



# Initial Environment Examination

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Project Number: 47229-001  
July 2016

## IND: Uttarakhand Emergency Assistance Project (UEAP)

Package: Civil Aviation Work Package No. UK/UEAP-CA/MPH/01

Submitted by

Project implementation Unit –CA (Civil Aviation), Dehradun

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**Fw: ADB Loan No. 3055 IND, Uttarakhand Emergency Assistance Project (UEAP): Submission of "IEE" Reports for MPH (Dakpathar) (Package No. UK/UEAP-CA/MPH/01)**

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Dear Sir,

Please find the attached IEE report for your review.



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Respected Sir,

Please find herewith the attached initial Environmental Examination (IEE) reports for Construction of MPH (Package No. UK/UEAP-CA/MPH/01) in Dakpathar for your kind perusal and approval.

With Regards,

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Dehradun IEE MPH (Dakpathar).pdf



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for logging pls  
GM/AS.

PLS

# Initial Environmental Examination (IEE)

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June 2016

India: Construction of one MPH cum Rescue Centers at Helipads/Heliports at Dakpathar in Uttarakhand under Uttarakhand Emergency Assistance Project (MPH: Civil Aviation Work Package No. UK/UEAP-CA/MPH/01)

This Initial Environmental Examination (IEE) is a document of the State Disaster Management Authority, Government of Uttarakhand. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

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## ABBREVIATIONS

ADB	Asian Development Bank
CFE	Consent for Establishment
CFO	Consent for Operation
CPCB	Central Pollution Control Board
DM	District Magistrate
DoT	Department of Tourism
DSC	Design and Supervision Consultant
dB	Decibel
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EIA	Environmental Impact Assessment
EC	Environmental Clearance
EMMP	Environmental Management and Monitoring Plan
FATO	Final Approval and Take Off Area
GMVN	Garhwal Mandal Vikas Nigam
GoI	Government of India
GoU	Government of Uttarakhand
Ha	Hectare
IEE	Initial Environmental Examination
ITI	Industrial Training Institute
JRDNA	Joint Rapid Damage and Needs Assessment
KMVN	Kumaon Mandal Vikas Nigam
Leq	Sound Level
MoEFCC	Ministry of Environment & Forests, and Climate Change
NAAQM	National Ambient Air Quality Monitoring
NA	Not Applicable
NOC	No-Objection Certificate
O&M	Operation and Maintenance
PIU	Project Implementation Unit
PMU	Project Management Unit
PTC	Police Training Centre
PWD	Public Works Department
REA	Rapid Environmental Assessment
RoW	Right of Way
RSPM	Respirable Suspended Particulate Matter
RP	Resettlement Plan
SAR	Sub-Project Appraisal Report
SEIAA	State Environmental Impact Assessment Authority
SDMA	State Disaster Management Authority
SPCB	State Pollution Control Board
SPM	Suspended Particulate Matter
TOLF	Touch Down and Lift Off
UCADA	Uttarakhand Civil Aviation Development Authority
UEAP	Uttarakhand Emergency Assistance Project
UEPPCB	Uttarakhand Environmental Protection and Pollution Control Board
UJS	Uttarakhand Jal Sanasthan

## WEIGHTS AND MEASURES

Cm	-	centimeter
Crore	-	100 lakhs = 10,000,000
Lakh	-	100 thousand = 100,000
Km	-	Kilometer
Kph	-	Kilometer per hour
Lpd	-	liters per day
M	-	Meter
mg/l	-	milligrams per liter
Mm	-	Millimeter
MSL	-	Mean sea level
≈	-	10 <sup>-6</sup> meter
μg/m <sup>3</sup>	-	micrograms per cubic meter
μS/cm	-	micro Siemens per centimeter
NTU	-	Nephalo turbidity unit
Ppm	-	parts per million

### NOTE{S}

In this report, "\$" refers to US dollars.  
`INR`\_ and `₹`\_ refer to Indian rupees

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## EXECUTIVE SUMMARY

1. Uttarakhand lies in the northern part of India amidst the magnificent Himalayas and dense forests. The State is bordering Himachal Pradesh in the north-west and Uttar Pradesh in the South and shares international borders with Nepal and China. The State is comprised of 13 districts divided into two regions and also called administrative divisions; the Kumaon and Garhwal. The region is traditionally referred to as Uttarakhand in Hindu scriptures and old literature, a term which derives from the Sanskrit for Northern Country or Section. Uttarakhand, by virtue of its geographical setting, is vulnerable to minor ecological changes. Hence, any activity disapproved by mountain ecosystem triggers a disaster. We cannot stop disaster to happen but can certainly take some steps to reduce its effects. Disasters are synonymous to damage of property, life and psyche of the people. If disasters cannot be averted, then reduction of losses of any type, caused by disaster becomes a focal point of the policy for disaster. So far, in the recent June 2013 Uttarakhand has experienced major natural calamities in five main districts Rudraprayag (especially Kedarnath), Chamoli, Uttarkashi, Bageshwar and Pithoragarh (Dharchula).
2. Being part the Himalayan region, Uttarakhand is a disaster prone state. Landslides, forest fires, cloudbursts and flash-floods are seasonal in nature and this strike at a certain period of the year with high frequency. Natural disasters in the mountains are the most devastating and are unpredictable. Natural disaster of June 2013 resulted in huge damage of life, roads, tourism assets/infrastructure, rural & urban infrastructure in the state of Uttarakhand. This event also recorded a glacial lake burst/overflow related flash flood at Kedarnath causing a great number of loss of lives and severe damage of property enroute.
3. The Government of Uttarakhand (GoU) launched a massive emergency rescue and evacuation operation with assistance from the Indian Army, Indian Air Force (IAF), Indo-Tibetan Border Police (ITBP), the National Disaster Response Force (NDRF) and the local Police evacuating more than 110,000 people from these flood affected areas. The need to immediately start the recovery and reconstruction work, especially in the most affected areas prompted the need for a rapid assessment to understand the nature of damages post-disaster. The Uttarakhand Government is committed to ensure the safety and well-being of its people and recognizes the necessity to continuously improve disaster risk reduction and management within the State.
4. Natural Disaster of June, 2013 has resulted in huge loss of lives of tourists/residents and severe damage to infrastructural facilities in the region, highlighting the requirement to strengthen the disaster preparedness by creating proper rescue/relief/evacuation mechanism through aerial route in such eventualities in the difficult Himalayan terrain. Presently one sub-projects is being undertaken (MPH cum Rescue Centres) and the NOCs have been obtained from the concerned authorities (District Magistrates). Sub-project locations exist in one Districts of Uttarakhand State i.e. Dehradun. Sub-projects to be developed as MPH-5 category, which needs atleast 110 m<sup>2</sup> areas for construction.
5. Consistent with the Environmental Assessment and Review Framework, the proposed sub-project were screened using ADB rapid environmental assessment (REA) checklist. The environmental screening revealed that no protected or sensitive areas were traversed. All impacts are site specific; few are irreversible and can be readily mitigated supporting an environmental Category B<sub>1</sub> classification. The brief description of subproject sites are as follows:  
Dakpathar: Dakpathar is a town situated in Dehradun district of Uttarakhand, India MPH 5 is proposed.

6. Air Quality. The pristine environment and sparse population suggest that most part of the State have a very good air quality. The baseline data related to ambient air quality and noise level will be generated before commencement of civil work/construction.
7. Seismicity. The State constitutes one of the most active domains of the Himalayan region. Several damaging earthquakes are recorded from this region. As such, the region is classified under high seismic zones IV & V.
8. Forest. Uttarakhand is ranked 9<sup>th</sup> in all-India in terms of forest covered area with 24,508 km<sup>2</sup> of forest land (As per State Forest Report 2013). The district of Pauri Garhwal, Uttarkashi, Nainital, and Chamoli have the largest forest cover accounting for 50% of all the state's total. The State Govt. of Uttarakhand has declared the oak tree (*Quercus* sp.) as a Kalpvriksha or wish fulfilling divine tree often treated as the signature plant of the Kumaon Himalayas as numerous logos and insignias with a stylized version of the deodar inscribed on them.
9. Sensitive Ecosystem. The sub-projects locations are not located within or fall within any sensitive ecosystem. Neither the project component has any direct intervention or indirect interventions with sensitive ecosystem.
10. Significant Environmental Impacts and Proposed Mitigation Measures. No environmental impacts related to siting were identified in the environmental examination. The proposed sub-projects are not located within or adjacent to the cultural heritage sites, protected areas, wetlands, mangroves, estuarine; core as well buffer zones of the protected areas or any special area for protecting biodiversity. There are no rare, threatened, and endangered species (flora and fauna) within the sub-project sites. The potential significant environmental impacts identified and assessed are related to construction time impacts.
11. Information Disclosure, Consultation, Participation, and Grievance and Redress Mechanism. Wide stakeholders consultation and participation was observed during the environmental examination of UEAP by project affected communities, government institutions, and non-governmental organizations. Highlight of all consultations were documented and applicable recommended measures particularly in minimizing shifting of structures, potential conflict with migrant workers, and competing demand for local resources were incorporated in the design and the environmental management plan. This IEE report will be disclosed on ADB website pursuant to the Bank's Public Communication Policy and in the SDMA website.
12. Environmental Management Plan. The Environmental Management and Monitoring Plan (EMMP), to form part of the bidding documents, adopted the procurement package scheme and facilitate subsequent compliance monitoring by the contractor.
13. Conclusion. The initial environmental examination (IEE) ascertains that the sub-project is unlikely to cause any significant environmental impacts. No additional studies or need of undertaking detailed EIA is envisaged at this stage. The Executing Agency shall ensure that EMP and EMoP is included in BOQ and forms part of bid document and civil works contract. The same shall be revised if necessary during project implementation or if there is any change in the project design and with approval of ADB. The IEE is based upon the EARF, which is in consistent with the ADB's Safeguard Policy Statement (SPS) 2009. All the sub-projects are classified as Category 'B' for Environment and do not require further EIA study. In the present IEE certain baseline data is not available for ambient air quality, water quality and noise level. Therefore, it is proposed that before the commencement of civil work, sampling for these parameters shall be conducted.

## I. INTRODUCTION

### A. Project Background/Rationale

1. Recent disaster of unprecedented floods in June, 2013 in the state of Uttarakhand, devastated many towns and villages on the banks of rivers Mandakini, Bhagirathi, Pindar, Alaknanda, Kali and Saryu. Infrastructure facilities like roads, power supply, communication, buildings, and water supply had been affected severely. Though the state government had taken up many steps to temporarily restore the facilities, it is envisaged to take up permanent measures to restore and rehabilitate the facilities.

### B. Uttarakhand Emergency Assistance Project (UEAP)

2. Uttarakhand, being a tourist and pilgrimage State, attracts a large number of tourist and pilgrims. A major disaster during 15-17 June 2013 resulted in severe damages in several parts of Uttarakhand, which has a mountainous terrain and a fragile geology. Several habitations and towns have been washed away by the unprecedented flash floods and landslides, and a large number of houses, public buildings, roads, bridges, urban, rural, and tourism infrastructure, power generation and distribution facilities have been severely damaged. The impact on the affected population due to the loss of connectivity has been manifold.
3. The Natural Disaster of June 2013 has resulted in huge loss of lives of tourists/residents and severe damage to infrastructural facilities in the region, highlighting the requirement to strengthen the disaster preparedness by creating proper rescue/relief/evacuation mechanism through aerial route in such eventualities in the difficult Himalayan terrain.
4. Based on the request of India, a Joint Rapid Damage and Needs Assessment (JRDNA) was undertaken by Asian Development Bank (ADB) and the World Bank. ADB agreed to assist the Government of India (GOI) with reconstruction and rehabilitation efforts for which the Uttarakhand Emergency Assistance Project (UEAP) has been formulated as a multi-sector emergency loan in sector loan modality. The executing agency (EA) for the UEAP will be Government of Uttarakhand (GoU) and State Disaster Management Authority (SDMA). The primary implementing agencies (IAs) will be Public Works Department (PWD) for roads, bridges, urban roads, and trekking routes including eco-trails. The Department of Tourism (DoT) for tourism infrastructure, Uttarakhand Civil Aviation Development Authority (UCADA) for helipads; and Uttarakhand Jal Sansthan (UJS) for urban water supply, or any successor hereto. Some other state agencies such as Forest Department, Kumaon Mandal Vikas Nigam Limited, and Garhwal Mandal Vikas Nigam Limited are likely to be entrusted with some works under UEAP under these primary IAs.
5. While the disaster affected almost all districts within the state, the main focus of the assessment was on five districts that were most affected: Bageshwar, Chamoli, Pithoragarh, Rudrapur, and Uttarkashi. However, to strengthen the disaster preparedness capability and to restore visitor's faith/confidence in the tourism safety through provision of better connectivity and presence of rescue, relief, and evacuation mechanisms, as per the indicative list of sub-projects in PAM under Section - II, Tourism Amenities and Helipads and its Sub-section 1. The main theme of PIU (CA) is to Construction of MPH cum Rescue centres in the state of Uttarakhand. Presently under this package, one MPH cum Rescue Centers have been identified in one districts of Uttarakhand under UEAP (Civil Aviation Program). These would be developed under one category i.e MPH 5. The nature of civil work would be construction of one new MPH cum Rescue Centres in one districts of Uttarakhand i.e. Dehradun

### C. Purpose of the Environmental Assessment

6. The main purpose of this IEE is to provide environmental assessment of the proposed construction of the MPH cum rescue centre. The purpose of this study is to identify the environmental issues to be considered at project planning and design stage, assesses environmental consequences due to project intervention and suggests mitigation measures to minimise the adverse environmental impacts, if any, associated with construction and operation. The key environmental impacts on natural and human environments have been assessed.
7. The Objectives of this Initial Environmental Examination (IEE) are as follows:
  - ¿ Assess the existing environmental conditions in the sub-project locations including the identification of environmentally sensitive areas and valued environmental components (VECs).
  - ¿ Assess the proposed planning and developmental activities to identify their potential impacts, evaluate the impacts, and determine their extent.
  - ¿ Assess the compliance with ADB's environmental safeguard requirements and applicable environmental laws.
  - ¿ To incorporate environmental mitigation measures in the project design and preparation of environmental management and monitoring plan (EMMP) for the project.
8. This IEE has been carried out to ensure that the potential adverse environmental impacts are appropriately addressed in line with ADB Safeguard Policy Statement, 2009.

### D. Extent of IEE

9. IEE was conducted based on preliminary Detailed Design Report (DPR). The IEE covers all activities proposed under the project. The core zone of impact is taken as direct impact of the new construction or upgradation of the project component. IEE also covers the direct impact of the sub-project component. Assessment is carried out for all components of environment covering terrestrial and aquatic ecology, soil, water, noise and socio-economic aspects.

### E. Contents of IEE

The IEE has been largely structured as per SPS, 2009, ADB's Environmental Assessment Guidelines (2003) and environmental safeguards. A Good Practice Source Book (December 2012). Following this introduction of this report contains seven more sections including (ii) Policy, Legal and Administrative Framework, (iii) Description of Project, (iv) Description of Environment, (v) Anticipated Environmental Impacts and Mitigation Measures, (vi) Information Disclosure, Consultation, and Participation, (vii) Environment Management Plan and Grievance Redress Mechanism, and (viii) Conclusion and Recommendation. This IEE is based on secondary sources of information, field reconnaissance surveys, review of legal requirements, identification of impacts and mitigation measures, impact assessment and institutional review and public consultation undertaken specifically for this study was also undertaken.

### F. Methodology

10. The overall methodology for the Environmental Examination comprises the following stages:

- (A) Field reconnaissance survey to assess the sub-project locations simultaneously to identify the critical environmental attributes.
  - (B) Stakeholders Meeting and Preliminary Public Consultation to get their feedback related to sub-projects.
  - (C) Collection and review of readily available secondary data (informations, khasra khatoni and revenue map etc.) especially from Revenue and Forest Departments.
  - (D) Superimposing technical data on the design aspects over baseline status to identify the nature of potential negative impacts and suggesting feasible mitigation measures for minimization of those impacts
  - (E) Identification of method, implementation of suggested mitigation measures and environmental monitoring to develop an Environmental Management and Monitoring Plan (EMMP).
  - (F) Preparation of Environmental Safeguard Reports such as IEE, EIA, EMP and Recommended Mitigation Measures as per project need.
11. All above mentioned tasks and sub-projects feasibility were assessed based on the Rapid Environmental Assessment (REA) Checklist (i.e. Checklist 2D General).
12. The reconnaissance survey of the sub-project locations was undertaken to determine the existing status of the various Valued Environmental Components (VECs) of the area. The baseline data was collected from primary as well as secondary sources. The different environmental components such as physical, environmental and ecological resources such as topography, geology, hydrology, climate and land use, flora and fauna were studied in detail to establish the baseline conditions. The objectives of reconnaissance survey are described below.
- ∫ To provide information about general baseline environmental setting of the project area with respect to the physical environment and ecological resources in the project specific location.
  - ∫ To identify and collect various informations on potential impacts of sub-projects and the characteristics of the impacts in terms of pre-construction, construction and operation phases of the project.
  - ∫ To determine strategy for formulation of EMMP.
  - ∫ To determine and use of sustainable methods and appropriate technologies for minimization of environmental as well as social impacts as far as possible.

## II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

13. The legal framework of the country consists of several acts, notifications, rules and regulations to protect environment and wildlife. In 1976, the 42nd Constitutional Amendment created Article 48A and 51A, placing an obligation on every citizen of the country to attempt to conserve the environment.
14. Specifically for the Uttarakhand Emergency Assistance Project (UEAP: ADB), the following environmental laws and regulations are applicable (Table II - 1).



Table II-1: Applicable Environmental National and State Requirements for UEAP (ADB)

Sl.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Sub-projects	Concerned Agency	Applicable to Contract	Responsibility	Status of Compliance
<b>A. Pre-construction Stage</b>						
1	Environmental Clearance	EIA Notification, 2006 amended till date, promulgated under Environment (Protection) Act 1986 The Notification and its latest amendment entails requirement of prior environmental clearance to the projects listed in schedule of this notification.	State Environmental Impact Assessment Authority (SEIAA). If not constituted then MoEF.	No	No	Not required
2	Forest Clearance for felling of trees and acquisition of forest land.	As per the Forest Conservation Act (1980): (i) If the forest land exceeds 20 ha then prior permission of Central Government is required; (ii) If the forest land is between 5-20 ha, then permission form the Regional Office of Chief Conservator is required; (iii) If the forest land is below or equal to 5 ha land, the State Government may give permission. (iv) If the construction area is more than 40% forest, permission to undertake any work is needed from the Central Government, irrespective of the size of the area. Besides these conditions: (v) Uttaranchal Van- Panchayat Rules (2005)	District Level Committee constituted by the State Govt.	No	PIU (Civil Aviation)	Not Required
			Van-Panchayat is a local level body, which is advised by the Forest Department. The NOC in this regard is issued by the Concerned Vanpanchayat Sarpanch, Chairman (Municipality) and District Magistrate.	NOC obtained from Van-Panchayat (Appended)	PIU (Civil Aviation)	Not Required

Sl.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Sub-projects	Concerned Agency	Applicable to Contract	Responsibility	Status of Compliance
3	Permission for Working in Protected Area	The Indian Wildlife (Protection) Act, 1972, amended 1993, The Wild Life (Protection) Amendment Act, 2002. This Act provides guidelines for protection of Wild animals, birds and plants etc. and for matters connected therewith or ancillary or incidental thereto. It also states the norms for hunting of wild animals, prohibition of picking, uprooting etc. of specified plants. The Act deals with the declaration of area as Sanctuary, National Park, and closed area and also states the restriction of entries in the sanctuary.	Protected Area Authority and Wildlife Board	No	No	Not Required
4.	Permission for Working in Protected Area	The Ancient Monuments and Archaeological Sites and Remains Act, 1958, and the rules, 1959 provide guidance for carrying out activities, including conservation, construction and reuse in and around the protected monuments.	Archaeological Survey of India	No	PIU (Civil Aviation)	Not required
5.	Bhagirathi Eco-sensitive Zone Notification	The maintenance of Environmental flow and ecology of the River Bhagirathi from Gaumukh to Uttarkashi with total area of 4179.59 km <sup>2</sup> covering the entire watershed of about 100 km stretch of the river Bhagirathi shall be declared as Eco-sensitive Zone from ecological and environment point of view.	Ministry of Environment, Forests and Climate Change	No	No	Not Required
6.	Doon Valley Notification	The Central Government hereby imposes restrictions on the following activities in Doon Valley, bounded on the North by Mussorie ridge, in the North-East by Lesset Himalayan range, on the South-West by Shivalik ranges, river Ganga in the South-East and river Yamuna in the North-West, except those activities which are permitted by the Central Government for examining the environmental impacts.	Ministry of Environment, Forests and Climate Change	No	No	Not Required
B. Construction Stage						

Sl.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Sub-projects	Concerned Agency	Applicable to Contract	Responsibility	Status of Compliance
1.	Discharge of waste water	The Water (Prevention and Control of Pollution) Act 1974 and The Water (Prevention and Control of Pollution) Rules 1975. The Act and Rules outlines the activities which are prohibited on account of their potential to cause water pollution. Pollution from various sources needs to be controlled as per this Act and Rules.	Uttarakhand Environmental Protection and Pollution Control Board, Dehradun	Yes	Civil Work Contractor	Contractor will obtain prior approval (if required)
2	Permission for Sand Mining from river bed	Mines and Minerals (Regulation and Development) Act, 1957 as amended in 1972.	River Board Authorities/ Department of Mining Govt. of Uttarakhand	Yes	Civil Work Contractor	Contractor will obtain prior approval from the concerned authority.
3	Consents to establish & operate Hot and Batch Mixing Plants & Stone Crushers.	Air (Prevention and Control of Pollution) Act 1981	Uttarakhand Environmental Protection and Pollution Control Board - Dehradun	Yes	Civil Work Contractor	
4	Authorization for Disposal of Hazardous Waste	Hazardous Waste (Management and Handling) Rules 1989 as amended 2003	Uttarakhand Environmental Protection and Pollution Control Board - Dehradun	No	Civil Work Contractor	Not required
5	Consent for Disposal of Sewage from Labour camps	Water (Prevention and Control of Pollution) Act 1974	Uttarakhand Environmental Protection and Pollution Control Board - Dehradun	No	Civil Work Contractor	Not required
6	Use of Fly ash within 100 kms around Thermal Power plants	Fly Ash Notification, 1999 & its amendment in 17 August 2003.	MoEF	No	Civil Work Contractor	Not required
7	Pollution Under Control Certificate	Central Motor and Vehicle Act, 1988	Department of Transport, Govt. of Uttarakhand	Yes	Civil Work Contractor	Contractor will obtain prior approval before start of Construction work.

Sl.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Sub-projects	Concerned Agency	Applicable to Contract	Responsibility	Status of Compliance
8	Installation of Generators	The Air (Prev. & Con. of Pollution) Act, 1980	Uttarakhand Environment Protection and Pollution Control Board - Dehradun	Yes	Civil Work Contractor	
9	Employing Labour/workers	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996,	District Labour Commissioner	Yes	Civil Work Contractor	Contractor will obtain the Labour licence before commencement of work
10	Permission for extraction of boulder and sand from river beds	Mines & Minerals (Regulation and Development) Act, 1957 and its amended in 1972	Department of Mines and Geology. Government of Uttarakhand	No	Civil Work Contractor	Not required
11	License for Storing Diesel and other explosives	Petroleum Rules, 2002. Hazardous Waste (Management and Handling) Rules 1989.	Commissioner of Explosives and Uttarakhand Environmental Protection and Pollution Control Board, Dehradun	No	Civil Work Contractor	Not required
<b>C. Implementation Stage</b>						
1	Consent to Establish & Cosent to Operate for Installation of Generators	The Air (Prev. & Con. of Pollution) Act, 1980	Uttarakhand Environment Protection and Pollution Control Board, Dehradun	Yes	PIU (Civil Aviation)	

### III. DESCRIPTION OF THE PROJECT

#### A. Project Location

15. The list of one MPH Cum Rescue Centers identified on priority basis under the sub projects are given in Table III-1&2 and Figure 1 for the location of these sites. The locations for these one MPH Cum Rescue Centers for construction have been identified in these areas because the effect of climatic mishaps in this part of Uttarakhand is maximum and also some of the most frequented tourist destinations for adventure and pilgrimage.

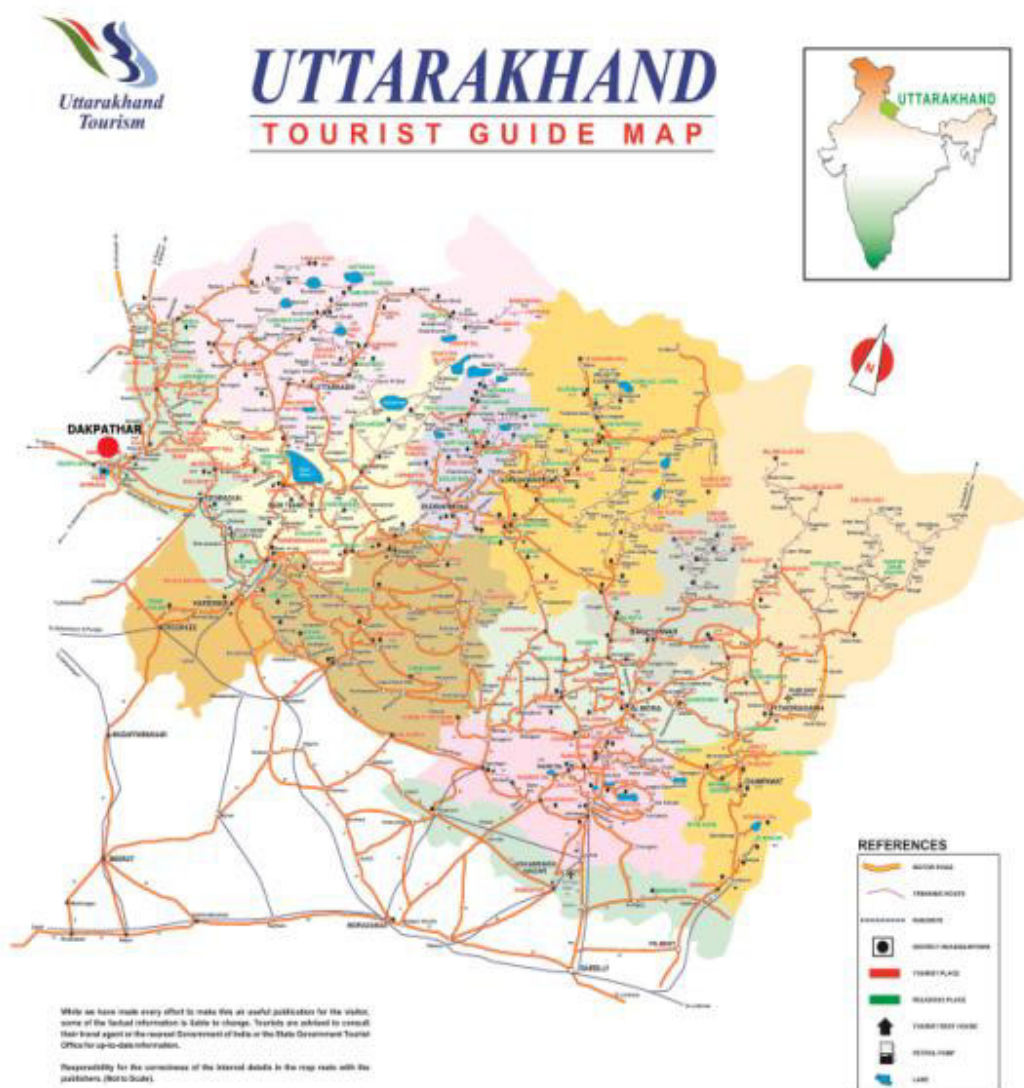


Figure 1: Map Showing Locations for Proposed MPH

Table III-1: List of MPH cum Rescue Centres to be constructed under Package IV (UEAP: ADB)

Sl. No.	Sub-Project Location	District	Category Proposed	Geographical Location	Helipad /Heliport category	Status of Land	Status of NOC	Diversion of Forest	Status of Environmental & Social (R&R) issues
1.	Dakpathar	Dehradun	MPH 5	30 <sup>o</sup> 29.688 N 79 <sup>o</sup> 47.156 E	H4	Government Degree College	NOC obtained	No	No
	Total	5	MPH-5=6			-	6	-	-

17. The disaster preparedness area coverage is for pilgrim destinations of parts of `Char Dham Circuit, viz. Chamoli district being home to Badrinath, while Rudraprayag district is home to Kedarnath, and some other tourism destinations and settlements; as well as tourism destinations and settlements in the other 9 districts of the Uttarakhand that needs to be supported with enhanced disaster preparedness measures.

Table III-2: Categorization of MPH Cum Rescue Centres

No.	Category	Capacity	Plinth Area (in sqm)	No. of proposed
1	MPH 20	1 Pilot Room + Lounge +Kitchen + Multipurpose Hall 20 Person + aviation control room + medical facilities + store + toilets	272 sqm	-
2	MPH 10	1 Pilot Room + Lounge +Kitchen + Multipurpose Hall 10 Person + aviation control room + medical facilities + store + toilets	196 sqm	-
3	MPH 5	1 Pilot Room + Lounge cum Multipurpose Hall for 5 persons +Kitchen + aviation control room + medical facilities + store + toilets	110 sqm	1

#### B. Proposed Category of the Project

18. Pursuant to the requirements of the ADB Safeguard Policy Statement (2009) proposed `Construction of MPH Cum Rescue Centres` was screened to identify significance of potential impacts, determine the environmentally sensitive component, establish the needed level of assessment, and prescribe the information disclosure and consultations requirement to be complied by the Uttarakhand Civil Aviation Development Authority (UCADA). Consistent with the Environmental Assessment and Review Framework (EARF), the sub-project was screened using the ADB rapid environmental assessment (REA) checklist.
19. The environmental screening revealed that no protected or sensitive areas were traversed. There are no rare, threatened, and endangered species (flora and fauna) within the sub-project corridor of impact. All impacts are site specific, and all impacts can be readily mitigated supporting a category `B` classification.

#### C. Background of the Proposed Sub-Projects

##### i. Dakpathar (District ` Dehradun)

20. Dakpathar is a town situated in Dehradun district of Uttarakhand, India. It is on the left bank of the Yamuna River and 43 km northwest of the city of Dehradun. Dakpathar lies about 790 meters above sea level at the foothills of Shivalik range. The ground is used for multi purpose activities.
21. The proposed land is not located within or adjacent to the core and buffer zones of any national park, wildlife sanctuary, biosphere reserve and other critically environmental habitats such as wetlands, eco-sensitive zone (ESZ) etc.
22. Scope of proposed MPH cum Rescue Centre is MPH-5 category, which is confined to construction of prefabricated structure of MPH over RCC foundations, trusses and roofing

works, interior & external wall finishing works, flooring and ceiling works, electrical and plumbing works, loose furniture and misc. items complete in all respect to make the building ready to use and thus no adverse impact is anticipated due to construction activities.

D. Project Implementation Schedule

23. The implementation period for the UEAP is upto March 2017.

E. Technical Specification

24. The following points are considered for designing of these MPHs in brief at the SAR level.

a) Area Requirement:

No.	Category	Capacity	Plinth Area (in sqm)
1	MPH 20	1 Pilot Room + Lounge +Kitchen + Multipurpose Hall 20 Person + aviation control room + medical facilities + store + toilets	272 sqm
2	MPH 10	1 Pilot Room + Lounge +Kitchen + Multipurpose Hall 10 Person + aviation control room + medical facilities + store + toilets	196 sqm
3	MPH 5	1 Pilot Room + Lounge cum Multipurpose Hall for 5 persons +Kitchen + aviation control room + medical facilities + store + toilets	110 sqm

b) Foundation:

The Foundation for the entire structure shall be raft / isolated footing considering the load of the super-structure, seismic zone, wind velocity and snow load.

c) Prefabricated Steel works:

The Steel frame shall be of MS Built-up Sections and complete PEB Structure (incl. wall frames, Roof frames), internal and external walls made out of cement board filled with insulation, Galvulume profiled roofing sheets supported over purlins in required slope as per design complete with end drain channels and rain water pipes as per drawings and specifications.

d) Masonary works

230/115 mm thick Brick work is to be done using modular bricks & cement motor as binding material.

e) UPVC Door-Window works

Factory made UPVC white colour casement/sliding window / door, made of extruded profiles. Profiles of frames and sash will be mitered cut and fusion welded at all corners, including drilling of holes for fixing hardware and drainage of water etc., making arrangement for fixing of hardware, EPDM gasket, 1.2 ÷ 0.2 mm thick galvanized steel profile to be inserted in required profile, frame will be fixed to the wall with 8 mm x 100 mm long fasteners.



- f) PVC interior and exterior paneling works  
External & internal wall cladding system (Exterior grade compact panel for exterior facia) made out of natural fibre with thermosetting resins under high temperature & pressure & UV coated for 10+ year guarantee, fixed onto existing walls/cement board panels with necessary fittings, fixtures, aluminium/UPVC profiles in design with grooves etc, complete with all fittings and hardware š wooden look alike design.
- g) Electrical Works  
Complete electrical works including point wiring, circuit wiring, light fixtures, switch-sockets, power points, MCB boards, main panel complete including earthing etc in all respects.
- h) Plumbing and Sanitation Works  
Plumbing Works for toilets, bathrooms & kitchen complete in all respect (water supply in washbasins, wcs, urinals, bath areas, waste water from urinals, washbasins, sewage from w.c., hot - cold water lines & liquid soap container etc complete including floor traps, wall traps, external gully traps, manholes etc. Including water storage tank & soak pit.
- i) Loose Furniture and misc. items  
Bed, Sofa, Table chair, TV along with other basic necessity items to be provided as per the size of MPHs.

#### IV. DESCRIPTION OF THE ENVIRONMENT

##### A. Physical Environment

25. This section presents a brief description of the existing environment including its physical, ecological resources, and socio-economic development of the Sub-projects. Broad aspects on various environmental parameters such as geography, geology, physiography, climate, meteorology, seismology, ecology, socio-cultural and economic developmental parameters on one hand and information to be compiled from relevant government agencies like the Forest Department, Wildlife Department, State Environment Protection, and Pollution Control Board and Metrological Department etc.

##### 1. Geography

26. Uttarakhand lies in the northern part of India amidst the magnificent Himalayas and dense forests. The State is bordering Himachal Pradesh in the north-west and Uttar Pradesh in the South and shares international borders with Nepal and China. The State is comprised of 13 districts, these are; Pithoragarh, Almora, Nainital, Bageshwar, Champawat, Uttarkashi, Udham Singh Nagar, Chamoli, Dehradun, Pauri, Tehri Garhwal, Rudraprayag, and Haridwar. Geographically, the state lies in the northern Himalayas between 28°53'24" North latitude and 31°27'50" North latitude and 77°34'27" East longitude to 81°02'22" East longitude. The State has geographical area of 53,483 Km<sup>2</sup> and a population of about 1.01 crore as per census 2011.



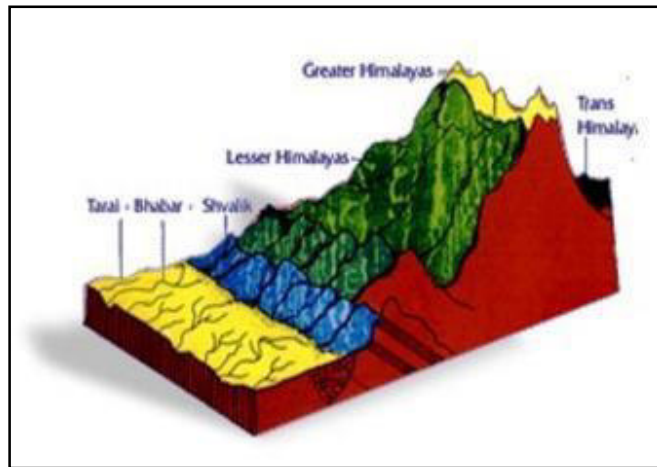
Figure 2: Location of Districts in Uttarakhand

27. Uttarakhand is divided into two regions and also called administrative divisions, basically following terrains: the Kumaon and Garhwal. The Kumaon division located southeast of the state and composed of Almora, Bageshwar, Champawat, Nainital, Pithoragarh, and Udham Singh Nagar districts. The Kumaon region is part of the vast Himalayan track and the sub-mountains of Terai and Bhabhar. The region is drained by Gori, Dhauri, and Kali from the Tibetan mountains, and Pindari and Kaliganga which ultimately joins Alaknanda River. The Garhwal division is composed of Chamoli, Uttarkashi, Rudrapur, Tehri Garhwal, Pauri, Dehradun, and Haridwar districts and is entirely on rugged mountain ranges dissected by valley, and deep gorges. The Alaknanda River, the main source of the Ganges, traces its headwaters in this region.

28. The State is part of the Western Himalaya. Geographically, the Kumaon zone of the Western Himalaya can be divided into four zones viz.

- (A) Tarai-Bhabhar-Shivalik (Sub-Himalayas)
- (B) Lesser-Himalayas
- (C) Greater-Himalayas
- (D) Trans-Himalaya (Tethys)

South of Lesser Himalayas, it is the outermost zone overlooking the foot-hills and the plains. The altitude ranging from 750-1,200 metres, the Shivaliks are the foot-hills just above the Bhabhar and Tarai, once famous for the swamps and insalubrious climate, inhabited by Tribal people only, now reclaimed and developed into a fertile land, supporting a large population. While the northern zone is composed of gneisses and granites, this has a great complexity of structure, having the most favorable climatic condition for human habitation. The elevation varying from 1,000 metres to 3,500 metres from low lying river valleys to peaks close to the Great Himalayas, the Lesser Himalayas, with moderately steep slopes, consists of many fertile and flat river valleys.



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29. The sub-projects fall within this zone, which is the most populated zone. This region is watered by the rivers Alaknanda, Pinder, Kosi, Gomti, Saryu, Ramganga, etc. The banks of these rivers locally called as 'seras' are highly fertile. The major Lesser Himalayan settlements are Almora, Bageshwar Chamoli, Champawat, Rudrapur, Pauri, Tehri, Haldwani etc. are situated in this region. The cross profiles of the fluvial valleys show convex form with steep valley sides, interlocking spurs descending towards the main channel, hanging valleys, water falls and rapids and terraced agricultural fields on the gentle slopes on the valley sides. The clustering of villages is confined mainly on the gentle slopes of the ridges on the fluvial terraces.

30. The northern most zone consisting of perpetually snow-covered ranges between 3,500 to 4,480 metres, although the snow-line rises to 5,400 metres, during summers at some places. The zone contains a number of glaciers, Pindari, Milam, Nandakot, Kafni, Untadhura, Gori etc. which originate to a number of Snowfed Rivers like Alaknanda, Bhagirathi, Pinder, Gori Ganga etc. The Dharamganga and Saryu are major tributaries of the Kali river, which separates Kumaon from Nepal in the extreme north-east.

## 2. Geology

31. According to Gansser (1964), the Himalayas may be sub-divided into five geographical divisions from west to east. In their longitudinal structure, the Himalayas are divided (from north to south) by a series of parallel tectonic zones. The 'Sub-' or 'Outer-Himalayas' forming the foot-hill zone are delimited in the south by the large fans of Ganges alluvial deposits, whereas the northern edge is a clearly outlined tectonic feature - the Main Boundary Fault - genetically linked with Miocene metamorphism in the Himalayas.
32. The Lesser Himalayas are composed of tectonically compressed blocks of Paleozoic and Mesozoic crystallines, metamorphics, and sedimentary rocks. The Main Central Thrust is a major tectonic feature of the Himalayas and has brought the crystalline rocks of the Higher Himalayas over the younger sedimentaries.
33. The Greater/Higher Himalayas consist of a single range with an average height exceeding 6,000 m. The width of this zone, mostly composed of granites and gneisses, is 24 Km. The Central Crystallines occupy the core or the 'axis' of this range, and were considered to be Tertiary intrusive accompanying the compression movements responsible for the uplift of the Himalayas by some earlier workers. The recent view, however, is that they are mostly Paleozoic or Precambrian in age and represent a geanticline between the unfossiliferous sediments of the Lesser Himalayas to the south and a highly fossiliferous sequence of the Tethys zone in the north. The stratigraphic order in the Tethys zone is well known because of the well preserved fossils such as productus, ophiceras, and the likes.

## 3. Physiography

34. Uttarakhand lies in the Northern part of India amidst the magnificent Himalayas and dense forests. The state is bordering Himachal Pradesh in the north-west and Uttar Pradesh in the South and has international borders with Nepal and China. Uttarakhand consists of 13 districts viz., Pithoragarh, Almora, Nainital, Bageshwar, Champawat, Uttarkashi, Udham Singh Nagar, Chamoli, Dehradun, Pauri, Tehri Garhwal, Rudraprayag and Haridwar.

### B. Pedology

35. The soils are natural, dynamic, heterogeneous, non-renewable resource, which support plant and animal life. Most of the soil in Uttarakhand state is organic in nature but in some areas it content high proportion of minerals.
36. The soils developed from rocks like granite, schist, gneiss, phyllites, shales, slate etc. under cool and moist climate.
37. Very steep to steep hills and Glacio-fluvial valleys are dominantly occupied with very shallow to moderately shallow excessively drained, sandy-skeletal to loamy-skeletal, neutral to slightly acidic with low available water capacity soils. They have been classified as Lithic/Typic Cryorthents. These soils are in general under sparse vegetation.
38. The baseline data on soil quality at each proposed site for construction of MPH will be generated by the contractor before commencement of construction works. The details of the sites is given in Table IV-1
39. During construction the sampling locations proposed are, where the construction/restoration/repair work will be done.

Table IV-1: Locations for Generation of Baseline Data for Soil Sample

S. No.	Sub-Projects	No. of Sampling	Sampling Locations
1.	Dakpathar	1	At project location

C. Climate and Meteorology

40. The State of Uttarakhand, with its highly varying topographical features, has shown an equally variegating climatic condition, ranging from hot and sub-humid sub-tropical in the southern tract of Bhabhar to temperate, cold alpine, and glacial climates in the northern part of the high mountains.
41. Factors such as elevation, slope, proximity of glaciers, forests, mountain peaks and ridges and direction of mountain ranges together give rise to the great variations in climatic conditions, even at the micro and local levels. These attributes determine the temperature range as well as the distribution of rainfall.
42. However, the overall climatic condition in the State is governed by the southwest monsoon. It has a sub-tropical to temperate climate, with three pronounced seasons; summer, winter, and monsoon. The hilly terrain of the Himalayan region has snow cover and is severely cold during winter with snowfall normally occurring during the months of December to March.
43. Dehradun district has within its limits lofty peaks of the Outer Himalayas as well as the Dun Valley with climatic conditions nearly similar to those in the plains. The climate of the district, in general, is temperate. In the hilly regions, the summer is pleasant but in the Doon Valley, the heat is often intense. The temperature drops below freezing point not only at high altitudes but also even at places like Dehradun during the winters, when the higher peaks are under snow. The summer starts by March and lasts up to mid of June when the monsoon sets in. The maximum temperature rises to over 42°C at Dehradun while at Mussoorie it doesn't exceed 32°C. The mean daily maximum temperature during winter is 19.1°C at Dehradun and 10.2°C at Mussoorie. The district receives an average annual rainfall of 2073.3 mm. Most of the rainfall is received during the period from June to September, July and August being the wettest months.

D. Ambient Air Quality and Noise Level

44. The pristine environment and sparse population suggest that most part of the State have a very good air quality. Any point or non-point pollution sources of air pollution were not observed throughout the survey period. It was observed that the traffic on the roads is too low to cause unbearable air pollution due to vehicular exhaust. Finally, there are no industries recorded in or along the sub-project areas and hence any other source of atmospheric air pollution is not expected.
45. The air pollution level is well within the permissible limits because there are no major sources of pollution in the sub-project region. The baseline data on ambient air quality will be generated by the contractor before commencement of construction work. The proposed locations of air quality monitoring at pre-construction stage (baseline data) are as follows as per CPCB guidelines. The air parameters to be monitored will be PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub> and CO.

Table IV-2: Locations for Generation of Baseline Data for Ambient Air Quality (AAQ) and Noise Levels

S. No.	Sub-Projects	No. of Stations	Sampling Locations	
			Location - 1	Location - 2
1.	Dakpathar	2	Nearest City/Town/Village (i.e. Dakpathar)	At project location (i.e. MPH site)

46. During construction the sampling will be conducted where the construction/restoration work will be done.
47. Generally, noise pollution is not a problem in the state except in the urban areas like Dehradun. Traffic, industrial, and festival/cultural noises, along with noise generated from construction activities, DG sets etc., are the most prominent sources of noise in the urban areas. Overall noise level in the towns is almost calm except on some busy routes of Uttarakhand.
48. During the construction period, a temporary increase in the noise levels are expected as there will be movement of construction machineries and construction activities to be done in the proposed sites. Suitable noise barriers in the form of vegetation and timely scheduling of construction activities will help minimize these effects better.
49. It was observed that ambient noise scenario in residential, commercial, and sensitive areas in the study area are quite low in general. The baseline data on ambient air quality will be generated by collection of representative samples by the contractor before commencement of construction works. The selection of sampling location will be representative of residential, commercial, institutional, industrial and sensitive locations. The proposed locations of noise quality monitoring at pre-construction stage (Baseline data) will be same as that indicated in Table IV-2.

#### E. Hydrology

50. Uttarakhand has tremendous water resources such as glaciers, lakes, rivers and other water bodies. Most of these have tourism importance like Milam, Pindari, Sunder Dhunga and Heeramani Glaciers; Seven lakes in Nainital; and some wetlands. However these water bodies are located far from the sub-project sites.
51. Generally, there has been an overall decline in water resources in the State. Hydrological studies over the last decades confirm the diminishing water resources and the worsening crises as caused by the following factors which have resulted in the decrease in underground seepages. These have directly contributed to the reduction of water availability in and reduction of discharge in nallas as well as extensive disappearance of springs-the region's primary source of drinking water.
  - ∴ There has been a diminishing regulatory effect of glaciers of the Great Himalayan zone.
  - ∴ There is a long-term decreasing trend of stream discharges.
  - ∴ The capacities of the lakes have dwindled.
  - ∴ Surface runoff on the hillsides has shown high increase.
  - ∴ There has been an increase in floodwater and decrease in base flow water in channels and rivers.
  - ∴ Extensive soil erosion and landslips are recurring phenomena in the region.

## 1. Water Drainage

52. The region of Uttarakhand is well drained by numerous rivers and rivulets locally known as Gad (river) and Gadhera (rivulet). The water resources of this region are of singular importance not only for the region but also for the whole Gangetic plains of north India. There are three main river systems are: (i) the Bhagirathi - Alaknanda basin - Ganges basin, (ii) The Yamuna - Tons basin, and (iii) the Kali basin.
53. The Ganges system drains the major part of the region covering the whole of the Garhwal, except the western part of Uttarkashi district, and the western part of Garhwal Himalayas from an altitude of 7,138 m meet at Devprayag and flow as the Ganges thereafter. The Bhagirathi is the main stream while the Alaknanda, Saraswati, Dauli Ganga, Berahi Ganga, Nandakini, Mandakini, Madhu Ganga, Pindar, Atagad, Bhilangana, Jad Ganga, the Kaldi Gad and the Haipur are the main tributaries to the Alaknanda and Bhagirathi rivers, ultimately contributing to the waters of Holy river Ganga. The Nayar, which drains more than a half area of the Garhwal district, is an important tributary of the Ganga. The Yamuna-Tons system is also located in the Garhwal region. The Yamuna river rises at Yamunotri and is joined by important tributaries such as the Giri and more importantly, the Tons, which is its biggest tributary with 2.7 times greater volume of water than the Yamuna. The River Yamuna flows out of the hill areas through the Doon valley and the Shivaliks, into Haridwar district, being joined in the Doon valley by several streams.

## 2. Water Quality

54. Water quality of Himalayan Rivers has been steadily deteriorating over several decades due to anthropogenic activities, dumping of treated or untreated effluents, poor structured sewerage and drainage system, etc. In the present, the water quality of five important rivers namely, Gola, Kosi, Ramganga, Saryu and Lohawati rivers were investigated which flow through the different districts of Kumaun region of Uttarakhand Himalaya. The water of all these rivers serves as the major source for drinking and irrigation purposes in these districts of the Kumaun region of Uttarakhand. River water samples collected in premonsoon and post-monsoon seasons of the years 2011 and 2012 were analyzed for various water quality characteristics. Statistical analyses indicate positive correlation among most of the chemical parameters. Piper diagram illustrates that all the water samples fall in Ca-Mg-HCO<sub>3</sub> hydrochemical facies, Moreover, the suitability of water for drinking purposes determined by water quality index indicated that river water in both the seasons is unsuitable. Irrigation water quality of all the river water was found suitable during both the seasons according to the result of sodium adsorption ratio, sodium percentage and residual sodium carbonate. The present study revealed that major factors contributing to deterioration of water quality of all the rivers might be eutrophication, tourism, anthropogenic and geogenic processes. Therefore, to restore the vitality and water quality of all these rivers, proper water resource planning programme should be developed.
55. Based on limited records, the water quality of Uttarakhand's rivers, rivulets, and other natural water bodies is generally good and no major source of water pollution was found. The hand pumps, natural water seepage in hilly areas locally called as 'Naula', and natural water springs locally called as 'Gadhera' represent the ground water sources in the hills. There are no major sources of water pollution in terms of point or non-point sources aside from natural landslides leading to deposition of debris in streams. The baseline data on water quality will be generated by collection of representative samples by the contractor before the commencement of construction activity. The main

parameters will be monitored are TDS, TSS, pH, Hardness, BOD and Faecal Coli Form, etc.

Table IV-3: Locations for Generation of Baseline Data for Water Quality

S. No.	Sub-Projects	No. of Sampling	Sampling Locations
1.	Dakpathar	1	Nearest water body (Yamuna River)

#### F. Mineral Resources

56. Uttarakhand is not very rich in field of mineral resources. Moreover, it is also part ecologically sensitive area, extensive quarrying is not practiced in the state. However, there are some minerals sparsely distributed in the state, which includes limestone, magnesite, gypsum, iron ore, graphite and copper.
57. It has been estimated that there are deposits of 100 million tonnes of limestone, 35 million tonnes of dolomite, 21 million tonnes of magnesite, 9.0 million tonnes of rock phosphate, 4.0 million tonnes of gypsum, and 8.8 million tonnes of soap stone in different areas of the State. Some of the major mineral deposits are indicated in the Table IV-4.

Table IV-4: Availability of important minerals (million tonnes)

S. No.	Name of Mineral	Quantity (million tonnes)
1.	Lime stone	430.5
2.	Marble	6.4
3.	Rock Phosphate	25.0
4.	Barytes	0.085
5.	Grayphite	10.7
6.	Dolomite (superior)	30
7.	Magnesite	70.294
8.	Copper	1.6
9.	Soap stone	26.64
10.	Gypsum	0.195

Source: <http://rrtd.nic.in/Uttarakhand.htm>

58. The common minerals, which are found in the State are the following:
  - I. Asbestos: This is of the amosite variety and can be used for the production of asbestos, cement bricks, laboratory asbestos sheet and paper, but it is considered as low economic importance.
  - II. Magnestic: This is of an average quality is crystalline in nature, and is found associated with crystalline dolomites and sometimes with soapstone. The Magnesium carbonate found here is also of average quality and its mineralisation has also been reported some districts of Uttarakhand.
  - III. Soap stone or Steatite: This is white saponaceous stone resembling pipe clay is obtained in as lenticular body and is associated with mineral pyrites, which adds a color to it, and in places with magnesite. it can be mined for use as filler in soap and in the cosmetic industries. In the past various utensils were made of it which, when polished, had the appearance of marble.
  - IV. Copper: The copper mines in uttarakhand are extensive and of reputed during the period of Hindus and The Gorkhas rules. All the rich mines have since being exhausted and at present they do not offer a fair field for the employment of capital.



- V. Iron: Small and sporadic occurrence of iron are known to occur in several parts of district but are of hardly any economic importance. Iron ore, rich in haematite, and magnetic ore, with haematite and siderite, also occur in Uttarakhand.
  - VI. Graphite: In past, this mineral also known as plumbago, found mostly in patti Lohba, was used as a dye but no large deposits have been noticed for a long time.
  - VII. Gypsum: This mineral is found on the bank of some rivers and was used in the past for the manufacture of saucers and bowls. When ground to a fine powder it is known as 'Plaster of Paris' and can be used for a number of purposes.
  - VIII. Lead: Deposits of this metal were fairly numerous in the past but it is found in somewhat inaccessible places and has long since ceased to be worked.
  - IX. Slate: This is dense, fine grained metamorphic rock, which is produced from fine clay, can be split into thin, smooth plates and is quarried throughout Uttarakhand except some plains Districts. It is suitable for roofing purposes, the thin dark blue slates being somewhat inferior in quality.
  - X. Building Stone: Stone which can be used for building purposes is available in most parts of Uttarakhand State. Sand stone is found in abundance in the lower hills. Gneiss and chlorite schists which are frequently used for building purposes.
  - XI. Sulphur: This is yellow coloured mineral, also known as brimstone is found in the form of green sulphate of iron and is obtainable from iron pyrites and copper mines, its presence being characterised by a small as of rotten eggs. Sulphur springs also occur in many parts of Uttarakhand State.
  - XII. Bitumen: The brownish white natural sulphate of alumina known as Shilajit is found in rocks at a fairly high altitude and occur in small lumps which generally have an admixture of red sand and micaceous stone embedded in them. It is used in Ayurvedic medicine and during the season when there is an influx of pilgrims, it fetches good income to those who deal its business and collection from the nature.
59. Besides the above minerals, some other minerals found in small quantities such as antimony, arsenic, lignite or brown marble, mica and silver.

#### G. Seismology

- 60. The main tectonic elements of the region include the (i) central thrust and (ii) boundary fault. Several NE-SW lineaments are also known from the area and these traverses across different tectonic zones.
- 61. Seismically, the State constitutes one of the most active domains of the Himalayan region. Several damaging earthquakes are recorded from this region. As such, the region is classified under high seismic zones IV and V. All the proposed 8 MPH cum rescue centre sites are located in the Seismic Zone V. The modified mercalli intensity broadly associated with the zone V is IX. The seismic zones of India are represented in Figure 3 given below.

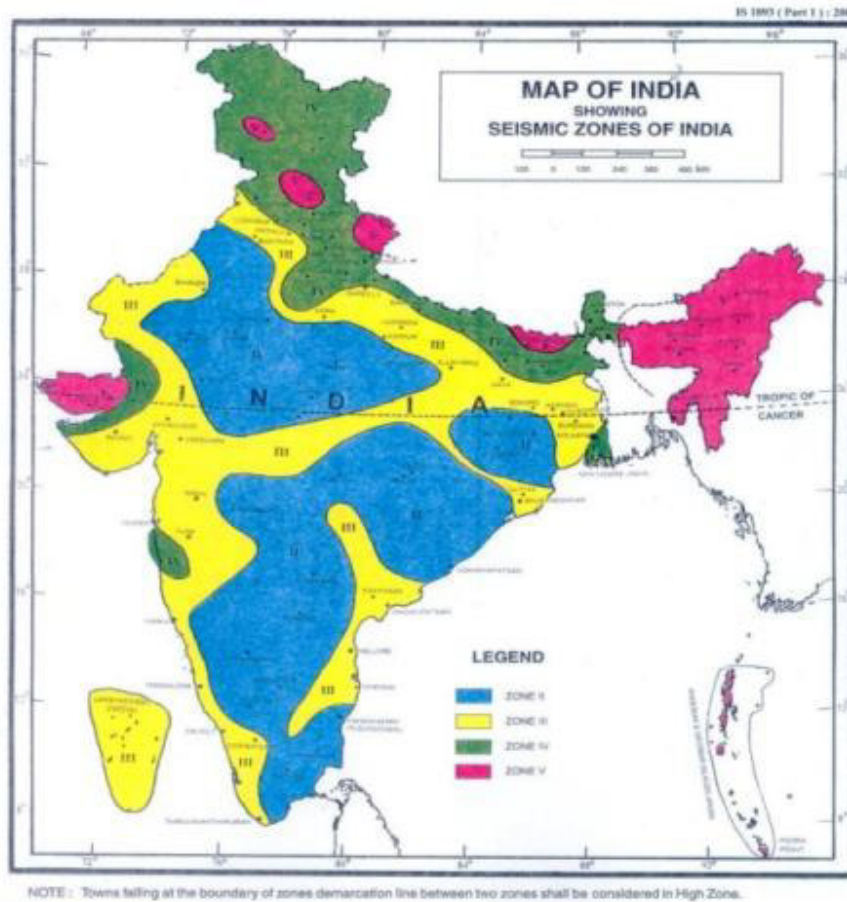
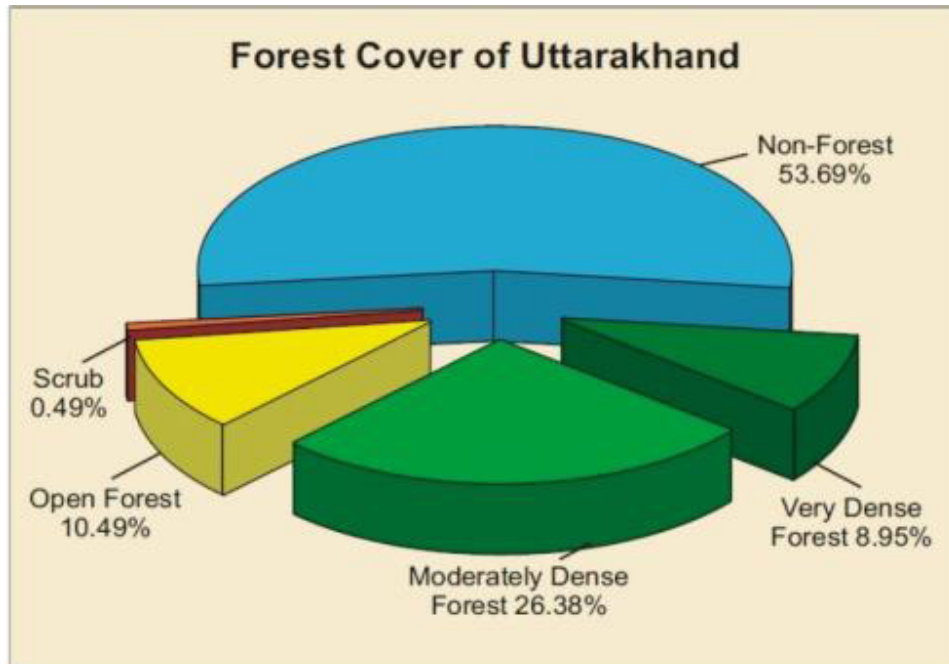


Figure - 3: Seismic Zones of India

## H. Ecology

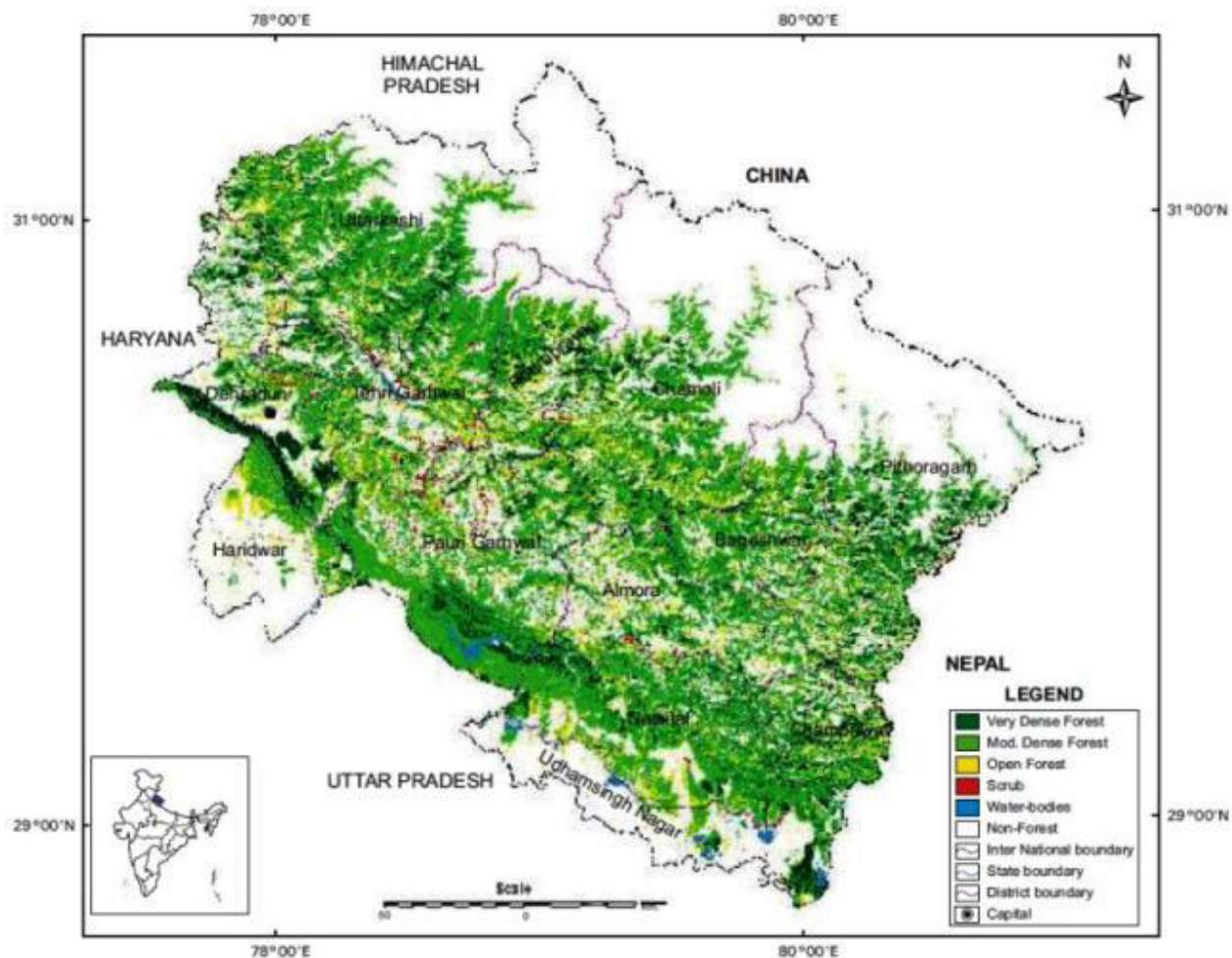
### 1. Forests

62. According to the India State Forest Report 2013, the recorded forest area of the Uttarakhand state is 24,508 Km<sup>2</sup>, which constitutes 45.82% of its total geographical area. The Very Dense Forests constitute of 4,785 km<sup>2</sup>, Moderate dense forest of 14,111 km<sup>2</sup> and Open Forest of 5,612 km<sup>2</sup>.
63. The Garhwal region has more forest cover with 14,639 km<sup>2</sup> compared to the Kumaon region with 9,869 km<sup>2</sup>. However, they are almost equal in terms of distribution over its territory with 45% and 47% of covered with forest. The district of Pauri Garhwal, Uttarkashi, Nainital, and Chamoli have the largest forest cover accounting for 50% of all the state's total. The forest covers of Uttarakhand state are shown in Figures - 4 & 5 and the district-wise forest cover are given in Table IV-5.



Source: India State Forest Report, 2013

Figure - 4: Forest Cover of Uttarakhand (As per India: State Forest Report, 2013)



Source: India State Forest Report, 2013

Figure-5: Forest Cover Map of Uttarakhand

Table IV-5: District-wise Forest Cover, Uttarakhand

Divisions	Districts	Geographical Area (Km <sup>2</sup> )	Forest Cover (Km <sup>2</sup> )			Total Forest	% of GA
			Very Dense	Moderate Dense	Open Forest		
Garhwal	Chamoli	8,030	441	1,573	686	2700	39.23
	Dehradun	3,088	583	695	332	1,610	52.17
	Pauri Garhwal	5,329	520	2,095	676	3,291	61.76
	Rudraprayag	1,984	241	592	297	1,130	56.96
	Tehri Garhwal	3,642	298	1,232	618	2,148	58.96
	Uttarkashi	8,016	570	1,957	618	3,145	39.23
	Haridwar	2,360	25	333	257	615	26.06
Sub-total	7 Districts	32,449	2,678	8,477	3,484	14,639	45.11

Divisions	Districts	Geographical Area (Km <sup>2</sup> )	Forest Cover (Km <sup>2</sup> )			Total Forest	% of GA
			Very Dense	Moderate Dense	Open Forest		
Kumaon	Pithoragarh	7,090	571	1,113	416	2,100	29.62
	Bageshwar	2,246	197	883	305	1,385	61.67
	Almora	3,139	222	927	428	1,577	52.04
	Nainital	4,251	605	1,899	570	3,074	72.31
	Champawat	1,766	337	576	274	1,187	67.21
	Udham Singh Nagar	2,542	175	236	135	546	21.48
Sub-total	6 Districts	21,034	2,107	5,634	2,128	9,869	50.38
Total	13 Districts	5,3483	4,785	14,111	5,612	24,508	45.82

Source: India State Forest Report, 2013

Note: (i) Very Dense Forest: All lands having tree canopy cover > 70%.

(ii) Moderate Dense Forest: Tree canopy cover between 40%-70%.

(iii) Open Forest: Tree canopy cover between 10%-40% and

(iv) Degraded Forest: Tree canopy cover <10%.

64. Forest type mapping using satellite data has been undertaken by the Forest Survey of India with reference to the classification given by Champion and Seth (1968). As per this assessment, the state has 34 forest types, which belong to eight forest type groups, viz.

- ⌘ Tropical Moist Deciduous,
- ⌘ Tropical Dry Deciduous,
- ⌘ Sub-tropical Pine,
- ⌘ Himalayan Moist Temperate Forests,
- ⌘ Himalayan Dry Temperate Forests,
- ⌘ Sub-Alpine Forests,
- ⌘ Moist Alpine Scrub and
- ⌘ Dry Alpine Scrubs.

65. A wide variety of trees are found in Uttarakhand State. Some prominent tree species enumerated in this section based on their altitudinal gradients above mean sea level. Some notable tree species are Poplar (*Populus ciliata*) and Eucalyptus (*Eucalyptus citriodora*) due to their fast growing and large market demands, and Khair (*Acacia catechu*), Sal (*Shorea robusta*), Seesam (*Dalbergia sissoo*) etc. for their ecological and economic importance, which are highly adapted to sandy soil are being used to stabilize river banks and islands in river beds. Oak (*Quercus* sp.) is another important species considered to be amongst the best wood in the world specially for making agriculture implements due to its good compactness with twisted fibers. The State Govt. of Uttarakhand has declared the oak tree (*Quercus leucotrichophora*) as a Kalpvriksha or wish fulfilling divine tree often treated as the signature plant of the Kumaon Himalayas as numerous logos and insignias with a stylized version of the deodar inscribed on them. The Chir-Pine (*Pinus roxburghii*) is an excellent source of resin in Uttarakhand, which is used in production of turpentine oil. The Deodar (*Cedrus deodara*) grows in the temperate to alpine area that is found between 1800 to 2400 m (amsl). Its oil has an

important medicinal property generally used in skin diseases and disorders. The predominant top-canopy (tree) species of the State forests have been described in Table IV-6 given below.

Table IV- 6: Predominant top-canopy (tree) species according to altitude (m. amsl)

Sl. No.	Name of Some Common Tree Species of Uttarakhand			Altitude (m. amsl)
	Vernacular	English Name	Botanical Name	
1.	Cheed	Chir-Pine	<i>Pinus roxburghii</i>	600-1800
2.	Kail	Blue-Pine	<i>Pinus wallichiana</i>	1800-2400
3.	Banj	Himalayan Oak Tree	<i>Quercus incana</i>	1700-2000
4.	Deodar	Himalayn Cedar Tree	<i>Cedrus deodara</i>	1800-2400
5.	Raga	Himalayan Low Level Fir	<i>Abies pindrow</i>	2100-2900
6.	Raga	Himalayan High Level Fir	<i>Abies spectabilis</i>	2900-3600
7.	Thuner	Himalayan Yew	<i>Texus baccata</i>	2400-2700
8.	Bhojpatra	Himalayan Birch	<i>Betula utilis</i>	3000-3500
9.	Kathbhoj	Himalayan Birch	<i>Betula alnoides</i>	2800-3200
10.	Moru	Oak Tree	<i>Quercus dilatata</i>	2000-2500
11.	Kharsu	Oak Tree	<i>Quercus semicarpifolia</i>	2200-2400
12.	Spruce	Spruce	<i>Picea smithiana</i>	2400-2900
13.	Surai	Cypress	<i>Cupressus torulosa</i>	2300-2400
14.	Pangar	Horse Chestnut	<i>Aesculus indica</i>	1800-2100
15.	Buransh	Rose Wood	<i>Rhododendron arboreum</i>	1600-2000
17.	Simaru	Rose Wood	<i>Rhododendron campanulatum</i>	2200-3000
18.	Kachnar	Orchid Tree	<i>Bauhinia variegata</i>	600-900
19.	Shal	Shal Tree	<i>Shorea robusta</i>	600-750
20.	Sagwan	Teak	<i>Tectona grandis</i>	600-750

## 2. Agriculture

66. Agriculture is the main economic activity in the State as per latest land-use statistics. The total reported area for agricultural activity is 55.66 lakh hectares. In the hills, the major crops grown include wheat, paddy, mandua, ramdana and potato whereas in the plains the major crops are wheat, paddy, pulses, and sugarcane.
67. The pattern of land ownership is unlike that found in the rest of India. Most of the Uttarakhand farmers are owner-cultivators. Tenant farming and share cropping are rare while land holdings are generally small and limited to family farms - approximately 50 percent of all land holdings are less than 0.5 hectares in size and 50 percent under one hectare. As such, the zamindari system of big landholders is limited to the plains. Both the geography and the Pahari cultural heritage have played roles in maintaining a traditionally more equitable, if impoverished, land distribution in Uttarakhand.

Table IV-7. Area under Principal Crops and Productivity in Uttarakhand

Sl. No.	Items	Year/Period	Unit	Statistics
<b>A. Area Under Principal Crops (Provisional)</b>				
1.	Cereals	2011-12	Ha	896774
	(i) Rice ( <i>Oryza sativa</i> )	2011-12	Ha	280108
	(ii) Wheat ( <i>Triticum aestivum</i> )	2011-12	Ha	369209
	(iii) Barley ( <i>Hordeum vulgare</i> )	2011-12	Ha	22508
	(iv) Maize ( <i>Zea mays</i> )	2011-12	Ha	28038
	(v) Finger millet ( <i>Eleusine coracana</i> )	2011-12	Ha	125163
	(vi) Sanwan	2011-12	Ha	63002
	(vii) Other	2011-12	Ha	8746
2.	Pulses	2011-12	Ha	55690
	(i) Urad ( <i>Phaseolus radiatus</i> )	2011-12	Ha	12980
	(ii) Lentil ( <i>Lens esculenta</i> )	2011-12	Ha	12295
	(iii) Pea ( <i>Pisum sativum</i> )	2011-12	Ha	3451
	(iv) Gahat ( <i>Mycrotoma biflorum</i> )	2011-12	Ha	12033
	(v) Rajma ( <i>Dolichos lablab</i> )	2011-12	Ha	4614
	(vi) Gram ( <i>Cicer arietinum</i> )		Ha	766
	(vii) Bhatt (Black Soyabeen)	2011-12	Ha	5734
	(viii) Others	2011-12	Ha	3817
3.	Oil Seeds	2011-12	Ha	29705
	(i) Mustard ( <i>Brassica campestris</i> )	2011-12	Ha	14294
	(ii) Seasmum ( <i>Sesamun indicum</i> )	2011-12	Ha	2020
	(iii) Groundnut ( <i>Arechis hypogea</i> )	2011-12	Ha	1112
	(iv) Soyabeen ( <i>Glycin max</i> )	2011-12	Ha	12279
4.	Other Crops	2011-12		
	(i) Sugarcane ( <i>Saccharum officinarum</i> )	2011-12	Ha	108255
	(ii) Onion ( <i>Allium cepa</i> )	2011-12	Ha	2353
<b>B. Agriculture Productivity (Provisional)</b>				
1.	Cereals	2011-12	Qtl./Ha	22.03
	(i) Rice ( <i>Oryza sativa</i> )	2011-12	Qtl./Ha	21.20
	(ii) Wheat ( <i>Triticum aestivum</i> )	2011-12	Qtl./Ha	23.80
	(iii) Barley ( <i>Hordeum vulgare</i> )	2011-12	Qtl./Ha	12.64
	(iv) Maize ( <i>Zea mays</i> )	2011-12	Qtl./Ha	14.66
	(v) Finger millet ( <i>Eleusine coracana</i> )	2011-12	Qtl./Ha	13.92
2.	Pulses	2011-12	Qtl./Ha	8.15
	(i) Urad ( <i>Phaseolus radiatus</i> )	2011-12	Qtl./Ha	8.13
	(ii) Lentil ( <i>Lens esculenta</i> )	2011-12	Qtl./Ha	8.19
	(iii) Pea ( <i>Pisum sativum</i> )	2011-12	Qtl./Ha	9.54
	(iv) Gahat ( <i>Mycrotoma biflorum</i> )	2011-12	Qtl./Ha	8.04
	(v) Rajma ( <i>Dolichos lablab</i> )	2011-12	Qtl./Ha	10.27
	(vi) Gram ( <i>Cicer arietinum</i> )		Qtl./Ha	7.85
	(vii) Bhatt (Black Soyabeen)	2011-12	Qtl./Ha	9.83
3.	Oil Seeds	2011-12	Qtl./Ha	8.34
	(i) Mustard ( <i>Brassica campestris</i> )	2011-12	Qtl./Ha	8.00
	(ii) Seasmum ( <i>Sesamun indicum</i> )	2011-12	Qtl./Ha	2.26
	(iii) Groundnut ( <i>Arechis hypogea</i> )	2011-12	Qtl./Ha	12.72
	(iv) Soyabeen ( <i>Glycin max</i> )	2011-12	Qtl./Ha	14.46
4.	Other Crops	2011-12	Qtl./Ha	
	(i) Sugarcane ( <i>Saccharum officinarum</i> )	2011-12	Qtl./Ha	609.33
	(ii) Onion ( <i>Allium cepa</i> )	2011-12	Qtl./Ha	55.69

Source: Uttarakhand at a Glance (2012-13), Directorate of Economics &amp; Statistics, GoU.

Table IV-8: Ecological Sub-Regions and Altitude-wise Major Agriculture Crops

Sl. No.	Ecological Sub-Region	Altitudinal Gradient (m)	Major Agriculture Crops
1.	Lower Dun, Terai	300-600	Wheat ( <i>Triticum aestivum</i> ), Paddy ( <i>Oryza sativa</i> ) and Sugarcane ( <i>Sachharum officinarum</i> ).
2.	Upper Dun, Bhabar, lower Shivaliks	600-1,200	Wheat ( <i>Triticum aestivum</i> ), Paddy ( <i>Oryza sativa</i> ), Maize ( <i>Zea mays</i> ) Chaulai ( <i>Amaranthus species</i> ) Finger millet ( <i>E leusine coracana</i> ) Barnyard millet ( <i>Echinochloa frumentesia</i> )
3.	Middle Garhwal-Kumaon Region	1,200-1,800	Wheat ( <i>Triticum aestivum</i> ), Paddy ( <i>Oryza sativa</i> ), Cheena ( <i>Panicum miliaceum</i> ), Potato ( <i>Solanum tuberosum</i> ), Barley ( <i>Hordeum vulgare</i> ) Finger millet ( <i>E leusine coracana</i> ) and Barnyard millet ( <i>Echinochloa frumentesia</i> ),
4.	Upper Garhwal-Kumaon Region	1,800-2,400	Wheat ( <i>Triticum aestivum</i> ) Barley ( <i>Hordeum vulgare</i> ) Potato ( <i>Solanum tuberosum</i> ), Chaulai ( <i>Amaranthus species</i> ), Cheena ( <i>Panicum miliaceum</i> ) and Phaphra ( <i>Fagopyum tataricum</i> )
5.	Cold Zone	2,400-3,600	Summer Crops: Wheat ( <i>Triticum aestivum</i> ), Barley ( <i>Hordeum vulgare</i> ) Potato ( <i>Solanum tuberosum</i> ), Phaphra ( <i>Fagopyum tataricum</i> ) Chaulai ( <i>Amaranthus species</i> ), Kauni ( <i>Setaria etalica</i> ) Ogal ( <i>Fagopyrum esculentum</i> ) and Uva J au ( <i>Hoyleum himalayanse</i> )

Source: Uttarakhand at a Glance (2012-13), Directorate of Economics & Statistics, GoJ.

68. The irrigation facility is only available adjoining to rivers in valleys. The cross drainages are very limited within the state. The irrigation and drainage system in Uttarakhand is described in Table IV-9 given below.

Table IV-9: Mode of Irrigation and Drainage System in Uttarakhand

Sl. No.	Items	Year/Period	Unit	Statistics
<b>A. Net and Gross Irrigated Area</b>				
1.	Canals	2011-12	Ha	83687
2.	Tube Wells	2011-12	Ha	216100
3.	Other Wells	2011-12	Ha	11519
4.	Tanks/ Ponds	2011-12	Ha	83
5.	Other Sources	2011-12	Ha	24747
6.	Net Irrigated Area (NIA)	2011-12	Ha	336136
7.	Gross Irrigated Area (GIA)	2011-12	Ha	561733
<b>B. Irrigational Infrastructure</b>				
1.	Length of Canals	2011-12	Km.	11588
2.	Length of Lift Canals	2011-12	Km.	242



Sl. No.	Items	Year/Period	Unit	Statistics
3.	Tube Wells (State)	2011-12	No.	1110
4.	Pump Sets ( Boring/ Free Boaring)	2011-12	No.	54642
5.	Hauj	2011-12	No.	32850
6.	Gool	2011-12	Km.	26365
7.	Hydrum	2011-12	No.	1547
8.	C.C.A. Under State Canal	2011-12	Lakh (Ha)	3.302
9.	Revenue Collection by Irrigation	2011-12	Rs. (Lakh)	252.27

Source: Uttarakhand at a Glance (2012-13), Directorate of Economics & Statistics, GoU.

### 3. Fishery

69. The State has great potential for the development of fisheries. The State abounds in perennial and seasonal water bodies which hold high promise for the growth of fishery. Golden Mahseer (*Tor putitora*), one of the main game and food fish in the central Himalayan region, has decreased significantly. The fish migrate considerable distances upstream in search of suitable spawning grounds. Stocks of the Himalayan mahseer are depleted and it is now considered an endangered species. Catch data from the major rivers are not available while studies are characterized as sporadic and preliminary in nature. According to available statistics, the Himalayan Mahseer contributes significantly only in one river-comprising 32.8% of the catch from the Nayar River, 9.7% from Song River, and 0.8-3.1% from other rivers. The important fishes commonly found in the Himalayan river basins are *Catla catla*, *Labeo rohita*, *Labeo calbase*, *Cirrihinus mirigale*, *Rita rita*, *Heteropneustus fonilis*, *Notopterus notopterus*, *Macrobrachum rosenbergii*, *Channa punetatus* etc.
70. No interference with fishery activities is envisaged by execution of the proposed subprojects.

### 4. Biodiversity and Protected Areas

71. The State of Uttarakhand is endowed with rich bio-diversity as manifested by its approximately 46 percent forest cover. The State has established six national parks and seven wildlife sanctuaries for the conservation of flora and fauna. Such areas include the Nanda Devi National Park, Valley of Flowers, Gangotri National Park, Govind Pashu Vihar National Park, Rajaji National Park, Jim Corbett National Park, Kedarnath Wildlife Sanctuary, Askot Musk Deer Sanctuary, Mussoorie Sanctuary, Binsar Wildlife Sanctuary, Sanadi Sanctuary, Nandhaur Wildlife Sanctuary and Govind Wildlife Sanctuary' all of which are being looked after by the Uttarakhand government. A positive remark on the State is that it maintains rich wildlife outside their protected areas.

Table IV-10: Wildlife in Uttarakhand

Sl. No.	Protected Areas	Year	Unit	Statistics
1.	Biosphere Reserves			
	(i) Number	2013-14	No.	1
	(ii) Area	2013-14	km <sup>2</sup>	5,860.69
2.	National Parks			
	(i) Number	2013-14	No.	6
	(ii) Area	2013-14	km <sup>2</sup>	4,915.02
3.	Wildlife Sanctuaries			
	(i) Number	2013-14	No.	7
	(ii) Area	2013-14	km <sup>2</sup>	2,690.12

Sl. No.	Protected Areas	Year	Unit	Statistics
4.	Important Wild Animals			
	(i) Tiger	2008	No.	178
	(ii) Leopard	2008	No.	2335
	(iii) Elephant	2008	No.	1346
	(iv) Musk Deer	2008	No.	376
	(v) Black Bear	2008	No.	1935
	(vi) Sloth Bear	2008	No.	172
	(vii) Brown Bear	2008	No.	14

Source: Wildlife and Protected Areas, ENVIS, 2014

72. The Himalayas represent one of the most fascinating biota (fauna and flora) all over the world, both in terms of quality and quantity. This is evident from the fact that more than 50 percent of all biota can be found only in the Himalayan region. Such fact is brought about by the region's uniqueness in terms of favorable climatic conditions, natural habitats, and soil types.
73. The State of Uttarakhand is represented by Biogeographic Zones 2B Western Himalaya and 7B Siwaliks<sup>1</sup> in this region. About 18.7% of the total area under the Forest Department has been clearly earmarked for biodiversity conservation by the creation and management of 12 Protected Areas (PA) and a biosphere reserve in the State.

Table IV-11: Protected Areas in Uttarakhand

Sl. No.	Protected Area	District	Establishment	Area (m <sup>2</sup> )
National Park				
1.	Corbett	Nainital & Pauri Garhwal	1936	520.82
2.	Nanda Devi	Chamoli	1982	624.60
3.	Valley of Flowers	Chamoli	1982	87.50
4.	Rajaji NP	Dehradun, Pauri & Haridwar	1983	820.00
5.	Gangotri	Uttarkashi	1989	2390.02
6.	Govind	Uttarkashi	1990	472.08
Wildlife Sanctuary				
1.	Govind WLS	Uttarkashi	1955	485.89
2.	Kedarnath WLS	Chamoli	1972	975.20
3.	Askot WLS	Pithoragarh	1986	600.00
4.	Sonanadi WLS	Garhwal	1987	301.18
5.	Binsar WLS	Almora	1988	47.07
6.	Musoorie WLS	Dehradun	1993	10.82
7.	Nandhaur WLS	Nainital and Champawat	2012	269.96

Source: Wildlife and Protected Areas, ENVIS, 2014

74. Variations in the topography of high mountain ranges and deep valleys and altitudes from sea-level portions give the project districts different habitats for a variety of fauna and in turn resulted in the enriched biodiversity in the region. The common wildlife reported from the forests includes Tigers, Panthers, Civet Cats, Leopard Cats, Jungle Cats, Himalayan Silver Fox, and the Jackal. Various species of deer including the Musk Deer and the Barking Deer also roam in the districts. Sambhar and Gural as well as the Bear and the Porcupine are also found in the project area. The flying mammal Bat is also common in the area. Other animals in the region include the Chipmunk, the Rhesus Monkey and the Flying Squirrel. Discussion with local people during the survey process generated reports

<sup>1</sup> Negi, A.S., Status, Distribution and Management of Mountain Ungulates in Uttaranchal, Envis Bulletin, 2002

on the presence of Leopards, Deers, Foxes, and Wild Pigs. Some important information about wildlife of Uttarakhand is given in the Table below.

Table IV-12: List of Major Flora

Sl. No.	Local Name	Scientific Name
<b>A. Trees</b>		
1.	Buransh	Rhododendron arboreum
2.	Deodar	Cedrus deodara
3.	Chir	Pinus roxburghii
4.	Surai	Cupressus tourulosa
5.	Padam	Prunus cornuta
6.	Mehal	Pyrus pashia
7.	Otis	Alnus nepalensis
8.	Ayar	Lyonia ovalifolia
9.	Kafal	Myrica sapida
10.	Akhrot	Juglans regia
11.	Bhimal	Grewia optiva
12.	Ritha	Sapijdus mukorossi
13.	Tun	Toona ciliata
14.	Nimla	Ficus auriculata
15.	Timur	Zanthoxylum tamala
16.	Kharik	Celtis australis
17.	Chamkhirik	Carpinus viminea
18.	Katmon	Betula alnoides
19.	Kajal	Acer acuminatum
20.	Katoj	Castanopsis tribuloides
21.	Kirmola	Acer oblongum
22.	Kandru	Ilese dipyrene
23.	Banj	Quercus semicarpifolia
<b>B. Shrubs</b>		
1.	Kala Hisalu	Rubus lasiocarpus
2.	Karoz	Carissa spinarium
3.	Kobra Plant	Arisama helleborifolium
4.	Kandali	Urtica parviflora
5.	Satavar	Asparagus racemosus
6.	Dudhi	Hollerrhena antidysentricr
7.	Bajradanti	Potentilla fulgens
8.	Banfasa	Viola surpans
9.	Bach	Acorus calamus
10.	Nakol	Urticor dioica
11.	Patyura	Pteraacanthus angustifrons
12.	Dudhia	Taraxacum officinale
13.	Vatula	Flemingia fruticulose
14.	Belmur	Flacourtia indica
15.	Nirghesi	Delphinium denudatum
16.	Silfoda	Bergenia gossypina
17.	Jula	Gerbera grassypina
<b>C. Grasses and Herbs</b>		
1.	Dub	Cynodon dactylon
2.	Kush	Sacharum spontaneum
3.	Gol ringal	Chimonobambusa falcata
4.	Jatamasi	Nardostachys grandiflora
5.	Tachita	Apluda muticr

Sl. No.	Local Name	Scientific Name
6.	Dev ringal	Thamnocalamus facloueri
7.	J hugra ringal	Arundinaria jaunsarensis
8.	Thamgil	Thamnocalamus spathiflorus

Table IV-13: List of Major Fauna

Sl. No.	Wild Animals	
	Local Name	Scientific Name
<b>A. Mammals</b>		
1.	Guldar	Panthera pardus
2.	Kala Bhalu	Selenarctos thibetanus
3.	Ghural	Memorhaedus goral
4.	Kakar	Muntiacus muntjak
5.	Khirao	Capricornis sumatraensis
6.	J angli Suar	Sus-scrofa cristatus
7.	Chitrola	Martes flarigula
8.	Langoor	Presbyits entellus
9.	Khargosh	Lepus nigricollis
10.	Sehi	Hystrix indica
11.	Gidar	Canis aureus indicus
12.	J angli Billi	Felis chaus
13.	Gilehri	Eurambulus pennant
14.	Bandar	Macaqua mulatta
<b>B. Birds</b>		
1.	Chir Fijent	Catreus wallichii
2.	Kalij Fijent	Lophura Leucomelana
3.	Koklaj Fijent	Pucrassia macrolophus
4.	Kala Irgal	Letinaetus makavensis
5.	Karorla	Urocissa erythrorhyncha
6.	Ullu	Strix aluco nivicola
7.	Baaj	Flaco severaus
8.	Kala Titar	Francolinus francolinus
9.	Papiha	Cuculus varius
10.	Tota	Psittacula himalayana
11.	Chakor	Alectoris graeca chuker
12.	Hariyal	Treron spenura
13.	Pashchimi Tregopan	Tragopan meloccephalus
14.	Bulbul	Pyconotus cafer
15.	Maina	Aerioctheres tristis
16.	Fakhta	Streptobelia orientalis meena
17.	Gidh	Gyps himalayensis
18.	Kauwa	Carvus macrorhynchos
19.	Saat Bahen	Teyrdoides striatus
20.	Neelkanth	Garrulus lanaclatus

Source: Negi, A.S., Status, Distribution and Management of Mountain Ungulates in Uttaranchal, Envis Bulletin, 2002.

## 5. Biosphere Reserves

75. The Biosphere Reserve is the top category after Wildlife Sanctuary and National Park in the Country. Out of the 14 Biosphere Reserves situated in India, the Nanda Devi Biosphere Reserve (NDBR) established second among the 14 is situated in the State of Uttarakhand. It extends in the three districts of Chamoli (Garhwal), Pithoragarh, and

Bageshwar (Kumaon). The Nanda Devi National Park (NDNP) and the Valley of Flowers are UNESCO World Heritage Site declared in 1988. The NDNP is located in the transition range between the Zaskar range and Himalayan foothills with 97 species of plants including many rare and almost extinct plants like *Saussurea sudhanshui*, *Nardostachys grandiflora*, *Picrorhiza kurroa*, *Cypripedium elegans*, *C. himalaicum*, *Dioscorea deltoidea* and *Allium stracheyi*. There are also 83 animal species including the Bharal (*Pseudois nayaur*), Himalayan Musk Deer (*Moschus chrysogaster*), Mainland Serow (*Capricornis sumatraensis*), Himalayan Tahr (*Hemitragus jemlahicus*), Goral (*Nemorhaedus goral*), Snow Leopard (*Panthera uncia*), Common Leopard (*Panthera pardus*), Himalayan Black Bear (*Selenarctos thibetanus*), Common Langur (*Presbytis entellus*), and Rhesus Macaque (*Macaca mullata*). Also, there are about 114 avian species and 27 species of butterflies in the NDNP.

76. The Rajaji National Park was established in 1983 protecting sections of the tropical deciduous forest area of the Shivalik Hill range on the Himalayan foothills. The Park covers 820.42 square kms, along the Haridwar, Dehradun and Pauri Garhwal. The park has a vast Sal forest, and mixed forest mostly covered with *Acacia catechu* and *Vetiveria zizanioides*. It is refuge to approximately 49 species of mammals, 315 species of birds, 49 species of reptiles, 10 species of amphibians and 49 of Piscean species. This park has the largest population of elephants in Uttarakhand and a large population of tigers and leopards. Notable animals seen in the park are the Wild Cat (*Felis silvestris*), Goral (*Nemorhaedus goral*), Rhesus Macaque (*Macaca mulatta*), Himalayan Yellow Throated Marten (*Martes flavigula*), Monitor Lizard (*Varanus*), Indian Hare (*Lepus nigricollis*), Sloth (*Folivora*), Himalayan Black Bear (*Ursus thibetanus*), King Cobra (*Ophiophagus Hannah*), Jackal (*Canis*), Barking Deer (*Muntiacus muntjak*), Sambar (*Rusa unicolor*), Wild boar (*Sus scrofa*), Indian Langur (*Semnopithecus entellus*), Indian Porcupine (*Hystrix indica*) and Pythons (*Pythonidae*). The population of birds consists of the Great Pied Hornbill (*Buceros bicornis*), Himalayan Pied Kingfisher (*Ceryle rudis*), Sparrows (*Passeridae*), Fire Tailed Sunbird (*Aethopyga ignicauda*) and the Peacock (*Pavo cristatus*) - Indian National Bird.
77. The Jim Corbett National Park covers 520 sq kms of Savannah-type grasslands and Sal forests. Declared as a Tiger Reserve in 1973, the Park has a rich diversity including the White Tiger (*Panthera tigris tigris*), Throated Martem (*Martes flavigula*), Himalayan Palm Civet (*Paradoxurus hermaphroditus*), Indian Grey Mongoose (*Herpestes edwardsii*), Para, Kakka, Ghoral (*Nemorhaedus goral*), Bar-headed Goose (*Anser indicus*), Duck, Grebe, Snipe (*Gallinago gallinago*), Turtles, Python (*Pythonidae*), Common Otter (*Lutrinae*), Porcupine (*Hystrix indica*), Clack-taped Hare, Chital (*Axis axis*), Spotted Deer (*Axis axis*), Viper, Cobra, Krait, King Cobra (*Ophiophagus Hannah*), Tortoise (*Testudinidae*), Graylag goose (*Anser anser*), Sandpiper (*Scolopacidae*), Gull (*Laridae* sp.), Cormorants (*Phalacrocoracidae* Sp.) and Egrets (*Ardea alba*).
78. The Govind National Park covers an area of 957 sq. kms in Uttarakashi and a sanctuary for the endangered Snow Leopard and some other 15 species of mammals and 150 species of birds that includes the Himalayan Black bear (*Ursus thibetanus*), Brown bear (*Ursus arctos*), Musk deer (*Moschus*), Bharal *Pseudois nayaur*), Himalayan Tahr (*Hemitragus jemlahicus*), Serow (*Capricornis*) and Common leopard (*Panthera pardus*). The endangered birds found in this region are Monal Pheasant (*Lophophorus impejanus*), Koklas Pheasant, Bearded Vulture Himalayan Snow Cock (*Gypaetus barbatus*), Golden Eagle (*Aquila chrysaetos*), Western Tragopan (*Tragopan melanocephalus*), Steppe Eagle (*Aquila nipalensis*) and Black Eagle (*Ictinaetus malaiensis*). Other varieties of birds include Owls, Pigeons, Minivets, Thrush, Warblers, Bulbul, Cuckoo and Finches.

79. The Valley of Flowers is a World Heritage Site located in Chamoli. There are hundreds of species mostly being Orchids, Poppies, Primula, Calendulas, Iris, Lily, Roses, Violets, Rhododendron, Angelica, Himalayan Fritillary, Daisies and Anemones and also supports a variety of mammals like the Himalayan Tahr, Snow Leopard, Musk Deer, Red Fox, Common Langur (a type of monkey), Bharal, Serow, Himalayan Black Bear, Himalayan Brown Bear, Pica (Mouse hare). A huge variety of butterflies and birds are also found in the valley including Himalayan Golden Eagle, Griffon Vulture, Snow Partridge, Himalayan Snow Cock, Himalayan Monal, Snow Pigeon, and Sparrow Hawk. All the protected sites listed above are far away from the 23 sub-project locations.

## I. Socio-Economic Profile

### 1. Social and Cultural Development

80. The State of Uttarakhand occupies a total land area of 53,483 Km<sup>2</sup>, which is about 1.73% of the total geographical area of the country. The native people of Uttarakhand are generally called either Garhwali or Kumaoni depending on their place of origin in either the Kumaon or Garhwal region.
81. According to the 2011 census of India, Uttarakhand has a population of 10,086,292 people comprising 5,137,773 males and 4,948,519 females. The state is the 20<sup>th</sup> most populous state of the country having 0.84% of the population on 1.69% of the land. The population density of the state is 189 people/Km<sup>2</sup> having a 2001-2011 decadal growth rate of 18.81%. The gender ratio is 963 females/1000 males. The crude birth rate in the state is 18.6 with the total fertility rate being 2.3. The state has an infant mortality rate of 43, a maternal mortality rate of 188 and a crude death rate of 6.6.
82. Administratively, the State is divided into Garhwal and Kumaon Divisions and 13 Districts, 49 Tehsils and 95 Blocks. The Kumaon and Garhwal Divisions have six and seven Districts respectively. There are 16,177 villages in the State and 7,227 gram panchayats. Of the total number of villages, 5,868 villages are not connected by roads.

### 2. Land Use Pattern

83. The land use pattern of Uttarakhand is strongly governed by the following geo-climatic factors: altitudinal gradients, climate, mountainous terrain, lithological type, topography, surface hydrology, exposure of sun light in the crop fields, forests and alpine meadows, sparse vegetation (scrub), human settlement areas, grazing and barren land etc.
84. Forest is the main land use sector in the State and nearly 45.82% of the geographical area is under forest cover. The timber line vegetation is clearly demarcated above 2900 m (amsl) altitude. Agriculture is confined to areas of low reliefs, which are underlined by weak rock formation (i.e. schists, phyllites, weathered gneisses, and crushed quartzite). The cultivated land, approximately 12.44% of the total geographical area, is either terraced/semi-terraced or plain. Other land use categories such as meadows, grazing lands, and scrubs do not exhibit definite relationship with lithology. It is also observed that the south-facing hill slopes are covered by lush green forests.

## J. Health

85. The Infant Mortality Rate is 36 and Maternal Mortality Ratio is 359 (SRS 2007 - 2009) which are higher than the National average. The Sex Ratio in the State is 963 (as compared to 940 for the country). The comparative figures of major health and demographic indicators are shown in Table IV-15.

Table IV-15: Demographic, Socio-economic and Health Profile of Uttarakhand as compared to India Figures

S. No.	Indicator	Uttarakhand	India
1.	Total Population (in Crore: Census 2011)	1.01	121.01
2.	Decadal Growth (in %: Census 2011)	19.17	17.64
3.	Crude Birth Rate (SRS 2011)	18.9	21.8
4.	Crude Death Rate (SRS 2011)	6.2	7.1
5.	Natural Growth Rate (SRS 2011)	12.8	14.7
6.	Infant Mortality Rate (SRS 2011)	36	44
7.	Maternal Mortality Rate (SRS 2007-09)	359	212
8.	Total Fertility Rate (SRS 2011)	NA	2.4
9.	Sex Ratio (Census 2011)	963	940
10.	Child Sex Ratio (Census 2011)	886	914
11.	Schedule Caste Population (in Crore: Census 2001)	0.15	16.67
12.	Schedule Tribe population (in crore: Census 2001)	0.02	8.43
13.	Total Literacy Rate (in %: Census 2011)	79.63	74.04
14.	Male Literacy Rate (in %: Census 2011)	88.33	82.14
15.	Female Literacy Rate (in %: Census 2011)	70.70	65.46

Source: RHS Bulletin, March 2012, M/O Health & F.W., GOI.

86. The health infrastructure of the State is described in succeeding Table. There are only 14 Obstetricians/Gynaecologists and 20 Pediatricians in the State. Such numbers are way below the estimated State requirement of 59 each. Some of the essential requirements of the new State include basic primary health care, pre and post-natal care, and nutritional status and preventive care. Accessibility to health services with the aid of improved road conditions is essential to put progress in the health indicators of the State. These health infrastructures have been described in Table IV-16.

Table IV-16: Health Infrastructure of Uttarakhand

Indicators	Required	In Position	Shortfall
Sub-centre	2341	1848	493
Primary Health Centre	351	257	94

Indicators	Required	In Position	Shortfall
Community Health Centre	87	59	28
Health worker (Female)/ANM at Sub Centres & PHCs	2105	2016	*
Health Worker (Male) at Sub Centres	1848	184	1664
Health Assistant (Female)/LHV at PHCs	257	88	169
Health Assistant (Male) at PHCs	257	29	228
Doctor at PHCs	257	205	52
Obstetricians & Gynecologists at CHCs	59	14	45
Pediatricians at CHCs	59	20	39
Total specialists at CHCs	236	51	185
Radiographers at CHCs	59	17	42
Pharmacist at PHCs & CHCs	316	292	24
Laboratory Technicians at PHCs & CHCs	316	81	235
Nursing Staff at PHCs & CHCs	670	243	427

Source: RHS Bulletin, March 2012, M/O Health & F.W., GOI.

#### K. Literacy

87. As per census data of 2011, the literacy rate of the Uttarakhand was 79.63% with 88.33% literacy for males and 70.70% literacy for female. In Uttarakhand, there are 15331 primary schools with 1040139 students and 22118 working teachers as per census 2011.

#### L. Cultural and Archeological Resources

88. The State of Uttarakhand has a great range of cultural practices. Festivals and cultural activities are being celebrated throughout the year in the State. The major fairs and festivals of the Garhwal region include the Hatkalika Fair, Tapkeshwar Fair, Surkhanda Devi Fair, Kunjapuri Fair, Lakhawar Village Fair, and Mata Murti Ka Mela. On the other hand, major fairs and festivals in the Kumaon region consist of Uttarayani Mela, Shraavan Mela (Jageshwar), Kartik Poonima at Dwarahat, Kasar Devi Fair, and Nanda Devi Fair.
89. Living in the mountains mostly in places that are not easily accessible the people of the district have been able to preserve their culture, folk lore, folk songs and folk dances, the last, a distinctive feature of the Uttarakhand district, being seasonal, traditional and religious, some of the better known being described below:
- ∩ The Thadiya dance, which is accompanied by song, is performed on Basant Panchami, the festival celebrating the advent of spring. Another dance, is performed on Deepawali and the Pandava Nritya during the winter after harvesting of crop and depicts the principal events of the Mahabharata.
  - ∩ Other folk dances are Jeetu Bhagdawal and Jagar or Ghariyali. These dances enact mythological stories, the participants, both men and women, put on their traditional colorful dress and dance to the tune of drums and Ransinghas.
  - ∩ One of the important dance performed during the fairs and accompanied by song is called Chanchari or Jhoda in which both men and women participate.
90. Folk songs are usually traditional and are sung particularly by the woman, who works very hard in the fields from morning till night in all kind of weather. During the month of Chaitra the women of the village gather at a central place and sing traditional song which generally relates deeds of heroism, love and the hard life which they have to lead in the hills. In the district, fairs, festivals, religious and social gatherings are the main occasions for recreation and amusement. On special occasions people arrange Swangs (open air



dramatic performances) particularly depicting scenes or legends connected with Shiva and Parvati.

91. The houses in the hilly areas of Uttarakhand do not build according to any town planning scheme but have been up haphazardly in clusters on level ground at places where water springs are accessible or on the bank of the river in the valleys. The houses are build of stones and are generally double storeyed, a few having three to five storeys, the very low rooms on the ground floor, which are usually 1.8 meters high being used for housing the cattle. Each house has in front of it a courtyard called a Chauk. A mud or stone staircase or a wooden ladder leads to the upper storey, the roof being of wood and stone. The height of the upper storey is generally 2.1 m and the roof is usually a sloping structures of timber covered with Patals (quartzite slabs), the well off use corrugated galvanized iron sheets. Generally the upper storey has a Verandah in front of the upper rooms.
92. The houses in the higher regions are two to three storeyes with balconies all round and paved courtyard in front where people do their threshing, weaving, spinning and other house hold works. A few houses have five or six storeyes, the top most being used as the kitchen. At times the cattle sheds are made at some distance from the villages. The houses are built in rows of half a dozen or so and strikingly picturesque in their fort like appearance.
93. The staple food grains consumed by the people are *Triticum aestivum* (wheat), *Oryza sativa* (rice), *Zea mays* (maize), *Eleusine coracana* (Mandua) and *Echinochloa frumentasea* (J hanjora), the last three being coarse grains generally eaten by the poorer sections. The pulses consumed are urad, gahat, bhatt, soontha, tur, lobia and masor. The hindus of the district mostly vegetarian by habit and preference and although the Muslims, Christians and Sikhs are generally non-vegetarian, those not able to afford eating meat daily due to money or local unavailability often resulting to a vegetarian diet.

## M. Economic Development

### 1. Transportation and Communication

94. Transportation system is a key factor in the socio-economic development of any area. Roads are logically the critical inputs to the growth of all the sectors. Aside from road systems, the State of Uttarakhand is connected to other states via rail and air transportation systems. Dehradun, Haridwar and Kathgodam are the major railway stations connected to various parts of the country. Jolly Grant near Dehradun is the alone airport present in the State.
95. As per stactical diary of Uttarakhand 2011-2012, the overall road network in the State is 337486.92 km. The road network is administered predominantly by the PWD and comprises of 1375.76 km of national highways (NH) 3788.20 km of State Highways (SH), 3289.74 km of Major District Roads (MDR), 2,945.04 km of Other District Roads (ODR), 14543 km of Village Roads (VR) 858.85 light vehicle road (LVR). Other than PWD, Irrigation department (741 km), Cane development Department (885 km), Forest Department (3257 km), Border Road Task Force (BRTF) 1281.32 Km and others like Mandi Parishad/Market council and PMGSY road (1685 km) a total 7849.32 km road is also managed by their respective department. The Border Roads Organization manages about 1,623 km of NHs, SHs, MDRs, and ODRs (class 9 equivalent and above roads having carriage way width 3.75 meter and above).
96. Density of road length per 100 sq. Km. is 45 km which is very low compared to the national average of 97 km. Only about seven percent of the roads in the State are built in two-lane standards while 50 percent are paved. About a third of the higher class paved roads are in poor condition and over 70 percent of the light-vehicle roads need to be

repaired or rehabilitated. Due to the lack of road connectivity, vast areas of the State are inaccessible. Such problem influences the population to :chunk~in far flung areas of the State remaining to be under-developed and devoid of educational and health facilities and employment opportunities.

97. As per PWD records, the Table IV-17 give the scenario of roads in Uttarakhand state.

Table IV-17: Transportation in Uttarakhand State

Sl. No.	Items	Year/Period	Unit	Statistics
(A)	Motor Roads Maintained by PWD			
	(i) National Highways	2013-14	Km.	1375.76
	(ii) State Highways	2013-14	Km.	3782.24
	(iii) Major District Roads	2013-14	Km.	3289.74
	(iv) Other District Roads	2013-14	Km.	2985.27
	(v) Rural Roads	2013-14	Km.	16177.16
	(vi) L.V. Roads	2013-14	Km.	790.38
(B)	Motor Roads Maintained by BRTF			
	(i) Total Length of Roads	2013-14	Km.	1281.32
(C)	Motor Roads Maintained by Local Bodies			
	(i) District Panchayats	2013-14	Km.	807.60
	(ii) Urban Local Bodies & Others	2013-14	Km.	2356.13
(D)	Roads Maintained by Other Departments			
	(i) Irrigation	2013-14	Km.	741
	(ii) Cane Development	2013-14	Km.	850.12
	(iii) Forest	2013-14	Km.	3270
	(iv) Others	2013-14	Km.	2060.21
(E)	Postal and Communication Services			
	(i) Post Offices	2013-14	No.	2719
	(ii) Telephone Exchanges	2013-14	No.	473
	(iii) Telegraph Offices	2013-14	No.	0
	(iv) PCOs	2013-14	No.	5275
	(v) Telephone Connections (Including WLL) by BSNL	2013-14	No.	195855
	(vi) Mobile phone by BSNL	2013-14	No.	902096

Source: Uttarakhand at a Glance (2014-15), Directorate of Economics and Statistics, GoU.

## 2. Industrial Development

98. The State has finite industrial units due to lack of adequate resources. In the hilly terrains, industries included food processing, fruit processing, medicinal and aromatic plants, and floriculture based industries. In the plain Districts like Haridwar, Udham Singh Nagar, and other places, capital intensive and high-value addition industries are being encouraged by the government.
99. In recent years, Uttarakhand has emerged as one of the most attractive industrial destinations in India. In this regard, the government is encouraging private participation in all industrial activities in the State. The New Industrial Policy announced in 2003 by the State government puts in place the regulatory framework for Uttarakhand's industrialisation. The New Industrial Policy indicates that private resources may be tapped while promoting integrated Industrial States in Uttarakhand. The State Government provides assistance for establishment of small and medium sized agro-parks, food-parks, which in turn are expected to provide common infrastructure facilities for storage, processing, grading, and marketing.

100. Main and traditional business of the state is, Handicrafts, Handlooms, Wool Based Industries, Khadi and Village Industries. Hydro Power, Tourism are the backbone of economic development of the state. No recognizable industry is located in close proximity of the sub-project sites.

#### N. Energy and Electric Power Potential

101. Uttarakhand has an estimated hydro power potential of about 20,200 MW. However, only 1,130 MW has been tapped at present. Mean while, 4,170 MW projects are under implementation and 3,800 MW projects are allotted to Central, State and private sectors. About 39 projects with a potential of 6,374 MW have been identified for PFR under PMS Hydro Initiatives.

102. Although, Uttarakhand is a power surplus State, a lot needs to be done to harness the untapped potential and sale the surplus power to make this a GDP driver sector for the State.

#### O. Aesthetic and Tourism

103. Tourism is one of the strong pillars of the State economy. The State has high growth potential for tourism, be in nature, wildlife, adventure or pilgrimage tourism. The State received 2,05,46, 323 domestic tourists in the year 2008, 2,19,34, 567 in the year 2009 and 3,02,06, 030 in the year 2010. As per Uttarakhand at a Glance 2012-13 a document issued by Directorate of Economic and Statistics GoU state received 5,69,250 tourists in the year 2011-2012 registering a considerable yearly growth. Expenditure on schemes for tourism development and promotion in the State has progressively increased over the years. Some of the major destinations with tourism potential include Haridwar (called :The Gateway of God), Rishikesh (the birth place of Yoga), Dehradun, Mussoorie, Almora, Kedarnath, Badrinath, Yamunotri, Gangotri, Jim Corbett National Park, Nainital, Ranikhet, and Pithoragarh.

104. In respect to tourism major tourist destination in Uttarakhand are Devprayag, Khatling Glacier, Narendra Nagar, Sem Mukhem, Chamba, Dhanaulti, Kunjapuri, New Tehri, Surkanda Devi, Chandrabadni, Kemty Fall, Nagtibba etc.

## V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

105. The sub-project was screened using the ADB's rapid environmental assessment (REA) checklist.

- ∫ The individual environmental screening checklist is provided in Appendix B of this report.
- ∫ Environmental impacts related to siting. The proposed sub-projects are not expected to have any impact on the Forests. Not a single site is located within or adjacent to the cultural heritage site, protected area (national park / sanctuary / biosphere reserve), wetland, mangrove, estuarine, buffer zone of protected area or special area for protecting biodiversity. There are no rare, threatened, and endangered species (flora and fauna) available or observed within the subproject corridor of impact.

### A. Land Acquisition and Resettlement

106. Most of the proposed sub-project locations exist are within the revenue lands as per Government record. There are no critical impacts on agriculture land and resettlement of people as well as dismantling of any structure during land acquisition or due to the proposed sub-project components.
107. The District-wise list of locations as per the land availability with ownership status was finalized after site visited by the Social Experts of PIU & PMU (UEAP: ADB).
108. Due to tough and risky hilly terrain, flat land is the major crisis in Uttarakhand. Most of the land belongs to the State Forest Department or surrounded by restricted areas such as reserve forests, protected areas, ecosensitive zones etc., which is again a major time taking process to get forest clearances. Keeping this fact in mind the land available with Revenue and Tourism department is selected for this purpose. There is no case of private land acquisition.

### B. Environmental Impacts

109. The assessment of environmental impacts due to the implementation of these sub-projects has been carried out for potential impacts during the following stages of the project planning and implementation:
1. Location Impacts: Impacts associated with site selection, including impacts on environment and resettlement or livelihood related impacts on communities.
  2. Design Impacts and Pre-Construction Impacts: Impacts arising from the inappropriate designs of proposed activities would in general include the inadequate drainage provisions, contemporary designs for the traditional and cultural environment etc. Selection of materials, if not carefully chosen, will adversely impact the aesthetic appeal of the surroundings. The results of interventions are unobtrusive and will be integral part of the overall ambience so as to avoid impacts on the aesthetic beauty of the proposed site. All component designs will be worked out to minimize any impacts on the adjoining properties, and considering the drainage and sewerage connections on the road. Given that there is a need for disposal of construction wastes. The contractors will be required to consult with the

- Project Implementation Unit under PMU/UEAP: ADB for safe disposal sites.
3. Construction Impacts: The impacts are generic to the construction activities, in all sub-project locations. All construction activities to be undertaken at the site will be approved by competent authority before start of any such activity in the vicinity of the site so that the history and sanctity as well as the usability of the site are not hampered. Hence, the EMMP emphasizes on the construction impacts and necessary mitigation measures to be strictly followed by the contractor and to be supervised by the Design and Supervision Consultant (DSC). Key impacts during construction are envisaged on the following aspects: (i) Drainage, (ii) Quarry and borrow pit operations, (iii) Slope cutting and their stability (iv) Water bodies and drainage system (v) Dust generation, air and noise from construction activities, (vi) handling of construction materials at site, (vii) Adoption of safety measures during construction; and (viii) Community health and safety measures.
  4. Operation and Maintenance Impacts: Impacts associated with the operation and maintenance of proposed MPHs. Impacts during operation of the MPH established in the sub-project will be due to lack of appropriate maintenance facilities created including the sites around the toilets, parking facilities apart from drainage and solid waste management of the tourist destinations. These impacts are proposed to be addressed through provisions of water and waste management and orientation of the Tourist facility owners in management and operation of such facilities including collection of wastes, operation of toilet facilities, timely clean-up of waste disposed by the tourists and aesthetics through appropriate maintenance of landscaping.

#### C. Cumulative Environmental Impact Assessment

110. The cumulative environmental impact assessment (CEIA) examined the interaction between the sub-project's residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing and reasonably foreseeable future projects or activities.
111. Since the sub-projects will be built in existing government owned land, and to be developed as MPH cum rescue centres especially for emergency period. Site specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, parking modifications, and increased volumes of construction related traffic. During operations of the facilities, added residential developments, commercial and business facilities increased densities are expected to develop and enhance the sub-project area. This can be considered a long-term cumulative benefit of the sub-project.
112. Increased tourist influx is expected to impact on environment but at the same time the routes to these destinations are open for a limited time with limited number of tourists. As the locations are mainly en route to pilgrim centres, it is used by trekkers and adventure lovers, who have a different mind set towards outdoors and love for nature. This will be further addressed by the project through regular orientation programs designed both for the tourists and facility providers, and dissemination of awareness material highlighting the environmental importance of the area.
113. Implementation of the project will not have any bearing on ecology and environment of the locality. The subproject will not involve any displacement of people or disruption of any economic activity such as agriculture land etc. The design and constructions are consistent with the surrounding landscape. The project will not influence the flora or fauna of the locality in any way.

## VI. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

114. The information disclosure, public consultation at sub-project locations and stakeholder analysis are very significant tasks under any project for proper understanding and transparency in proposed project.

### A. Public Participation during Preparation of IEE Report

115. The public consultation and participation includes identification of project affected persons (PAPs) and other interested groups or parties (stakeholders). Informing and providing the stakeholders with sufficient background and technical information regarding the proposed developmental activities; creating opportunities and mechanisms where by they can participate and raise their view points (issues, comments and concerns) with regard to the proposed development; giving the stakeholders feedback on process findings and recommendations; and ensuring compliance to process requirements with regards to the environmental and related legislation.

116. Stakeholder consultation and participation with various stakeholders is an integral part of the environmental and social impact assessment and also part of regulatory requirement of EIA Notification, 2006 and ADB requirements (Safeguard Policy Statement, 2009). The stakeholders of the project include project affected communities and institutional stakeholders such as local bodies, and other line department (Revenue, Forest, Environment etc.). The consultations at micro-level (village level) and macro-level (District/State level institutional consultations) helped planners to integrate the short term and long terms requirements of the local, regional, state and national goals in to the planning process.

117. During Project preparation and consultations with the Executing Agency (EA), Implementation Agency (IA), District Administration and other agencies at local levels on selection of sub-projects and identification of key issues including addressing the current gaps in provision of basic services like approach road to access the proposed MPH site. The outputs of public consultation during site visits have been summarized below for timely and effective implementation of the project.

Outputs of Public Consultation during Site Visits (24 <sup>th</sup> June, 2015)	
Name of the Places	: Sub-Projects sites Dakpathar
District	: Dehradun.
Period	: 24 <sup>th</sup> June, 2015
Participants	: Villagers, Shopkeepers and other Line Departments etc.
1. Issues discussed:	
∩	Importance of site selection for MPH and its suitability
∩	Benefits of MPH during natural disaster for evacuation and relief i.e. for emergency purposes.
∩	Issue of site related NOC and related environmental and social concerns
∩	Area specific socio-economic and environmental problems.
∩	Local issues of Panchayat and development schemes.
∩	Land ownership and provision of compensation.
∩	Scope of local employment generation during construction.
∩	Any damage of historical and cultural monuments due to the proposed MPH
∩	Any impact on nearby waterbodies or forests due to construction of MPH
2. Stakeholder's Response:	
∩	Local people are aware and agree for construction of MPH for emergency purposes.

- ⌘ People suggested that the approach to the MPH should be constructed in proper way so that it can easily accessible.
  - ⌘ Permanent caretaker should be provided so that he can take proper care and maintenance of the MPH.
  - ⌘ Local Panchayat has no objection in construction of MPH.
  - ⌘ During construction employment should be given to the local people.
  - ⌘ People suggested that the beautification of the MPH should be in design provision and should be undertaken during construction.
3. Recommendation and Suggestions:
- ⌘ Illegal cutting of trees and disturbance to wildlife should be strictly avoided.
  - ⌘ Land for MPH should have proper NOCs from the concerned authorities.
  - ⌘ Take care of natural resources along with proper disposal of wastes to be generated during construction of MPHs.
  - ⌘ Due care should be taken in selection of trees for cutting and minimum number of trees should be cut for conservation of local ecosystem.
  - ⌘ Speed breakers to be established on blind curves of approach roads to MPHs and settlement areas etc. for control of road accidents.
  - ⌘ Approches to the MPHs should be properly constructed so that during the time of emergency it can be easily accessible.
  - ⌘ Side drains and crossways for escape of rain water are required. Proper drainage is required for water during rainy season.
  - ⌘ Efforts should be taken for generation of employment of local people during construction.

#### B. Future Consultations and Disclosure

118. The public consultation and disclosure program will remain a continuous process throughout the sub-projects to resolve the issues which may be raised at any stage (pre-construction, construction and operational stages).

#### C. Consultation during Detailed Design

119. Focus-group discussions (FGD) with affected persons and other stakeholders to hear their views and concerns, so that these can be addressed in sub-project design wherever necessary. Regular updates on the environmental component of the sub-project will be kept available at the PIU established under PMU (UEAP: ADB).
120. Either PIU or PMU (UEAP: ADB) will conduct information dissemination sessions at major intersections and solicit the help of the local community leaders/prominent citizens to encourage the participation of the people to discuss various environmental issues.
121. The PIU or PMU (UEAP: ADB) with assistance of Design Supervision Consultant (DSC) will conduct information dissemination sessions in the sub-project area. During EMP implementation PIU, DSC, and PMU shall organize public meetings and will appraise the communities about the progress on the implementation of EMP in the sub-project works.

#### D. Consultation during Construction

122. Public meetings with affected communities (if any) to discuss and plan work programs and allow issues to be raised and addressed once construction has started.
123. Small scale meetings to discuss and plan construction work with local communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in sub-project monitoring and evaluation.

## E. Project Disclosure

124. After getting all clearance and final designing of the sub-projects, all details related to be project will be disclosure on the websites by the Executing Agency (SDMA or PMU) and ADB. The local communities will be continuously consulted regarding location of alternatives, construction camps, access to site and other likely disturbances which may raised during construction. Attendance sheet and photographs of Public Consultation are given in Appendices - E & F respectively.
125. For the benefits of the community, the IEE will be disclosed to the affected people and other stakeholders in a form and language(s) understandable to them at an accessible place in a timely manner and made available at: (i) PIU and PMU (UEAP: ADB) Office; (ii) District Magistrate Office; and, (iii) Design & Supervision Consultant (DSC) Office. It will be ensured that the hard copies of IEE are kept at such places which are conveniently accessible to citizens as a means to disclose the document and at the same time create awareness among general public. Electronic version of the IEE will be placed in the official website of the SDMA or PMU (UEAP: ADB) and the official website of ADB after approval of the IEE by ADB. The PIU will issue notification on the locality-wise start date of implementation of the sub-project. Copies of the IEE will be kept in the PIU and PMU (UEAP: ADB) Office and will be distributed to any person willing to consult the IEE.



## VII. ENVIRONMENTAL MANAGEMENT PLAN & GRIEVANCE REDRESS MECHANISM

### A. Institutional Arrangement

126. The institutional arrangements specify the arrangements for the implementation of environmental provisions of the proposed sub-projects. The Executing Agency (EA) - State Disaster Management Authority (SDMA) will work closely with Project Management Unit (PMU: UEAP-ADB). The PMU (UEAP: ADB) is responsible for effective implementation of environmental safeguards related to the requirements of the civil aviation infrastructure sub-projects. The detailed institutional arrangement and other responsibilities have been described below.

- ∫ The sub-project will be implemented and monitored by PIU (UEAP: ADB), which will be supported by Design and Supervision Consultant (DSC) and overall management support shall be provided by PMU (UEAP: ADB).
- ∫ The safeguard specialists of PMU (UEAP: ADB), and PIU (UEAP: ADB) will monitor and support the implementation programme of environmental covenants with assistance of Design and Supervision Consultant (DSC).
- ∫ The Executing Agency - PMU (UEAP: ADB) shall be responsible for ensuring compliance to environmental requirements of the ADB as well as central and state Governments and reporting the same to ADB an environmental management and monitoring plan (EMMP) will be a part of contract with the civil works contractors engaged for execution of the works. The primary responsibility of implementation of EMMP is of Executing Agency - PMU (UEAP: ADB) during pre-construction and operation and maintenance phases; and of the civil works contractor during the construction phase as defined in the EMMP.
- ∫ The responsibility of supervision of EMMP implementation is of the DSC; and it would guide the Implementation Agency (IA) and the civil works contractors in this regard. All applicable statutory clearances including environmental clearances, forest clearances, consents and permits or No-Objection Certificate (NOC) from National, State and Local levels to be required atleast 2 month before commencement of civil works at sub-project locations by the civil works contractor or project proponent in line with india's National, State and Local laws and regulations and in accordance with ADB's Safeguard Policy Statement 2009 requirements.

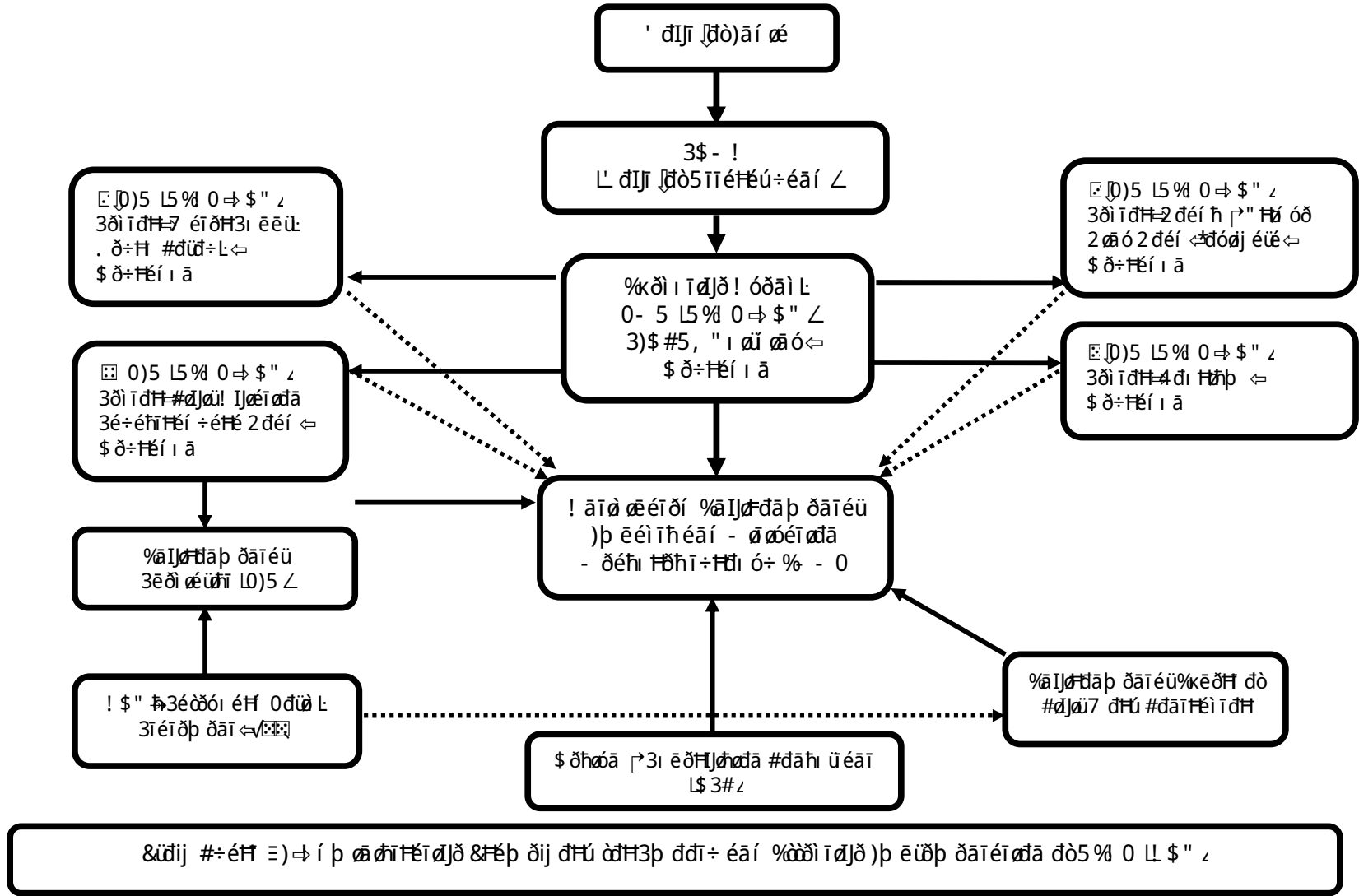
#### 1. Executing Agency (EA): State Disaster Management Authority (SDMA) -Project Management Unit (UEAP: ADB)

- ∫ The Executing Agency complies with all applicable legislations and its conversant with the requirements of the EMMP.
- ∫ To assesses all activities requiring special attention as specified or requested by the Design and Supervision Consultant (DSC) or safeguards specialist of Project Management Unit (UEAP: ADB).
- ∫ On the recommendation of the Environmental Expert (EE), Design and Supervision Consultant (DSC) and Safeguards Specialist of Project Management Unit (UEAP: ADB) through the DSC order, the contractor to suspend any or all works on site if the contractor or his sub-contractors or suppliers fail to comply with the said contractual stipulations with respect to environment and EMMP.
- ∫ To ensures along with the Design and Supervision Consultant (DSC) that EMMP and all necessary environmental stipulations are carried in bidding documents and contract documents of the contractor.

- ¿ Addressing of complaints and redressal of grievances for the project.
2. Implementation Agency (IA): Project Implementation Unit (Civil Aviation Depatt)
- ¿ Complies with all applicable legislation and is conversant with the requirements of the EMMP.
  - ¿ To assesses all activities requiring special attention as specified or requested by the Design and Supervision Consultant (DSC) or safeguards specialist of Project Management Unit (UEAP: ADB) for the duration of the contract.
  - ¿ To ensures that the contractor conducts all activities in a manner that minimizes disturbance to directly affected residents and the public in general, as advised by the engineers of DSC or Safeguards Specialist of PMU (UEAP: ADB).
  - ¿ Act as supervising & monitoring agency as delegated in EMMP.
3. Design and Supervision Consultant (DSC)
- ¿ To guides PMU (UEAP: ADB), PIU (UEAP: ADB) and contractors with respect to environmental regulations and associated requirements, and facilitates ensuring compliance with those.
  - ¿ Arranges information meetings for and consults with interested and affected parties about the impending construction activities;
  - ¿ Maintains a register of complaints and queries by members of the public at the site office. This register may be forwarded to the project manager of PIU (UEAP: ADB) on weekly basis.
  - ¿ To enforces and monitors compliance the requirements of the EMMP at project site.
  - ¿ To assess the contractor's environmental performance in consultation with environmental expert.
  - ¿ Documents in conjunction with the contractor, the state of the site prior to commencing construction activities.
4. Environmental Expert of Engineering (DSC)
- ¿ Briefs the contractor about the requirements of the environmental specification and EMMP as applicable.
  - ¿ To facilitate the statutory compliances related to civil works to PIU (UEAP: ADB) and contractors.
  - ¿ To advise the engineer about the interpretation, implementation and enforcement of the environmental specification and other related environmental matters.
  - ¿ Monitors and report on the performance of the project in terms of environmental compliances with the EMMP to the DSC, PMU and PIU and provides technical advice relating to environmental issues to the engineer.
5. Civil Work Contractor
- ¿ To depute a full time suitable, qualified and experienced environmental safeguard Specialist for the effective implementation of EMMP at project site including environment health & safety (EHS) measures, community liasoning, reporting and grievance redressal on day to day basis.
  - ¿ Complies with all applicable legislation, is conversant with the requirements of the EMMP, and briefs staff about the requirements of same.

- ¿ To ensure any sub-contractors or suppliers, who are utilized within the context of the contract comply with the environmental requirements of the EMMP. The contractor will be responsible for non-compliance on their behalf.
- ¿ Provides environmental awareness training to staff.
- ¿ To bears the costs of any damages or compensation resulting from non-adherence to the EMMP or written site instructions.
- ¿ To conducts all activities in a manner that minimizes disturbance to directly affected residents and the public in general, and foreseeable impacts on the environment.
- ¿ To ensures that the engineer is timely informed of any foreseeable activities that will require input from the environmental expert of DSC.
- ¿ To receive complaints/grievances from public, discuss with DSC and PIU and take necessary steps for implementation of remedial measures in consultation with the engineer of DSC and report to the executive Agency on the status in its each monthly report till satisfactory resolution.
- ¿ The proposed sub-project will be implemented by the PIU (UEAP: ADB). The PIU (UEAP: ADB) will be responsible for supervision and monitoring of day-to-day implementation of sub-projects including EMMP.
- ¿ For monitoring of environmental parameters as outlined in the EMMP, appropriate monitoring agencies would be engaged by the contractor (cost has been included in each contract package based on the sub-project specific monitoring programme) or by the IA for the monitoring works, if not included in the civil works contracts.
- ¿ The flow chart of various sectors under PIUs (ADB) of Uttarakhand Emergency Assistance Project (Funded by ADB) is given below.

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## B. Environmental Management Plan (EMP)

127. The Environmental Management Plan (EMP) is a key to ensure a safe and clean environment. The desired results of mitigation measures may not be achieved without unless formulations of a proper management plan and its effective implementation. The EMP envisages a plan for sound environmental management practices and the proposed mitigation measures (i.e. generic and sub-project specific) may reduce the potential impacts due to the project activities. Based on the existing baseline environmental condition of the sub-project locations, through site survey, various project activities during preconstruction, construction and operation phases of the project, environmental checklist as per the ADB's guidelines environmental impacts are anticipated. The mitigation measures are suggested to minimize the impact. The project activities considered during improvement stage are location of construction camp, obtaining appropriate clearances from regulatory bodies prior executing construction work, and determination of safety measures.
128. The environmental impacts during construction stage are temporary and reversible in nature. Important project activities considered are establishment of labor camps, removal of some herbaceous and bushy vegetation, cutting of hill slopes to some extent may be envisaged, borrow and quarry operation, crushing of stones and transportation of construction material, construction of drainage channels, and operational movements of construction equipments, vehicles and water supply etc.
129. The EMP designed for the project will guide the environmentally-sound construction practices under sub-projects and ensure efficient lines of communication between the proposed design and supervision consultants (DSC) also an engineer for the project, contractors, and Project Implementation Unit (PIU) and Project Management Unit (PMU). The EMP identifies the three phases of development as: (i) Pre-construction Phase (ii) Construction Phase and (iii) Post-construction or Operational Phase.
130. The purpose of EMP is to ensure that the activities are undertaken in a responsible non-detrimental manner with the objectives of: (i) providing a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the sub-projects; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the sub-project; and (iv) ensure that safety recommendations are complied with.
- Δ A copy of the EMP must be kept at each project site during the construction period at all times. The EMP will be made binding on all contractors operating on the site and will be included within the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance. It shall be noted that the Supreme Court of India mandates those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventive measures to reduce or prevent further pollution and environmental damages.
- All works undertaken towards protection of environmental resources as part of the EMMP and as part of good engineering practices while adhering to relevant specifications will be deemed to be incidental to works being carried out and no separate payment will be made unless otherwise specified explicitly. The costs towards environmental management as per EMMP unless otherwise provided as a separate head, will be deemed to be part of the BOQ of the project. The scope of works of the contractor towards the implementation of the environmental provisions shall be as follows:
- ζ Abide by all existing environmental regulations and requirements of the Govt. of

Uttarakhand and Govt. of India, local levels and gram sabha etc. during sub-project implementation.

- ¿ Compliance with all mitigation measures and monitoring requirements set out in the EMMP.
  - ¿ Submission of a method statement detailing how the sub-project EMMP will be complied with this shall include methods and schedules of monitoring.
  - ¿ Monitoring of project environmental performance including performance indicators defined therein, and periodic submission of monitoring reports.
  - ¿ Compliance with all measures required for construction activities in sensitive areas, in line with the regulatory requirements of these protected areas, and the guidelines set forth in the management plans for these areas.
  - ¿ Compliance with all regulatory requirements associated with proximity of the sub-project to the international borders based on assessment of contractor in consultation with the engineer of DSC.
  - ¿ Compliance of all safety rules and regulations applicable at work, and provision of adequate health and safety measures such as water, food, sanitation, personal protective equipment, workers insurance, and medical facilities besides all social and community related requirements as stipulated in EMMP.
131. The detailed provisions for specific environmental issues are outlined in the EMMP table of impacts and mitigation measures. The key clauses are outlined in the following sections.

¿ Quarry and Borrowing

- V The contractor will identify and seek prior approval of the engineer for quarrying and borrowing operations. The quarry and borrowing will be carried only from locations approved by the Department of Geology & Mining (if required). Any deviation from the provisions will be immediately notified and approval of the engineer is to be sought.
- V The contractor shall maintain all borrow sites, stockpiles and spoil disposal areas so as to assure the stability and safety of the works and that any adjacent feature like houses and community assets especially along hill slopes are not endangered, and to assure free and efficient natural and artificial drainage, and to prevent erosion. Stockpiling of materials (top soil, fill material, gravel, aggregates and other construction materials) shall not be allowed during rainy season unless covered by a suitable material. The storage on private property will be allowed if written permission is obtained from the owner or authorized party.
- V Borrow areas and quarries shall be sited, worked, and restored in accordance with the specifications and as per the closure plan (approved by engineer). Spoils shall be disposed of at approved disposal sites prepared, filled, and restored in accordance with the related specification requirements.

¿ Debris Disposal

- V The dismantling of existing structures: debris disposal shall be maximum utilized and disposed as per norms after consultation with DSC, PIU and PMU's Safeguard Specialist. Due care shall be taken that any material falling under hazardous waste category is disposed in accordance with

the Hazardous Wastes (management, handling and transboundary movement) Rules, 2008 and amendments till date Hazardous Wastes (management, handling and transboundary movement) Rules, 2008 and its amendments till date and applicable norms.

¿ Precautions for Protection of Environmental Measures

- V The contractor shall ensure that construction activities do not result in any contamination of land, air or water by polluting substances or cause noise generated by the activities and for cleaning activities and operation of equipments, the contractor will utilize such practical methods and devices as are reasonably available to control, prevent and otherwise minimize air and noise pollution effectively.
- V The contractor shall ensure that no trees or shrubs or other vegetation are felled or harmed except those required to be cleared for execution of the works for which all statutory permissions have been obtained.
- V The contractor shall protect trees and vegetation from damage to the satisfaction of the engineer (DSC).

¿ Air, Water, and Noise Pollution, and Soil Contamination

- V All works will be carried out without unreasonable noise and air, water and soil pollution subject and without prejudice to any other provision of the contract and the law of the land and its obligation as applicable.
- V The contractor will take all precautions outlined in the EMMP to avoid the air, water, soil and noise pollution.
- V The contractor shall monitor the environmental parameters periodically as specified in the monitoring plan and report to the engineer of DSC and PIU/PMU (UEAP: ADB) in the form of montly progress report and after one year a consolidated report to be submitted by PMU (UEAP: ADB) to the funding agency (ADB).
- V The contractor shall reduce the dust emission due to construction activities by regular water sprinkling nearby project affected areas.
- V All the construction equipments and vehicles shall have Pollution under Control (PUC) certificate to ensure that no air pollution is caused due to operation of their equipments and vehicles.
- V All the construction equipments and vehicles should remain all time in good conditions up to satisfaction of site engineers.
- V The contractor shall indemnify and keep indemnified the employer from and against any liability for damages on account of noise or other disturbance created while carrying out the work, and from and against all claims, demands, proceedings, damages, costs, charges, and expenses, whatsoever, in regard or in relation to such liability.

¿ Occupational and Community Health and Safety during Construction

The contractor shall, in accordance with the safety and health provisions specified in the EMMP, provide workers with a safe and healthy working environment, in the working areas, through application of preventive and protective measures consistent with international good practices, as reflected in internationally recognized standards. the contractors, engineer (DSC), EA and IA will take steps to prevent

accidents, injury, and disease arising from, associated with, or occurring during the course of work by:

- o Providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances.
- o Providing appropriate equipment to minimize risks and requiring and enforcing its use;
- o Training to workers and other staff; and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment.
- o Documenting and reporting occupational accidents, diseases, and incidents having emergency prevention, preparedness, and response arrangements in place.
- o Provide first aid facilities in all the working sites and workers camps and having qualified first aider to give first aid at the time of any accident. The contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camps, contact information of doctor, availability & location of first aid box shall be displayed in appropriate language both at work site and workers camps.
- o The contractor should provide safe drinking water, clean eating and resting areas, separate toilets for male and female work force and sufficient amenities at work site and workers camps as per prevalent labour law and EMMP. The contractor will ensure proper sanitation and would provide soak pits and septic tanks for disposal of waste water and sewage.
- o The contractor should have prepared emergency response plan (to be approved by engineer) with full details and methods of emergency response during any accident and shall have and display the emergency contact numbers at site; and contractor should follow all the applicable rules and regulations for workers related to health and safety.

The contractor will also ensure that the interests of the community are disturbed to the minimum as envisaged in the EMMP provide barricade, signage and safety information in and around the construction site and also to prevent local people entering into the construction site.

#### ¿ Post-construction Clearance

- V On completion of work, wherever applicable, the contractor shall clear away and remove from the sites all constructional plant, surplus materials, rubbish, scaffoldings, and temporary works of every kind and leave the whole of the sites and works in a clean condition as per agreed redevelopment plan to the satisfaction of the engineer.
- V The construction camp sites and any other sites temporarily occupied during construction shall be cleared as specified in the contract and handed over to the owner. It will be ensured by the contractor that the site handed over is in line with the conditions of temporary acquisition signed by both parties. Contractor would obtain and furnish to PIU a certificate to this effect from the owner.

#### C. Environmental Monitoring Programme

132. To ensure the effective implementation of mitigation measures and environmental management plan during construction and operation phase of the sub-projects, it is



essential that an effective environmental monitoring plan be followed as given Table below.

133. Monitoring is an essential component for sustainability of any developmental project. It is an integral part of any environmental assessment process. The monitoring program consists of performance indicators, reporting formats and necessary budgetary provision. The contractors monitoring methods and parameters should be in accordance with the norms prescribed by the Central Pollution Control Board (CPCB) standards for ambient air, water, noise and soil. Indicators and targets for environmental performance are provided in the EMMP.

134. The monitoring will be carried out by the contractor through approved agency accredited by National Accreditation Board for Testing and Calibration Laboratories and will be supervised by the environmental expert of the Design & Supervision Consultant (DSC). The environmental monitoring plan is outlined in the Table given below.

Table VII - 1: Environmental Monitoring Programme

S. No.	Indicators	Parameters to be Monitored	Frequency	Responsibility
<b>I. Pre- Construction Stage</b>				
1.	Legislation, Permits and Agreements	Permissions, /NOCs/Consents other statutory requirement.	Once in Pre-Construction Stage	Civil Work Contractor, DSC, IA & EA
2.	Environmental Baseline Data Generation	Ambient Air Quality, Noise level, Water Quality & Soil characteristics as per parameters outlined in EMMP.	Once in Pre-Construction Stage	Civil Work Contractor
3.	Debris Disposal	Safe disposal of construction wastes including bituminous wastes.	Random checks	Civil Work Contractor
<b>II. Construction Stage</b>				
1.	Legislation, Permits and Agreements	Permissions, / NoCs/Consents other statutory requirement	Continuous	Civil Work Contractor, DSC, IA & EA
2.	Dust Suppression	No. of tankers for water sprinkling, Timing of sprinkling, Location of sprinkling (log books to be maintained)	Random checks	Civil Work Contractor
3.	Ambient Air Quality (AAQ)	RPM, SPM, SO <sub>2</sub> , NO <sub>x</sub> and CO	Once in a Quarter where work is in progress and near sensitive receptors; and at the construction camp sites (except monsoon) for the entire construction period	Civil Work Contractor, to be monitored through approved Monitoring Agency.
4.	Ambient Noise Level	Equivalent Day & Night Time Noise Levels	Once in a quarter where work is in progress and near sensitive receptors during construction stage	Civil Work Contractor, to be monitored through approved Monitoring Agency
5.	Water Quality Monitoring	TDS, TSS, pH, Hardness, BOD and Faecal Coli Form	Once in a quarter where work is in progress and near sensitive receptors	Civil Work Contractor, to be monitored

S. No.	Indicators	Parameters to be Monitored	Frequency	Responsibility
			during construction stage	through approved Monitoring Agency
6.	Soil Testing	Available Nitrogen, Phosphorus, Carbon, heavy metals (including Lead) and Pesticides.	Once in a quarter where work is in progress and near sensitive receptors during construction stage	Civil Work Contractor, to be monitored through approved Monitoring Agency
7.	Heritage Protection (if needed)	Visual inspection of works, compliance with ASI regulations and norms	Continuous	DSC/ASI/PIU
8.	Supply of PPE	Usage of PPE on site, adequacy of equipments.	Continuous	Civil Work Contractor
9.	Establishing Medical Facilities	Access to health facilities for the construction workers	Continuous	Civil Work Contractor
10.	Accident Record	No. of fatal accidents at work site, No. of injuries, No. of disabilities.	Continuous	Civil Work Contractor
11.	Post-construction Clearance of site	Physical field verification and Satisfaction certificate from owner: Whether temporary locations for workers camp, site office, batching plant and other construction locations are restored to pre-project conditions as per approved closure plan	Post-construction	Civil Work Contractor
<b>III. Operation &amp; Maintenance Stage</b>				
1.	Water Quality Monitoring	All parameters as per CPCB standards.	Once in year during operation stage	PMU, SDMA
2.	Disposal of Solid Waste (if any)	Proper disposal of Solid Waste (domestic) generated shall be ensured in accordance with the prevalent norms.	Continuous	Civial Aviation Department
3.	Ambient Air Quality (AAQ)	PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> and CO	Once in a Quarter at the MPH site	Civil Aviation Department
4.	Ambient Noise Level	Equivalent Day & Night Time Noise Levels	Once in a quarter at the MPH site	Civil Aviation Department

Note: Budget covered in subsequent cost Table, however, would be finalized based on subproject specific requirements at IEE stage. Contractor will obtain a copy of approved IEE and keep available at construction site and site office(s) for proper implementation of IEE & EMMP.

#### D. Environmental Budget

135. As part of good engineering practices in the project, there have been several measures as erosion prevention, rehabilitation of borrow areas, safety, signage, provision of temporary drains, etc., the costs for which will be included in the design costs (site development cost) of specific subprojects. Therefore, these items of costs have not been included in the IEE budget. Only those items not covered under budgets for construction are included in the IEE budget.
136. The Contractor's cost for site establishment, preliminary, construction, and defect liability activities will be incorporated into the contract agreements, which will be binding on him for implementation. The air, soil, water quality, and noise level monitoring during construction and defect liability phases will be conducted by the contractor for which provision has been kept in Environmental budget of EMMP.
137. These are small scale construction projects; therefore, it is not expected to cause much significant impacts on ambient air, water, soil and noise levels. The main EMMP cost will arise from monitoring of environmental parameters (air, water, soil and noise level).
138. The costs of water sprinkling for dust suppression and providing personal protective equipment to construction workers shall be borne by contractor as part of conditions of contract. In addition of this, the sources of funds for Mitigation measures during construction stage including monitoring during construction stage are also to be borne by the contractor. These are deemed to be included as part of the contract price amount quoted by the contractor for the works. The costs for generation of baseline data and monitoring shall be borne by the contractor. The locations for baseline data generation & monitoring shall be identified during IEE study. The baseline data will be generated prior to commencing with civil works. The costs of components for monitoring during operation and maintenance stage and the capacity building costs are to be funded by the PMU. The EMMP cost is given below.
139. Most of the mitigation measures require the contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with this compliance. Only those items not covered under budget for construction are included in the IEE budget. The IEE costs include mitigation, monitoring and capacity building costs. The estimated budget for environmental monitoring and management of sub-projects as per contract packages are presented below:

Table VII-2: EMMP Cost for Construction of One MPH Cum Rescue Centres

Sl. No.	Particulars	Stages	Unit	Quantity	Rate (INR)	Cost (INR)*
A.	Legislation, Permits and Agreements	Consent to Establish and Consent to Operate for plants and machinery of the contractor	-	-	-	-
B.	Environmental Baseline Data Generation					
1	Ambient Air Quality monitoring	Pre-Construction	Per Sample	2	20,000	40,000
2	Noise Quality monitoring			2	20,000	40,000
3	Water Quality monitoring			1	20,000	20,000
4	Soil			1	20,000	20,000
5	Dust Suppression at sub-project sites	Construction and defect liability phases	Rs. (Lump sum)	1	5,000	5,000
					Sub-total	1,25,000
C.	Environmental Monitoring					
1	Air quality	Construction	Per sample	6	20,000	1,20,000
2	Water quality			3	20,000	60,000
3	Noise Levels			6	20,000	1,20,000
4	Soil			3	20,000	60,000
5	Ambient Air Quality	Operation/ Defect Liability Period	Per Sample	3	20,000	60,000
6	Water quality			3	20,000	60,000
7	Ambient Noise Quality			3	20,000	60,000
					Sub-total	5,40,000
D.	Capacity Building (includes cost estimates for entire sub-project area not included in the package costs)					
1	Capacity Building expenses for 2 sessions	EMP Training at Site. Implementation of EMMP for PIU and Engineer	Lump sum in Rs.	(2x1) 2	25,000	50,000
					Sub-total	50,000
					TOTAL INR	7,15,000

## E. Environmental Monitoring and Reporting Process

140. The PMU (UEAP: ADB) will monitor and measure the progress of EMMP implementation. PIU (UEAP: ADB) will undertake site inspections and document review to verify compliance with the EMMP and progress toward the final outcome. Environment and Safety Officer of the Contractor will submit the monitoring of EMMP to the DSC/Engineer on day to day basis. DSC/Engineer will submit monthly EMMP monitoring and implementation reports to PIU-CA, who will take follow-up actions, if necessary. PIU (UEAP: ADB)/IA will submit quarterly monitoring and implementation reports to PMU. The PMU will submit semi-annual monitoring reports to ADB based on reporting of PIU (UEAP: ADB)/IA and its own site inspections, assessment of the implementation performance. PMU (UEAP: ADB) will also take corrective actions as required.
141. Monitoring reports will be posted in a location accessible to the public.
142. ADB will review project performance against the EA's commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the Project's risks and impacts. Implementation of social and environmental safeguards related requirements will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued. The Standardized EMMP to guide the contractor in mitigating Environmental Impacts is given in Table VII -3.

Table VII-3: Standardized EMMP to Guide the Contractor in mitigating Environmental Impacts

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
1.	Site Establishment and Preliminary Activities Impacts				
1.1	Legislation, Permits and Agreements	In all instances, EA, IA contractors and consultants must remain in compliance with relevant environmental legislation of India at the national, state and local levels.	1. Permissions, /NOCs/Consents requirement - IA 2. Permissions/NOCs/Consents requirement for equipment/machineries, Borrow area/queries etc. - Contractor	PMU	IA, Contractor
		Proof of compliance to statutory requirements must be forwarded by the facility owner contractor to PMU/PIU in relation to hot mixing, stone crushers, diesel generators etc	ESO-Contractor, Engineer, & Environmental Expert of DSC (EE)	PMU	
		A copy of the EMP must be kept on site during the construction period	ESO-Contractor, Engineer & EE	PIU, IA & PMU	
1.2	Education of site staff on general and Environmental Conduct <sup>2</sup>	Ensure that all site personnel have a basic level of environmental awareness training	ESO-Contractor and EE EE to deliver	IA & PMU	Contractor, IA
		Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task	Environment and Safety Officer of Contractor, and EE	PIU, IA & PMU	Contractor
		No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor	Contractor and EE	PIU, IA & PMU	
		All employees must undergo safety training and wear the necessary protective clothing /equipment	Contractor and EE	IA & PMU	Contractor
		A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: <ul style="list-style-type: none"> <li>¿ No alcohol / drugs to be present on site;</li> <li>¿ Measures for abatement of noise due to construction related activities and conduct of work force;</li> <li>¿ Construction staff are to make use of the</li> </ul>	Contractor and EE	IA & PMU	

<sup>2</sup> These points need to be made clear to all staff on site before the work commences.

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		<p>facilities provided for them, as opposed to ad-hoc alternatives (e.g. use of firewood for cooking, the use of surroundings as a toilet facility are forbidden);</p> <ul style="list-style-type: none"> <li>∩ Trespassing on private/commercial properties adjoining the site is forbidden; and</li> <li>∩ Other than pre-approved security staff, no workers shall be permitted to live on the construction site. No worker may be forced to do work that is potentially dangerous or for what he / she is not trained to do.</li> </ul>			
1.3	Social Impacts <sup>3</sup>	Open liaison channels shall be established between the Site owner, operator, the contractors and interested and affected parties such that any queries, complaints or suggestions pertaining to environmental management aspects can be dealt with quickly and by the appropriate person(s).	Environment and Safety Officer of Contractor with the Engineer, EE & PIU	IA & PMU	Contractor
		A communications strategy is of vital importance in terms of accommodating traffic during road closure. The road closure together with the proposed detour needs to be communicated via advertising, pamphlets, radio broadcasts, road signage, etc.	Contractor with the Engineer, EE & PIU	IA & PMU	Contractor
		Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	Contractor with the Engineer, EE & PIU	IA & PMU	Contractor
		Storage facilities, elevated tanks and other temporary structures on site shall be located such that they have as little visual impact on local residents as possible.	Engineer and EE	IA & PMU	
		In areas where the visual environment is particularly important (e.g. along commercial/ tourism routes) or privacy concerns for surrounding buildings exist, the site may require screening. This could be in the form of shade	Engineer and EE	IA & PMU	

<sup>3</sup> It is important to take notice of the needs and wishes of those living or working adjacent to the site. Failure to do so can cause disruption to Works.

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		cloth, temporary walls, or other suitable materials prior to the beginning of construction.			
		Special attention shall be given to the screening of highly reflective materials on site.	EE	IA & PMU	
1.4	Lack of sufficient planning to assure long term sustainability of the improvements and ensure protection of the assets created and the architectural/archaeological character of the surroundings	Design will include provisions for ensuring effective maintenance and protection of the assets created so as to ensure the long term sustainability.	Contractor, Engineer, EE, and PIU	IA & PMU	IA, Contractor
2.	Design Impacts and Pre-construction Impacts				
2.1	Layout of components to avoid impacts on the aesthetics of the site	The project components siting will avoid impacts on the aesthetics of the site, ensure minimal impacts and in compliance with statutory and regulatory requirements.	Engineer, EE, and PIU	IA & PMU	
2.2	Increased storm water runoff from alterations of the site's natural drainage patterns due to landscaping, excavation works, and addition of paved surfaces	Design of proposed components will enable efficient drainage of the sites and maintain natural drainage patterns.	Engineer, EE, and PIU	IA & PMU	Contractor
2.3	Selection of materials and construction technologies, if not carefully chosen, will adversely impact the aesthetic appeal of the destinations	Selection of materials will be from approved sources and construction technologies proposed will strictly conform to the Uttarakhand architecture. Any new landscaping elements will only utilize native species. Material selection would be done keeping in view that no asbestos (except as allowed), and CFC is used.	Engineer, EE, and PIU	IA & PMU	Contractor
2.4	Socio cultural resources- Ground disturbance can uncover and damage archaeological and historical remains	Consult Archaeological Survey of India (ASI) and/or concerned Dept. of Uttarakhand Govt. as applicable to obtain an expert assessment of the archaeological potential of the site; Consider alternatives if the site is found to be of	Engineer, EE, and PIU	Contractor, IA & PMU	IA, Contractor



S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		medium or high risk; and Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.			
2.5	Integration of energy efficiency and energy conservation programs in design of sub-project components	The detailed designs for the sub-project components shall ensure that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, rainwater harvesting etc.	Engineer, EE, and PIU	IA & PMU	Contractor
2.6	Site clearance activities, including delineation of construction areas	Any removal of vegetation or tree felling shall be done after taking statutory permissions if required. All works shall be carried out such that the damage or disruption of flora other than those identified for cutting is minimum. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works shall be removed with prior approval from the Environmental Expert of DSC. All areas used for temporary construction operations will be subject to complete restoration to their former condition with appropriate rehabilitation procedures as per the rehabilitation plan prepared by the contractor and approved by the EE of DSC.	Contractor	Engineer, EE, and PIU	Contractor
3	Construction Impacts				
3.1	Construction Camps - Location, Selection, Design and Layout	Siting of the construction camps shall be as per the guidelines below and details of layout to be approved by DSC. Construction camps shall not be proposed within 500 m from the sensitive receptors, nearest settlements to avoid conflicts and stress over the infrastructure facilities with the local community. Location for stockyards for construction materials shall be identified at least 300 m away from watercourses. Construction camps will be located away from	Contractor with the Engineer and EE	PIU, IA & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		settlements and drainage from and through the camps will not endanger any domestic or public water supply. Construction camps including sanitation facilities must be adequately drained. Sewage management through septic tanks and solid waste management through local ULB system or other alternate measures.			
3.2	Drinking water availability	Sufficient supply of cold potable water to be provided and maintained. The water quality shall be as per standard norms for drinking water. If the drinking water is obtained from an intermittent public water supply then storage tanks will be provided. The cleanliness of the storage tanks will be ensured and all measures to be taken to avoid any water contamination.	Contractor	Engineer and EE	Contractor
3.3	Waste disposal	Pre-identified disposal location (identified by Contractor and approved by EE-DSC) shall be part of Comprehensive Waste Disposal Plan Solid Waste Management Plan to be prepared by the Contractor in consultation and with approval of Environmental Specialist of DSC. The Environmental Specialist of DSC shall approve these disposal sites after conducting a joint inspection on the site with the Contractor. Wherever, possible Solid waste management shall be through local ULB system or other alternate measures. Contractor shall ensure that waste shall not be disposed off near the water course or agricultural land, Orchards and Natural Habitats like Grasslands.	Contractor with the Engineer	PIU, IA & PMU	Contractor
3.4	Stockpiling of construction materials	Stockpiling of construction materials does not impact obstruct the drainage and Stockpiles will be covered to protect from dust and erosion.	Contractor with the Engineer	PIU, IA & PMU	Contractor
3.5	Quarry operations	Contractor shall finalize the quarry for procurement of construction materials after assessment of the availability of sufficient quantity of materials, quality and other logistic	Contractor with the Engineer	PIU, IA & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		<p>arrangements.</p> <p>The Contractor shall obtain materials from approved quarries only after consent of the Department of Mines and Geology and District Administration.</p> <p>Adequate safety precautions will be ensured during transportation of quarry material from quarries to the construction site. Vehicles transporting the material will be covered to prevent spillage.</p>			
3.6	Arrangement for construction water	<p>The Contractor shall use ground/surface water as a source of water for the construction with the written consent from the concerned Department. To avoid disruption/ disturbance to other water users, the Contractor shall extract water from fixed locations and consult DSC &amp; line agencies before finalizing the locations.</p> <p>The Contractor shall provide a list of locations and type of sources from where water for construction shall be extracted.</p> <p>The Contractor shall need to comply with the requirements of the State Ground Water Department for the extraction and seek their approval for doing so and submit copies of the permission to DSC.</p>	Contractor with the Engineer	PIU, IA & PMU	Contractor
3.7	Soil/Land Erosion	Slope protection measures will be undertaken as per design to control soil erosion.	Contractor with the Engineer	FPIU, IA & PMU	Contractor
3.8	Water Pollution from Construction Wastes	The Contractor shall take all precautionary measures to prevent entering of wastewater into streams, water bodies or the irrigation system during construction Contractor shall not wash his vehicles in river/stream water and shall not enter riverbed nearby the water resource area for that purpose.	Contractor with the Engineer	Engineer, PIU & PMU	Contractor
3.9	Water Pollution from Fuel and Lubricants	The Contractor shall ensure that all construction vehicle parking locations, fuel/ lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites shall be located	Contractor	EE of DSC, Engineer, PIU & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		at least 300 m away from rivers/streams and irrigation canal/ponds if any Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling shall be carried out in such a manner that spillage of fuels and lubricants does not contaminate the ground. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be collected and separated through an oil interceptor before discharging it on land or into other treatment system as per specified standards and UEPPCB and ULB norms if any.			
3.10	Soil Pollution due to fuel and lubricants, construction waste	The fuel storage and vehicle cleaning area will be stationed such that spillage of fuels and lubricants does not contaminate the ground. All pollution parameters will be monitored as per monitoring plan. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be collected and separated through an oil interceptor before discharging it on land or into other treatment system.	Contractor	Engineer, PIU & PMU	Contractor
3.11	Generation of dust	The Contractor will take every precaution to reduce the levels of dust at construction site. Regular sprinkling of water and Stockpiles of soil will be kept covered in such a manner to minimize dust generation.	Contractor	Engineer, PIU & PMU	Contractor
3.12	Emission from Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery used for construction shall conform to the relevant Bureau of India Standard (BIS) norms. The discharge standards promulgated under the Environment Protection Act, 1986 shall be strictly adhered to. The use of silent/quiet equipment compliant with India ambient noise standards and standards specified for manufacturers shall be encouraged in the sub Project. The Contractor shall maintain a record of PUC	Contractor	Engineer, PIU & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		for all vehicles and machinery used during the contract period which shall be produced for verification whenever required.			
3.13	Noise Pollution	<p>The Contractor shall confirm that all Construction equipment used in construction shall strictly conform to the MoEF/CPCB noise standards and all Vehicles and equipment used in construction shall be fitted with exhaust silencers.</p> <p>At the construction sites noisy construction work such as crushing, operation of DG sets, use of high noise generation equipment shall be stopped during the night time between 10.00 pm to 6.00 am.</p> <p>Noise limits for construction equipment used in this project will be in conformity to the BIS/SPCB/CPCB standards</p> <p>Regular monitoring of ambient noise levels to ensure compliance to Uttarakhand Environment Protection &amp; Pollution Control Board standards.</p>	Contractor with the Engineer	EE, PIU & PMU	Contractor
3.14	Material Handling at Site	<p>Workers Employed on mixing cement, lime mortars, concrete etc., will be provided with protective footwear and protective masks and goggles.</p> <p>Workers, who are engaged in welding works, will be provided with welder's protective eye-shields.</p> <p>Workers engaged in stone breaking activities will be provided with protective goggles, masks, and clothing.</p> <p>The use of any toxic chemical will be strictly in accordance with the manufacturer's instructions and applicable regulations. The Engineer will be given at least 6 working days' notice of the proposed use of any chemical. A register of all toxic chemicals delivered to the site will be kept and maintained up to date by the Contractor.</p>	Contractor	Engineer, PIU & PMU	Contractor
3.15	Disposal of Construction Waste/Debris/Cut Material	The Contractor shall confirm that Safe disposal of the construction waste will be ensured in the pre-identified disposal locations. In no case, any	Contractor	Engineer, PIU & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		construction waste will be disposed around the project site indiscriminately.			
3.16	Safety Measures During Construction	<p>Personal Protective Equipment for workers on the project and adequate safety measures for workers during handling of materials at site will be taken up. The Contractor has to comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress.</p> <p>The Contractor has to comply with all regulations for the safety of workers. Precaution will be taken to prevent danger of the workers from fire, etc. First aid treatment will be made available for all injuries likely to be sustained during the course of work. Contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camp. Contact information of Doctor, availability &amp; location of first aid box shall be displayed in appropriate language both at work site and workers camp.</p> <p>The Contractor will conform to all anti-malaria instructions given to him by the Engineer.</p> <p>The Contractor will also ensure that the interests of the community are preferably not disturbed, and if unavoidable then disturbed to the minimum. Provide traffic management personnel, barricade, appropriate signage and safety information in and around the construction site and prevent local people entering into the construction site.</p>	Contractor	Engineer, PIU & PMU	Contractor
3.17	Clearing of Construction of Camps and Restoration	<p>Contractor to prepare site restoration plans for approval by the Engineer. The plan is to be implemented by the contractor prior to demobilization.</p> <p>On completion of the works, all temporary structures will be cleared away, all rubbish burnt,</p>	Contractor	Engineer, PIU & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the Engineer and facility owner.			
3.18	Risk of archaeological chance finds	Strictly follow the protocol for chance finds in any excavation work; Request FPIU/DSC or any authorized person with archaeological field training to observe excavation; Stop work immediately to allow further investigation if any finds are suspected; and Inform FPIU/DSC, and take any action they require ensuring its removal or protection in-situ.	Contractor	Engineer, PIU & PMU	Contractor
3.19	Conflict with locals	Contractor shall ensure that mostly the local labourers are employed and migratory laborer shall be employed only in case of unavoidable circumstances.	Contractor	Engineer, PIU & PMU	Contractor
3.20	Environment Safeguard Officer	Contractor shall appoint one full-time suitably qualified and experienced Environment and Safety Officer who shall be responsible for assisting contractor in implementation of EMMP, community liaising, consultations with interested/affected parties, reporting and grievance redressal on day-to-day basis. This environment and safety officer will be at site till all works related to the project including demobilization are completed.	Contractor	Engineer, PIU & PMU	Contractor
4	Operation and Maintenance impacts				
4.1	Environmental Conditions	The periodic monitoring of the ambient air quality, noise level, water (both ground, surface water) quality and soil, in the subproject area as suggested in pollution monitoring plan through an approved monitoring agency.	Pollution Monitoring Agency appointed by IA	SDMA, PMU	IA
4.2	Increased Pollution load on the Ecosystem in peak tourist season	Increased Pollution load will be addressed through better facilities. Wherever, possible Solid waste management shall be through local ULB system or other	IA and EA	SDMA, PMU & GoU	IA

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		<p>alternate measures.</p> <p>Trampling impacts on vegetation and soil will be minimized by designating proper walkways in and around proposed facilities. Proper parking facilities and traffic management for catering to increased vehicle movement shall be provided.</p> <p>The project (UEAP) will have positive impacts on the socio economic conditions of people of project area by way of providing better road connectivity, water supply &amp; allied facilities Tourism Infrastructure and emergency rescue, evacuation facilities.</p> <p>As per Loan covenants of UEAP:</p> <p>a) EA shall prepare guidelines for new infrastructure to be developed under the sector;</p> <p>(b) prepare master plan for redevelopment of Kedarnath Dham; and</p> <p>(c) Undertake the carrying capacity and tourist regulation studies and measures thereof.</p>			
4.3	Unhygienic condition due to poor maintenance of sanitation facilities and irregular solid waste collection	IA will carry out maintenance of the existing toilets, and carry out the regular collection and disposal of wastes as per norms. New facilities proposed to be created under UEAP will cater to additional load.	IA	IA	IA

EE= Environmental Expert of Engineer (DSC), DSC= Design & Supervision Consultants, IA= Implementing Agency, EA= Executing Agency, PIU= Project Implementation Unit



## F. Performance Indicators

143. The performance indicators of implementation of environmental management and monitoring programme has been given in Table VII-4.

Table VII-4: Performance Indicators of EMMP

Sl. No	Performance Indicators	Target	Achievement in Semi-annually and Annually
1.	Budget	Environmental Budget (EMMP Budget)	Expenditure till date
<b>A. Performance Indicators of Monitoring Plan</b>			
2.	Ambient Air Quality (AAQ)	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
3.	Noise Level	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
4.	Water Quality	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
5.	Soil	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
6.	Safety of Workers	List of PPE as per the number labours	List of PPEs actually provided in the project
<b>B. Performance Indicators of Environmental Management Plan</b>			
7.	Permissions,/ NoCs/Consents requirement	Target timeline to obtain the permit/NoC/ consents and its validity	List of Permission and NoCs / consents obtained till date and status of its validity.
8.	Public Consultation	Total Number of planned Public Consultation with timeline and coverage of people.	Number of public consultation conducted till date and actual coverage of the people.
9.	Grievance Redressal	Total number of complaints received, its timeline to response and resolution	Actual number of complaints resolved in percentage, response time.
10.	Issues raised in Public Consultation	Target to attend the issues raised in the Public Consultation	Status of compliance to the issues of Public consultation
11.	Information Disclosure	List of information and locations where information to be disclosed	Actual locations where information has been disclosed.
12.	Education of site staff on Environmental training	Total Number of staffs to be trained	No of staff actually
13.	Capacity Building	Total number of sessions to be covered Total Number of contractors, PIUs and DSCs to be covered	Number of Sessions completed and Number of contractors, PIUs and DSCs.
14.	Implementation of EMP mitigation Measures	All items of Environmental Management Plan with timeline and its respective regulatory standards like for Ambient air Quality - NAAQS, 2009	Implementation status of EMP items till date

Sl. No	Performance Indicators	Target	Achievement in Semi-annually and Annually
		standards, Drinking water - IS:10500 etc, Residual Chlorine - UEPPCB standards and CPHEEO manual for handling.	
15.	Reporting	List and number of Report to be submitted	List and number of reports submitted

### G. Grievance Redressal Mechanism

144. The EA has established a mechanism to receive and facilitate resolution of affected peoples concerns, complaints, and grievances about the Projects environmental performance (Appendix C). The project-specific grievance redress mechanism (GRM) is not intended to bypass the governments own redress process; rather it is intended to address affected people's concerns and complaints promptly, making it readily accessible to all segments of the affected people and is scaled to the risks and impacts of the Project.
145. The PMU and PIU (UEAP: ADB) will make the public aware of the GRM through public awareness campaigns. Grievances will be filed in writing using the Complaint Register and Complaint Forms or by phone with any member of the PMU and PIU (UEAP: ADB). The contact phone number of the PIU and the PMU have been publicized through the media and placed on notice boards outside their offices and at construction sites and will serve as a hotline for complaints. . The safeguard documents will be made available to the public in an accessible version including information on the GRM and will be widely disseminated throughout the corridor by the safeguards officers in the PMU and PIUs with support from the NGO engaged to implement the Community Awareness Program.
146. The PIU has already convened Grievance Redressal Committees (GRC) of the voiced grievance at the project level consisting of members of local government, NGOs, project staff, and representatives of the affected people. Decisions on the grievance are to be made within 15 days of receipt by the committee formed for the purpose. If the grievance cannot be solved, the PMU is notified to further advice on the situation with higher government and legal bodies.
147. The GRC will ensure rights of vulnerable and poor are included. The grievance mechanism will be scaled to the risks and adverse impacts of the Project. It will address affected people's concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people at no costs and without retribution. The mechanism developed will be in a manner that it shall not impede access to the existing judicial or administrative remedies. The affected people will be appropriately informed about the mechanism.
148. The PIU officers will be responsible for processing and placing all papers before the GRC, maintaining database of complaints, recording decisions, issuing minutes of the meetings and monitoring to see that formal orders are issued and the decisions carried out. All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the PMU (UEAP: ADB).
149. The safeguard monitoring reports will include the following aspects pertaining to progress on grievances: (i) number of cases registered with the GRC, level of jurisdiction (first, second and third tiers), number of hearings held, decisions made, and the status of pending cases; and (ii) lists of cases in process and already decided upon may be

prepared with details such as Name, ID with unique serial number, date of notice, date of application, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (i.e., open, closed, pending).

## VIII. CONCLUSION AND RECOMMENDATION

150. The proposed sub-projects components do not involve any interventions in surrounding environment, natural as well and cultural heritage destinations and have less significant (direct/indirect) environmental impacts. It is expected that the proposed sub-project will enhanced economic growth and provision of livelihood opportunities for local communities through tourism infrastructure development with a focus on preservation and development of natural and cultural heritage and incidental services. The proposed project under the infrastructure development will provide support facility to the State of Uttarakhand, to enhance and develop the tourism sector as a key driver for economic growth on one hand and useful during emergency period on other.
151. This IEE has identified minor likely impacts on water, air and noise during construction and operation period and has defined mitigation measures. Those mitigation measures will be implemented and monitored during the sub-project execution. Further, the provision of environmental infrastructure, including access to sanitation and waste management facilities within the project sites, will better the environmental conditions and minimize the pollution related and aesthetic quality etc.
152. The specific management measures laid down in the IEE will effectively address any adverse environmental impacts due to the sub-project. The effective implementation of the measures proposed will be ensured through the building up of capacity towards environmental management within the PMU/PIU (UEAP: ADB) supplemented with the technical expertise of a Safeguards Specialist as part of the DSC Consultants. Further, the environmental monitoring plans provide adequate opportunities towards course correction to address any residual impacts during construction or operation stages.
153. On the basis of the IEE report, it is expected that the proposed project components have only minor temporary and reversible impacts or simply say very less significant environmental impacts on environment. These impacts can be easily mitigated through adequate mitigation measures and regular monitoring during the Design, Construction and Post-construction Phases of the project. It is recommended that PMU/PIU (UEAP: ADB) should have monitoring responsibility in environmental issues of all program components and to ensure the environmental sustenance.
154. The IEE carried out for the sub-project show that the proposed sub-components will result in net environmental benefits, and that any adverse environmental impact can be addressed through proper location, planning, and design of the proposed sub-project; control of construction activity and mitigation measures. The EMP provides for mitigation of all identified impacts and the contract clauses for the environmental provisions will be part of the civil works contracts. Further, the proposed sub-project elements have been consulted with the stakeholders and no significant issues requiring redressal in terms of environmental safeguards exist.
155. Based on the findings of the IEE, the classification of the sub-projects as Category - B is confirmed, and no further special study or detailed EIA needs to be undertaken to comply the rules and regulations under Government of Uttarakhand, Government of India and ADB's (Safeguard Policy Statement, 2009).
156. The 'No-objection Certificates' (NOCs) from the concerned Revenue Department (District Magistrates) and user agencies have been obtained for the commencement of civil work. There is no environmental and social issue at this stage. Thus, the commencement of civil work for one location can be started as per target of the Uttarakhand Emergency Assistance Project on priority basis.



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# APPENDICES



















## UCADA ADVERTISEMENT

**परियोजना प्रबन्धन ईकाई**  
**उत्तराखण्ड डिजास्टर रिकवरी प्रोजेक्ट एवं**  
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आपदा राहत एवं पुनर्वास के अन्तर्गत आवास, सड़क, पुल दुर्गम क्षेत्रों के लिये हैलीपैड, चिह्नित क्षतिग्रस्त सरकारी भवनों, पर्यटन विभाग की परिसम्पत्तियों, बहुउद्देशीय भवनों एवं एफ.आर.पी. हटस बनाये जा रहे हैं। उपरोक्त से संबंधित किसी भी समस्या के निवारण के लिये परियोजना प्रबन्धन ईकाई एवं जनपद स्तर पर समस्या निवारण प्रकोष्ठ गठित किये गये हैं, जिनके संपर्क सूत्र निम्नवत हैं- इन संपर्क सूत्रों पर कार्यालय दिवसों एवं कार्यालय समयावधि में संपर्क किया जा सकता है।

केन्द्रीय समस्या निवारण प्रकोष्ठ दूरभाष संख्या 0135-2708376,  
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## LEAFLET FOR PUBLIC INFORMATION



लोक सूचनार्थ हेतु प्रपत्र  
(Leaflet for Public Information)

एशियाई विकास बैंक द्वारा सहायित  
“उत्तराखण्ड आपातकालीन सहायता परियोजना”  
(Uttarakhand Emergency Assistance Project Assisted by ADB)  
दूरभाष संख्या: 0135-2808881 E-Mail : piu.ca.uk@gmail.com

परियोजना कियान्वयन इकाई  
उत्तराखण्ड नागरिक उड्डयन विकास प्राधिकरण – देहरादून  
(Project Implementation Unit: Uttarakhand Civil Aviation Development Authority)

### 1. प्रस्तावना (Introduction)

उत्तराखण्ड एक नवसृजित राज्य है, जो 9 नवम्बर 2000 को पूर्ण रूप से पृथक राज्य के रूप में अस्तित्व में आया। जिसका अधिकांश भाग मध्य हिमालय का पर्वतीय क्षेत्र है। अधिकांश भू-भाग पर्वतीय आंचल में होने के कारण यहाँ रेलवे एवं वायुयान जैसी सुविधाओं का प्रायः अभाव रहा है। फलस्वरूप सड़क मार्ग ही एकमात्र आवागमन का सुलभ साधन है। राज्य में आवागमन एवं समस्त विकासशील योजनायें सड़कों की उपलब्धता एवं गुणवत्ता पर ही आश्रित हैं। राज्य की विषम भौगोलिक परिस्थिति होने के कारण 15-17 जून 2013 को राज्य का अधिकांश पर्वतीय भू-भाग आपदा से डूरी तरह से प्रभावित हुआ। जिसके परिणामस्वरूप जानमाल की क्षति के साथ कई मोटर मार्ग पूर्ण एवं आंशिक रूप से क्षतिग्रस्त हुए। जो राज्य सरकार के साथ समस्त मानव समुदाय के लिए एक बहुत बड़ी चुनौती साबित हुई। राज्य के पर्वतीय भू-भाग में मौजूदा सड़कों की उचित गुणवत्ता न होने के कारण उक्त नवसृजित राज्य के बहुमुखी विकास हेतु राज्य सरकार द्वारा एशियाई विकास बैंक के वित्तीय सहयोग से उत्तराखण्ड नागरिक उड्डयन विकास प्राधिकरण राज्य में सुलभ आवागमन हेतु विशेषतः आपदाकालीन स्थिति को मद्देनजर रखते हुए पूर्व अनुभवों के आधार पर प्रभावित क्षेत्रों के जनमानस के मध्य उक्त महत्वाकांक्षी परियोजना के अन्तर्गत राज्य के अवीन मौजूदा हैलीपैड्स एवं हैलीपोर्ट्स के सुवारीकरण एवं सुदृढीकरण के साथ-साथ कई नये हैलीपैड्स एवं हैलीपोर्ट्स के निर्माण हेतु

यत्नबद्ध है। उक्त कार्य हेतु परियोजना से सम्बन्धित सूचना आम जनमानस के सूचनार्थ एवं महत्वपूर्ण सुझाव के लिए इस प्रपत्र के माध्यम से प्रकाशित की जा रही है।

### 2. उद्देश्य (Objectives)

विकास एवं पर्यावरण एक ही सिक्के के दो पहलू हैं। यदि प्राकृतिक पर्यावरण के संतुलन एवं संयोजन की ओर ध्यान केंद्रित किया जाए तो निश्चित ही विकास के दुष्प्रभावों को नियंत्रित किया जा सकता है। परन्तु विकास की दौड़ में जहाँ नये मोटर मार्गों का निर्माण कार्य अति आवश्यक है। उसी प्रकार से राज्य के दुर्गम एवं पर्वतीय क्षेत्रों में आपदा जैसी समस्या से निपटने के लिए हैलीपैड्स एवं हैलीपोर्ट्स का निर्माण एवं रखरखाव करना भी उतना ही आवश्यक है। अस्थायी आपदा जैसी दघटनाओं से बच पाना सम्भव नहीं होगा। उक्त समस्या को समाधान हेतु उत्तराखण्ड राज्य सरकार ने एशियाई विकास बैंक के वित्तीय सहयोग से उपरोक्त परियोजनामार्गत प्रथम चरण (फेज-1) में 12 एवं द्वितीय चरण (फेज-2) में 48 नये एवं पूर्ण निर्मित हैलीपैड्स एवं हैलीपोर्ट्स का कार्य सुवारीकरण एवं सुदृढीकरण हेतु प्रस्तावित किया है। परियोजना के स्थलों में सम्बन्धित विभाग/प्रयोक्ता एजेंसी एवं जिलाधिकारियों से निर्माण कार्य हेतु अनापत्ति प्रमाण-पत्र उपलब्ध हो पाये। जिनका संक्षिप्त उल्लेख तालिका-1 में किया गया है।



तालिका-1: "उत्तराखणुड नागरिक उदुडहन विकास प्राधिकरण" के अन्तर्गत द्वितीय-चरण पैकेज 1 में नव-निर्माण एवं सुधारीकरण हेतु हैलीपैडस एवं हैलीपोर्टस की सूची

कड संड	प्रस्तावित स्थल	जनपद	श्रेणी (न्यूनतम वांछित क्षेत्रफल)	डीडएसडडी	एनडडीडडी
1	Dakpathar	Dehradun	MPH 5	आईडआईड डीडसीड देहरादून (श्री पियूष जैन: ५०२० 09818290426 E-Mail: piyushjain@ifsindia.com) डडी सुरजीत सिंह (पर्यावरण विीषडः 09971012878) डडी सुदीः कौल (सामाजिक विीषडः 09818053030)	श्री एसड केड सिंह, अध्यक्ष सेंटर फीर रुरल एणुड इकोलौजिकल डेवलपमेंट (ड्रेडड) देहरादून (9219517770 / 941 2369319)

नोट: हैलीपैडस एवं हैलीपोर्टस के निर्माण हेतु सम्बन्धित विभाग एवं जिलाधिकारियों से प्रस्तावित सरकारी भूमि होने के कारण अनापत्ति प्रमाण-पत्र प्राप्त किया गया है।



प्रवाह मानचित्र - 1: सतत विकास के अन्तर्गत परियोजना के प्रभावपूर्ण कियान्वयन हेतु अच्छे प्रबन्धन के लिए विभिन्न घटकों का प्रारूपिक प्रवाह मानचित्र।

- परियोजना के प्रमुख उद्देश्य निम्नवत इस प्रकार हैं।
- ✓ राज्य में मौजूदा हैलीपैडस एवं हैलीपोर्टस का पुनरुद्धार एवं सुदुडीकरण के साथ-साथ एवं नये हैलीपैडस एवं हैलीपोर्टस के निर्माण हेतु स्थलों का चयन कर सम्बन्धित विभाग एवं जिलाधिकारियों से निर्माण कार्य हेतु अनापत्ति प्रमाण-पत्र प्राप्त कर परियोजना का प्रभाव पूर्ण कियान्वयन करना।
- ✓ राज्य के दुर्गम स्थानों में आपदा के दौरान जनता को हैलीकोप्टर/चोपड के माध्यम



Ministry of Panchayats

- से प्राथमिक सुविधाएँ एवं आवश्यकीय बसाव कार्य उपलब्ध कराना।
- ✓ राज्य के दुर्गम स्थानों के आर्थिक विकास एवं चार धान यात्रा हेतु पर्यटन को बढ़ावा देना।
  - ✓ ऐसे क्षेत्र जो उच्च आर्थिक गतिविधियाँ एवं विकास के अन्तर्गत आते हैं, उनको अन्य क्षेत्रों से जोड़ना ताकि उनसे होने वाले प्राप्त नुनाओं को राज्य के प्रत्येक भाग तक पहुँचाया जाना सम्भव हो सके।
  - ✓ उच्च अध्ययन का मुख्य उद्देश्य प्रस्तावित ईलीमेंट्स एवं ईलीमेंट्स की अभियांत्रिकी, परिवहन, आर्थिक, सामाजिक एवं पर्यावरण सम्बन्धित गतिविधियों को प्राथमिकता की सूची में सम्मिलित करना तथा विस्तृत परियोजना आख्या (डीपीआर) निर्धारित करते समय स्थानीय जनता के महत्वपूर्ण सुझावों को नदरेनजर रखना।
  - ✓ परियोजना से प्रभावित व्यक्ति चाहे प्रत्यक्ष रूप से लाभान्वित न हो, लेकिन परोक्ष रूप को लाभान्वित हुए परियोजना के क्रियाभ्ययन के तत्परशात आम जनमानस के जीवन में सुधार आना सुनिश्चित है।
  - ✓ मुख्यतया आम जनमानस की आजीविका पर प्रभाव और भूमि अधिग्रहण एवं पर्यावरण अवनयन जैसे नकारात्मक प्रभाव यथासम्भव कम से कम हो जैसे प्रयास करना उचित अध्ययन का प्रमुख लक्ष्य है।
  - ✓ एशियाई विकास बैंक के नीति निर्देशों के तहत मार्किट आवादी (पीपी) के अन्तर्गत महिला सत्तात्मक परिवार, बुजुर्ग वर्ग, गरीबी रेखा से नीचे जीवनयापन (बीपीएल) करने वाले परिवार और सामाजिक रूप से पिछड़े वर्ग (एलसी, एलटी) को सम्मिलित किया गया है। उचित वर्गों के परिवारों पर विशेष ध्यान कोन्द्रित है।
  - ✓ उक्त कार्यक्रम के अन्तर्गत 3 वर्ष की समयावधि में लगभग 60 ईलीमेंट्स एवं ईलीमेंट्स का निर्माण कार्य प्रस्तावित है।
  - ✓ उक्त कार्यक्रम के तहत प्रस्तावित क्षेत्र में पड़ने वाले सुझावों को पाठन एवं आँकड़मय जैसे प्रमुख मुद्दों पर सरकार एवं स्थानीय

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जनमानस के मध्य विचार विमर्श कर निर्माण कार्य को सुनिश्चित करना।

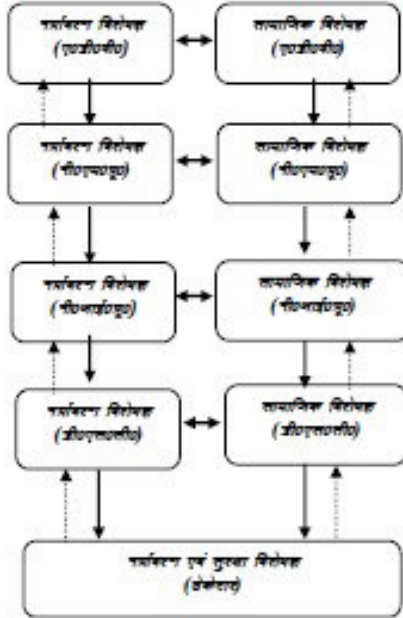
- ✓ उक्त कार्यक्रम के अन्तर्गत सतत पर्यावरणीय एवं पुनर्वास के संवेदनशील मुद्दों को स्थित कार्य के क्रियाभ्ययन होने से दो माह पूर्व निम्नादिित किया जाना अति आवश्यक है।

3. पर्यावरण परिदरय  
(Environmental Scenario)

उचित परियोजना के अन्तर्गत पर्यावरण परिदृश्य का मुख्य उद्देश्य प्राकृतिक पर्यावरण एवं आपदा स्थिति के साथ-साथ सतत विकास को नदरेनजर रखते हुए बेहतर विकल्पों को पर्यावरण संरक्षण हेतु दृष्टिगोचर करना। जिसमें सुनियोजित योजना, आलेखन एवं परियोजना के क्रियाभ्ययन के समय विभिन्न अयस्थाओं में निम्नादिित बिन्दुओं को सम्मिलित किया जायेगा।

- ✓ परियोजना के अन्तर्गत प्रमुख पर्यावरणीय घटक (जल, जमीन, जंगल, वायु एवं प्राकृतिक संसाधनों का संरक्षण) की पहचान एवं मूल्यांकन करना।
- ✓ प्रमुख पर्यावरणीय मुद्दों (जल, जमीन, जंगल, वायु एवं प्राकृतिक संसाधनों का संरक्षण) पर पड़ने वाले नकारात्मक प्रभावों पर नियंत्रण एवं स्थूनीकरण करना।
- ✓ परियोजना के सरल संचालन हेतु प्रारम्भिक पर्यावरण परीक्षण (आईईई), पर्यावरण प्रबंधन योजना (ईएमपी) एवं पर्यावरण प्रभाव विधेक्षण (ईआईई) जैसे महत्वपूर्ण दस्तावेजों को परियोजना की आवश्यकतानुसार एशियाई विकास बैंक एवं भारत सरकार के नीती निर्देशों के अनुसूच सुनियोजित कर सम्यक् तरीके से क्रियाभ्ययित करना।

पर्यावरण एवं सामाजिक सुरक्षा की दृष्टिकोण से विशेषज्ञों का पदानुक्रम



#### 4. प्राकृतिक पर्यावरण के अंग (Parts of Natural Environment)

##### (अ) भौतिक पर्यावरण (Physical Environment)

- जल संसाधन।
- नृदा संरक्षण।
- पर्यावरण प्रदूषण (वायु, जल, ध्वनि इत्यादि)।
- अपशिष्ट पदार्थों का निष्पादन।
- खनिज एवं धातु संसाधन।
- स्थलाकृति इत्यादि।

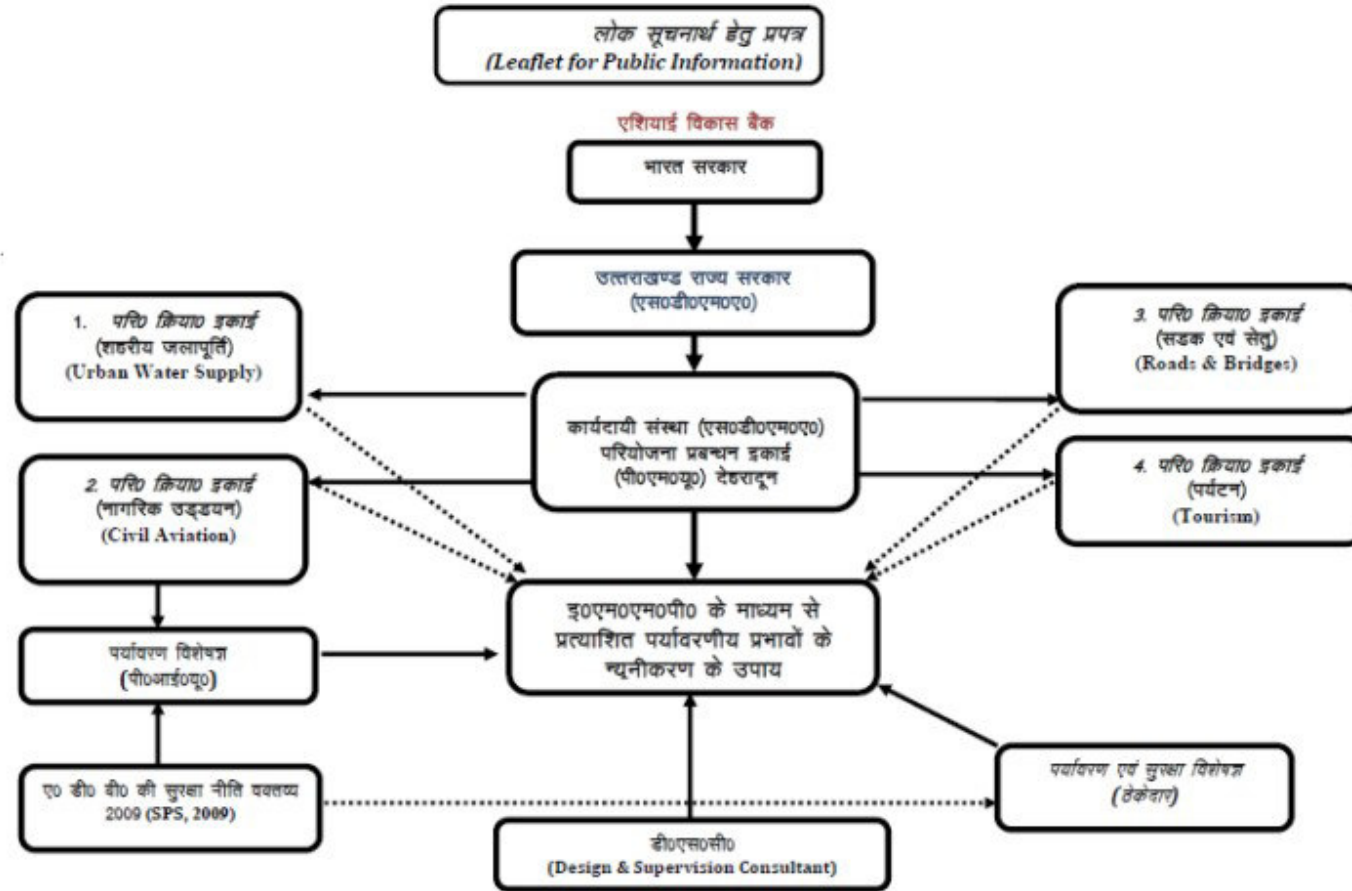
##### (ब) जैविक पर्यावरण (Biological Environment)

- प्रस्तावित भूमि में आच्छादित वृक्ष।
- वन्य जीव एवं उनके प्राकृतिक आवास (घन, जलाशय, घोंसले, छिद्र, गडहंसार भूमि आदि)।

- घन, अभयारण्य, राष्ट्रीय पार्क, जैव-मण्डल निधय इत्यादि।

##### (स) सामाजिक एवं सांस्कृतिक पर्यावरण (Socio-cultural Environment)

- पेयजल के स्रोत।
- विद्यालय, महाविद्यालय, अस्पताल इत्यादि।
- धार्मिक स्थल (मन्दिर, मस्जिद, गुरूद्वारा इत्यादि)।
- सांस्कृतिक एवं पुरातात्विक स्थल (धरोहर)।
- अपशिष्ट पदार्थों के निष्पादन हेतु अन्य स्थल एवं तैयार कार्य हेतु ली गई भूमि।



प्रवाह मानचित्र – 2: उत्तराखण्ड आपातकालीन सहायता परियोजना (ए0डी0बी0) के समयबद्ध एवं प्रभावपूर्ण क्रियान्वयन हेतु प्रशासनिक ढांचा



## PUBLIC CONSULTATION ATTENDANCE SHEET

GDC (Degree college)

Dak Pathar

## ATTENDANCE SHEET FOR FOCUS GROUP DISCUSSION

Name of the Site : ..... Vikasnagar ..... Block : ..... Vikasnagar ..... District : ..... Dehradun .....

Sl No	Name	Phone Number	Subjects Discussed	Suggestions	Signature of Participants
1	Mr. Subodh Goyal (Village Pradhan)	9412348772 9557050772	Construction site	The approach can	
2	Mr. Vijay Mahar	7560675005	for Helipad, Any	be made through	
3	Mrs. Meenu Mahar (UP Pradhan)	9634052444	local issues	Jamna Khadar Road	
4	Mr. Anuj	9897175321	Panchayat and	a bridge of 20 mts	
5	Mr. Vivishan	9719075220	Development	would be required	
6	Mr. Satish Kumar	9720762829	Schemes,	to develop.	
7	Mr. Sher Singh Pundir (BDC Khastha Panchayat)	9411139163		Employment during	
8				Construction should	
9	Mr. Manjeet Singh (ward member)	9412018864		be given to local people in order	
10				Helipad should be	
11	Mr. Vijaypal Singh (RSI)	9456538585		constructed as early	
12	Kanungo Vikasnagar	9412953804		as soon.	

Local participation should be ensured during construction  
 Signature & Date  
  
 22-06-2015

Focus Group Discussion

PHOTOGRAPHS OF PUBLIC CONSULTATION



## NO-OBJECTION CERTIFICATES (NOCs)

Dakpathar (District - Dehradun)

देहरादून में हैलीपैड/हैलीपोर्ट/हैलीड्रॉम निर्माण हेतु अनापत्ति प्रमाण-पत्र  
(संख्या - यूई.ए.पी. पत्रांक 229 पी0आई0यू0 (रिविल एविएशियन)/ यूई0ए0पी0 (10)/2014-15 दिनांक 04-10-2014)

क्र. सं.	प्रस्तावित भूमि	खसरा सं.	तहसील	कुल क्षेत्रफल	वर्तमान स्वामित्व	टिप्पणी
1.	मसुरी हाथीचंदि (जार्ज एडरस्ट से पास)	शून्य	देहरादून	24 एकड़	पर्यटन विभाग	उप-जिलाधिकारी मसुरी की आख्या दिनांक: 8.10.2014 के अनुसार प्रस्तावित हैलीपैड मसुरी नगर पालिका क्षेत्रांतर्गत जिसमें सर्वेक्षण प्रस्ताव उपलब्ध नहीं है। नोटिफाइड एस्टेट के संदर्भ में वन विभाग से जानकारी प्राप्त किया जागा उचित होगा।
2.	ग्राम डाकपथर	703 ख	शिकारनगर	8.975 हे०	राजकीय महाविद्यालय डाकपथर	तहसीलदार शिकारनगर की आख्या दिनांक: 7.10.2014 के अनुसार उपर्युक्त भूमि राजकीय महाविद्यालय डाकपथर नाम के 50 के नाम अधिपति है जिसमें उक्त विद्यालय प्रशासन को 50X50=2500 वर्ग मी० में हैलीपैड निर्माण करने में कोई आपत्ति नहीं है।
3.	बूनाड बास्तिल	581	रतूनी	1.100 हे०	रा० म० वि० उच्च शिक्षा	तहसीलदार रतूनी की आख्या दिनांक: 7.10.2014 के अनुसार यह 1.100 रा० म० वि० उच्च शिक्षा को पूर्व में आवंटित हुई थी वर्तमान में उक्त भूमि पर महाविद्यालय को भूमि दी गई है वर्तमान में उक्त भूमि रिक्त है-संयोजक है।
4.	एस0डी0आर0एफ0 रीटान जीलीघाट	-	ऋषिकेश	-	-	तहसीलदार ऋषिकेश की आख्या दिनांक: 8.10.2014 के अनुसार जीलीघाट एयरपोर्ट के समीप एस0डी0आर0एफ0 के नाम खसरा 20250 वर्ग मी० एकरा 20250 वर्ग मीटर भूमि मुख्यालय हेतु गृह विभाग के नाम दर्ज है। उक्त भूमि हैलीपैड निर्माण हेतु उपयुक्त है। इस संबंध में ए.डी.आर.एफ. के सहाय प्राधिकारी से अनुमति प्राप्त करना उचित होगा।
5.	ऋषिकेश आई0डी0पी0एल0	-	ऋषिकेश	-	-	तहसीलदार ऋषिकेश की आख्या दिनांक: 9.10.2014 के अनुसार आई0डी0पी0एल0 ऋषिकेश में बिना खसरा न० के वन विभाग की भूमि जो वर्तमान में आई.डी.पी.एल. के पास लीज पर है यह भूमि उक्त कार्य हेतु उपयुक्त है तथा इसी भूमि पर अस्थायी रूप से हैलीपैड/हैलीपोर्ट/हैलीड्रॉम का संचालन किया जाता है। उक्त दोनो स्थानों के संबंध में संबंधित विभागों से अनापत्ति प्रमाण पत्र प्राप्त करना आवश्यक है।

प्रमाणित किया जाता है कि जनपद देहरादून में हैलीपैड/हैलीपोर्ट/हैलीड्रॉम के निर्माण हेतु उपरोक्त स्थलों की संस्तुति की जाती है तथा उपरोक्त स्थलों में हैलीपैड/हैलीपोर्ट/हैलीड्रॉम निर्माण कार्य कराये जाने हेतु इस कार्यालय को कोई आपत्ति नहीं है।

(चन्देप्र कुमार)  
जिलाधिकारी, देहरादून।

DAKPATHAR