be addressed in this Chapter. Also provided in this Chapter will be the cost estimates for the ESMP implementation.
- Stakeholder consultations: This section will describe the objective, process, and outcome of the stakeholder consultations carried out during the ESMP preparation.