Initial Environmental Examination

Project Number: 47229-001
October 2014

IND: Uttarakhand Emergency Assistance Project

Submitted by

Project implementation Unit, UEAP, Garhwal Mandal Vikas Nigam Limited, Dehradun

Asian Development Bank

GM

GARHWAL MANDAL VIKAS NIGAM LIMITED
(A Government of Uttarakhand Undertaking)
under Department of Tourism

Uttarakhand Tourism

GMVN

Project Implementation Unit (PIU),
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Ref: 62/PIU-GMVN

Dated: 17 July, 2014

To,

Country Director
South Asian Department
Indian Resident Mission
4, San Martin Marg, Chanakyapuri
New Delhi – 110021, India

Sub : ADB Loan No. 3055-IND, UEAP
Submission of Corrected IEE Report for Sub-Project of Reconstruction and Rehabilitation of Damaged Tourism Assets in Rudraprayag District.

Dear Sir,

This has reference to your comments vide letter dated 09.07.2014 with respect to your No Objection from Environmental Considerations of the Initial Environmental Examination Report for Tourism Sub-Projects (Reconstruction and Rehabilitation of Damaged Tourism Assets in Rudraprayag District). We have incorporated the said comments and have corrected the IEE Report. The same corrected IEE Report is being sent herewith for your record.

The soft copy of above IEE Report has already been submitted to you through email dated 11.07.2014.

Encl: As above

Yours sincerely

Program Manager
UEAP-PIU(T), GMVN

ASIAN DEVELOPMENT BANK
INRM
18 JUL 2014
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Initial Environmental Examination

June 2014

India: Reconstruction & Rehabilitation of Damaged Tourism Assets in Disaster Affected District Rudraprayag Uttarakhand under Uttarakhand Emergency Assistance Project

Prepared by State Disaster Management Authority, Government of India, for the Asian Development Bank.

This initial environmental examination 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
BOD	Biochemical Oxygen Demand
CO	Carbon Monoxide
CFE	Consent for Establishment
CH_4	Methane
CFO	Consent for Operation
DO	Dissolved Oxygen
dB	Decibel
IEE	Initial Environmental Examination
EA	Executing Agency
EIA	Environmental Impact Assessment
EC	Environmental Clearance
GoI	Government of India
GoU	Government of Uttrakhand
Ha	Hectare
H_2S	Hydrogen sulphide
HDPE	High Density Poly Ehylene
HFL	High Flood level
Km	Kilometer
Leq	Sound level
Mg	Milligram
MFF	Multitranche Financing Facility
MoEF	Ministry of Environment & Forests
MLD	Million Litter Per day
Mn	Million
M	Meter
Mm	Millimeter
mg/l	Milligram per Liter
m3	Cubic meter
NAAQM	National Ambient Air Quality Monitoring
NOx	oxides of Nitrogen
NA	Not Applicable
OUR	Oxygen Uptake Rate
O & M	Operation and Maintenance
PMU	Project Management Unit
PVC	Poly Vinyl Chloride
PWD	Public Works Department
PIU	Project Implementation Unit
RCC	Reinforced Cement Concrete
RoW	Right of Way
RSPM	Respirable Suspended Particulate Matter
RP	Resettlement Plan
SEIAA	State Environment Impact Assessment Authority
SPCB	State Pollution Control Board
UEPPCB	Uttaranchal Environmental Protection and Pollution Control Board

SS	Suspended Solids
SBR	Sequential Batch Reactor
UEAP	Uttarakhand Emergency Assistance Project
UJS	Uttarakhand Jal Sanasthan
SPM	Suspended Particulate Matter
SO_2	Sulphur dioxide
ST	Scheduled Tribes
SC	Scheduled Castes
SOP	Standard Operational Procedures
UDD	Urban Development Department
UJS	Uttaranchal Jal Sansthan
U.P	Uttar Pradesh
UPCL	Uttaranchal Power Corporation Limited

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^{-6} meter
µg/m^3	-	micrograms per cubic meter
≈S/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.

2. Recent disaster of unprecedented floods in June, 2013 in the state of Uttarakhand, devastated many towns and villages on the banks of rivers Bhagirathi, Pindar, Mandakini, Alaknanda and Sarju. 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.

3. Tourism was worst hit in the state with destruction of tourism infrastructure on one hand and loss of livelihoods on the other. The tragedy besides claiming thousands lives badly hit the industry stakeholders especially, those involved in Religious and Adventure Tourism on account of the major portion of the season of the Char Dham Yatra being washed out. According to estimates from the Uttarakhand Hotel and Restaurant Association, the floods washed away over 100 small hotels which were constructed right on the riverbanks. Uttarakhand Tourism Department˘s Assets run by Garhwal Mandal Vikas Nigam (GMVN) at various locations viz TRH Rambara, TRH Syalsaur, TRH Chandrapuri were washed away and TRH Kedarnath, Gaurikund, Guptkashi, Tilwara & Jakholi and public toilets located in various locations suffered heavy damages due to flash flood incessant rain and landslides. The tragedy also brought realization that the mushrooming of hotels along river banks was triggered by tourist boom and contrary shortage of accommodation / dwelling units to meet the ever-increasing numbers of tourists. This also contributed to the mushrooming of illegal structures, some of which were constructed right on the riverbanks.

4. As a part of Tourism Restoration Drive, reconstruction and rehabilitation of damaged tourism assests in disaster affected Rudrparyag district run by GMVN are proposed so as to compensate for the loss of tourist accommodation and to provide improved accommodation facilities to the tourist / pilgrims visiting this area.

5. Consistent with the Environmental Assessment and Review Framework, the proposed subproject were screened using ADB rapid environmental assessment (REA) checklist-General (Tourism). 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_ classification.

6. **Air Quality**. The pristine environment and sparse population suggest that most part of the State have a very good air quality while noise level is calm except in central part of the Rudraprayag town.The baseline of air quality and noise level will be generated before commencement of the 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 zone IV & V.

8. **Forest.** Uttarakhand is ranked 9th in all-India in terms of forest covered area with 24,495 $km^2$of forestland 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 subproject location does not fall within any sensitive ecosystem. Neither the project component has direct intervention not indirect intervention with sensitive ecosystem.

10. **Significant Environmental Impacts and Proposed Mitigation Measures.** No environmental impacts related to siting were identified in the environmental examination. All components of subproject are existing, no components of subproject is located inside or near a cultural heritage site, protected area, 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) within the subproject corridor of impact.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 stakeholder consultation and participation was observed during the environmental examination of UEAP. 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 in the 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.** In the present IEE certain baseline data is not available for water, noise and air quality. Therefore it is proposed that before the commencement of work sampling for these parameters 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 Bhagirathi, Pindar, Mandakini, Alaknanda and Sarju. 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. THE UTTARAKHAND EMERGECY 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 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 damaged. The impact on the affected population due to the loss of connectivity has been manifold.

3. Based on the request of India, a Rapid Joint Damage and Needs Assessment (RJDNA) 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 (Sector) Project (UEASP) has been formulated as a multi-sector emergency loan in sector loan modality. The executing agency (EA) for the UEASP will be Government of Uttarakhand (GOU) and State Disaster Management Authority (SDMA). The primary implementing agencies (IA) will be Public Works Department (PWD) for roads, bridges, urban roads, and trekking routes including eco-trails Department of Tourism (DOT) through Kumaon Mandai Vikas Nigam Limited, and Garhwal Mandai Vikas Nigam Limited for tourism infrastructure, Uttarakhand Civil Aviation Development Authority (UCADA) for helipads; and Uttarakhand Jal Sanstahan (UJL) for urban water supply, or any successor hereto. Some other state agencies such as Forest Department are likely to be entrusted with some works under UEASP under these primary IAs.

C. Purpose of the Environmental Assessment

4. The purpose of the 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.

5. Initial environmental examination (IEE) has four basic objectives; (i) asses relevant potential impacts and risks associated with the proposed reconstruction and rehabilitation of damaged tourism assets, (ii) assess the compliance with ADB environmental safeguard requirements and applicable environmental laws, (iii) incorporate mitigation measures in the project design, (Iv) preparation of environmental management and monitoring plan.

D. Extent of IEE

6. 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 reconstruction or rehabilitation 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. IEE Content

7. 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). This includes following eight chapters including this introduction Chapter.

- Chapter 1- Introduction
- Chapter 2- Policy, Legal and Administrative Framework
- Chapter 3- Description of Project
- Chapter 4- Description of Environment
- Chapter 5- Anticipated Impacts and Mitigation Measures
- Chapter 6- Information Disclosure, Consultation, and Participation
- Chapter 7- Environment Management Plan and Grievance Redress Mechanism
- Chapter 8 Conclusion and Recommendation

F. Methodology

8. The following key steps were followed in this study: review of legal requirements, reconnaissance survey for identification of key issues data requirement and preliminary consultation, primary and secondary data collection, impact assessment, consultation with stakeholders, identification of impacts and mitigation measures, and institutional review.

G. Public Consultation

9. Extensive consultations were held with all stakeholders˘that includes: local residents, gov˘t. departments/ agencies, other water users, and NGOs with intent to collect baseline information, for better understanding of the potential impacts and appreciate the perspectives/concerns of the stakeholders. Key information gathered were integrated in project design and used in formulating mitigation measures.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

10. 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. Specifically for the UEAP, the following environmental laws and regulations are applicable:

Table II-1 Applicable Environmental National and State Requirements for UEAP

S.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Road Projects	Concerned Agency	Applicable to Contract package	Responsibility	Status of Compliance
	A. Pre-construction Stage					
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		Not required
2	Forest Clearance for felling of trees and acquisition of forest land for widening.	Forest Conservation Act (1980): i) If the forest land exceeds 20 hectare then prior permission of Central Government is required; ii) if the forest land is between 5 to 20 hectare, then permission form the Regional Office of Chief Conservator is required; iii) If the forest land is below or equal to 5 hectare the State Government can give permission. 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. MoEF issued specific guidelines in July 2013 for state of Uttarakhand for expediting forest clearances to carry out the emergency work in forest areas (excluding works in national parks and sanctuaries) vide no 11-298/2013-FC Dated 24.07.2013	District Level Committee constituted by the State Govt.	No	F-PIU, GMVN	Not Required
3	Permission for	The Indian Wildlife (Protection) Act, 1972,		No	No	Not Required

S.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Road Projects	Concerned Agency	Applicable to Contract package	Responsibility	Status of Compliance
	Working in Protected Area	amended 1993, The Wild Life (Protection) Amendment Act, 2002 This Act provides guidelines for protection of Wild animals, birds and plants] 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.				
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.		No	F-PIU, GMVN	Not required
	B. Construction Stage					
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 need to be controlled as per this Act and Rules	Uttarakhand Environmental Protection and Pollution Control Board - Dehradun	No	Contractor	Not required
3	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	No		Not required

S.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Road Projects	Concerned Agency	Applicable to Contract package	Responsibility	Status of Compliance
4	Consents to establish &operate Hot mix plant, Crushers, Batching Plant	Air (Prevention and Control of Pollution) Act 1981	Uttarakhand Environmental Protection and Pollution Control Board - Dehradun	No	Contractor	
5	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	Contractor	
6	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	Contractor	
7	Use of Fly ash within 100 kms around Thermal Power plants	Fly Ash Notification, 1999 as amended up to 17th August 2003:	MoEF	No	Contractor	
8	Pollution Under Control Certificate	Central Motor and Vehicle Act 1988	Department of Transport, Govt. of Uttarakhand	Yes	Contractor	
9	Installation of Generators	The Air (Prev. & Con. of Pollution) Act, 1980	Uttarakhand Environment Protection and Pollution Control Board - Dehradun	Yes	Contractor	
10	Employing Labour/workers	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996,	District Labour Commissioner	Yes	Contractor	
11	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 Contractors	
12	License for Storing Diesel and other	Petroleum Rules, 2002. Hazardous Waste (Management and Handling)	Commissioner of Explosives and	No	Contractor	

S.No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Road Projects	Concerned Agency	Applicable to Contract package	Responsibility	Status of Compliance
	explosives	Rules 1989.	Uttarakhand Environmental Protection and Pollution Control Board ¯ Dehradun			
	C. Implementation Stage					
13	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	GMVN	

III. DESCRIPTION OF THE PROJECT

A. Project Location

a. District Rudraprayag

Sl. No	Latitude and Longitude	Location	Proposed Facilities	Remarks
1	30^0 20˘40.17 :˘ N and 78^0 58˘ 34.29 :˘E	Tilwara-TRH Campus	13 Duplex Huts	Loss of accommodation facility at TRH Syalsour & Chandrapuri is compensated by construction of LGFs structure's at TRH Tilwara
			1 MPH	Multipurpose hall- to facilitate Tourist and Locals
			1 Yoga and Meditation Center	To Facilitate Tourist and Yoga Students
			Chain link fencing, parking and approach road.	To protect the premises, Parking & approach Road for Vehicle
2	30^0 14˘28.52 :˘ N and 78^0 31˘00. 23 :˘E	Jakholi - TRH Campus	Strengthening of TRH	To provide improved/ better Facilities to Tourist.
			Chainlink Fencing, and approach Road.	To protect the premises, approach Road for Vehicle
			1 No Duplex HUT	To provide accommodation facilities for staff
3	30^0 31˘29.52 :˘N and 79^0 04˘50. 08 :˘E	Guptkashi ¯ TRH Campus	01 duplex hut	To provide improved/ better facilities to tourist.
			Strengthening of TRH	To provide improved/ better facilities to tourist.
			Parking and approach road.	Parking & approach road for vehicle
4	30^0 37˘57.95 :˘ N and 78^0 59˘58. 86 :˘E	Sonprayag	4 Nos night shelter	To provide shelter to tourist and stranded people.
			Chain link fencing, and internal path	To protect the premises and interconnecting path
5	30^0 22˘01.65 :˘N and 78^0 59˘13. 73 :˘E	Rampur ¯ TRH	Strengthening of TRH	To provide improved/ better facilities to tourist.
			Chain link fencing and parking	To protect the premises and parking for vehicle
			Canopy over internal path	To facilitate tourist during rainy season.
			Water supply system	To restore water supply to TRH
6	30^0 39˘10.10 :˘N and 79^0 01˘32. 22 :˘E	Gaurikund ¯ TRH	3 LGFs huts	To provide accommodation facility to tourist after replacing damaged old huts with new LGFs prefab huts
			Retaining wall	To protect the campus
			Septic tank & soak pit	To restore sewerage system
7	30^0 38˘52.76 :˘N and 78^0 59˘17. 46 :˘E	Triyuginarayan	8 duplex huts	Loss of accommodation facility at TRH Rambara is compensated by construction of LGFs prefab structure at Triyuginaryan.
			Parking and internal road.	Parking for Vehicle and internal path connecting Huts

Figure 1. Showing proposed locations for reconstruction of tourism infrastructure

B. Proposed Category of the Project

11. Pursuant to the requirements of the ADB Safeguard Policy Statement (2009) proposed reconstruction and rehabilitation of damaged tourism assets in Rudraprayag 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-Jal Sansthan. Consistent with the Environmental Assessment and Review Framework, the subproject was screened using the ADB rapid environmental assessment (REA) checklist- General (Tourism).

12. 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 subproject 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-project

13. Tourism was worst hit in the state with destruction of tourism infrastructure on one hand and loss of livelihoods on the other due to heavy rains in June, 2013. The tragedy besides claiming thousands lives badly hit the industry stakeholders especially, those involved in Religious and Adventure Tourism on account of the major portion of the season of the Char Dham Yatra being washed out. According to estimates from the Uttarakhand Hotel and Restaurant Association, the floods washed away over 100 small hotels which were constructed right on the riverbanks. Uttarakhand Tourism Department˘s Assets run by G.M.V.N. at various locations viz TRH Rambara, TRH Syalsaur, and TRH Chandrapuri were washed away and TRH Kedarnath, Gaurikund, Guptkashi, Tilwara & Jakholi and public toilets located in various locations suffered heavy damages due to flash flood incessant rain and landslides.

14. As a part of Tourism Restoration Drive, it was decided by the Govt. of Uttarakhand that Uttarakhand Tourism Department's Assets run by G.M.V.N., damaged during disaster June 2013 in Rudraprayag district be restored / redeveloped / reconstructed / rehabilitated so as to compensate for the loss of tourist accommodation and to provide improved accommodation facilities to the tourist / pilgrims visiting this area. For this purpose the Eco- friendly Galvanized LGFS (Light gauge framing steel structures) prefabricated structure's with minimum concrete work is proposed in tune with ecological balance of the region. These structures are ideal for earthquake prone area, hilly area and high wind pressure area. Owing to lighter weight (60% weight of the traditional concrete building), the earthquake forces gets reduced. These structures are light weight hence very heavy foundations are not required. Even in the hill areas, where plain land is not available, the foundation can be made smaller and cantilevered prefab building can be constructed, this saves the cost on foundation and plinth and also excavation in the hill areas are 70% which avoids the landslide likelihood and the hills are left in their natural form. The construction speed of these structures is faster than the conventional concrete buildings. These building are thermally insulated and have excellent insulation value and acoustics due to the cavity concept construction filled with glass wool or rock wool. These buildings are eco-friendly, green building and completely weather proof, have longer life span and easy to maintain and to shift to another site easily if required. In addition to this Tourism Department assets run by GMVN and toilet facilities in Rudraprayag District during damage the disaster are also proposed to be Reconstructed/Redeveloped, Rehabilitated, or Restored/Strengthened so as to provide improved accommodation facilities to tourist/pilgrim visiting Kedarnath Shrine. It would also strengthen state's coping mechanism and help in reviving tourism in the affected region. Thus construction of environmentally sustainable, affordable accommodation for tourists with eco-friendly material would help in bridging the gap in the shortage of accommodation in Rudraprayag District during the tourist season. Provision of affordable accommodation to tourists at various destinations in the form of Light-Gauge Framing Steel (LGFS) cottages which are aesthetically and eco-friendly designed, taking into consideration the natural landscape of the area. These accommodation facilities would encourage tourists to stay at most frequented locations. The loss of accommodation facility at TRH Syalsour & Chandrapuri is proposed to be compensated by providing additional accommodation facility in the form of prefabricated LGFS structure's on the land available in the premises of TRH Tilwara. Similarly the TRH building washed away at Rambara is proposed to be constructed in the form of prefabricated LGFS structure on the Tourism department's land available at Triyuginaryana, which may be the base camp of alternative trek route to Kedarnath. Damaged existing GMVN TRH's viz Guptkashi, Jakholi, Rampur & Gaurikund are proposed to be Re-developed/Re-strengthened so as to improve tourist accommodation facilities in these TRH's. Moreover, Night Shelter's in Prefabricated Fiber-reinforced Plastic (FRP) Structure and toilet facilities are also proposed to be constructed on the available land of Tourism Department at Sonprayag, so as to facilitate tourist/devotees visiting Kedarnath shrine. These shelters can be used at the time of emergency to halt victim or stranded people prior to rescue with the objective to protect life during disaster.

D. Subproject Description

1. Triyuginarayan

14. The Triguninarayan village is located at an altitude of 1,980 metres (6,500 ft) about 5 kilometres (3.1 mi) away from Sonprayag, the confluence of Mandakini and Songanga rivers.[5] The geographical belt is 5 kilometres (3.1 mi) away from Sonprayag that

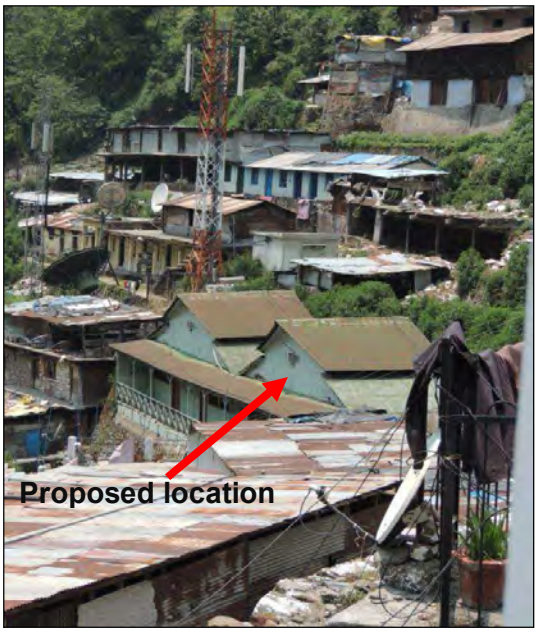
extends to 14 kilometres (8.7 mi) between Triyugninarayan and Toshi villages with an average altitude of 2,200 metres (7,200 ft) that has favourable agro-climatic conditions for growing horticultural crops such as apple and stone fruits. During the three winter months, the area is covered by snow.Triyuginarayan Temple is a Hindu temple located in the Triyuginarayan village in Rudraprayag district, Uttarakhand. The ancient temple is dedicated to god Vishnu. Its fame is credited to the legend of god Shiva's marriage to goddess Parvati witnessed by Vishnu at this venue and is thus a popular pilgrimage centre. A special feature of this temple is a perpetual fire, that burns in front of the temple. The flame is believed to burn from the times of the divine marriage. Thus, the temple is also known as Akhand Dhuni temple. The temple courtyard is also the source of a water stream, which fills four sacred bathing ponds (kunds) nearby.

15. A 24 bedded TRH at Rambara was completely washed away during June 2013 disaster. Hence in order to compensate for the loss of accommodation facilities, a 64 bedded accommodation facilties in the form of LGFS structure is proposed to be created on available Tourism Department land.

Proposed location for construction of LGFS at Triyuginarayan

2. Gaurikund

16. Gauri Kund is a Hindu pilgrimage site and base camp for trek to Kedarnath Temple, in Uttarakhand, India. It is situated at an altitude of more than 6000 feet in the Garhwal Himalayas. Gauri Kund is connected with Shiva's wife Parvati, also known as Gauri. In Hindu folklore, Gauri committed to penance involving many ascetic and yogic practices to win over Shiva's affections. Local tradition claims that Gauri Kund is the spot where Gauri lived while carrying out these practices and it was here that Shiva finally admitted his love for her. They were married at Triyuginarayan, which is located nearby. There are hot springs in Gaurikund and they are converted to bathing places.
17. This place is also associated with the legend of how Ganesha acquired his elephant head. While bathing in the kund, Goddess Parvati fashioned Ganesha from the soap suds on her body, breathed life into him and placed him at the entrance as her guard. Lord Shiva happened to arrive at the spot and he was stopped by Ganesha. Indignant at this affront, Shiva cut off Ganesha's head and Parvati was inconsolable. She insisted that the boy be brought back to life and Shiva took the head of a wandering elephant and placed it on Ganesha's body. Parvati had her son back and Ganesha acquired the persona by which he is known all over the Hindu world since then.
18. A 8 bedded prefabricated hut and retaining wall in the premises of GMVN was damaged during June-2013 disaster. Hence in order to compensate for the loss of accommodation facilities, 12 bedded accommodation facilities in the form of LGFS Structure is proposed to be created on available Tourism Department land.



Proposed location for construction of LGFS at Gaurikund

3. **Tilwara**

19. Tilwara is situated on Rudrapryag - Gaurikund highway at a distance of 10 Km from Rudraprayag and the bank of river Mandakini. It is the main point of Kedarnath dham for pilgrimage. A 36 bedded Tourist Rest House at Chandrapuri including restaurant, Staff Qtr & Prefab huts and 32 bedded Tourist Rest House at Syalsour including restaurant, Staff Qtr & Bamboo huts were washed away during the June- 2013 disaster. Hence, in order to compensate for the loss of accommodation facilities 13 LGFS Duplex huts with the total bed capacity of 104 beds are proposed to be constructed at GMVN premises Tilwara. Moreover, a Yoga Center, a multipurpose hall, improvement of approach road and parking, chain-linking fencing are also proposed in the premises.

Proposed location for construction of LGFS, Yoga 7 Meditattion center and Multipurpose shelter at Tilwara

4. **Jakholi**

20. Jakholi is a small village located in the proximity of river Ganges and Mandakini in Rudraprayag district. This village is surrounded by mountains and offers an opportunity to indulge in trekking. Tourists can visit Chamunda Devi Temple and Rudranath Temple along with nearby places such as Agastmuni and Tilwara.

21. A 30 bedded TRH run by GMVN is located here. The TRH suffered damages during June- 2013 disaster. It is proposed to Restore/Upgrade the existing TRH. In addition to this 1 Nos LGFS Duplex hut with a bed capacity of 8 is proposed to be constructed, so as to enhance the bed capacity of TRH.

Proposed location for construction of LGFS at Jakholi

5. **Guptkashi**

22. Guptakashi, Gupta Kashi or Guptkashi is a fairly large town located at an elevation of 1,319 metres (4,327 ft) in the Kedar-khanda ('khanda' means "sector"), in Garhwal Himalayas of Rudraprayag district in Uttrakhand, India. It is famous for the ancient Vishwanath Temple - dedicated to god Shiva - similar to the one in Varanasi (Kashi). The other famous temple here is dedicated to Ardhanareshvara (a half man half woman form of Shiva and Parvati). The name Guptakashi has legendary significance linked to the Pandavas, the heroes of the Hindu epic Mahabharata. Its religious importance is considered next to that of Varanasi, believed to be the most pious of all Hindu pilgrimage places.

23. The temple town is located on the way to the Kedarnath, one of the Chota Char Dhams and Panch Kedars. It has the scenic backdrop of the snow covered peaks of Chaukhamba and enjoys a salubrious weather throughout the year. It is approachable from Rudraprayag by road over a distance of 24 miles (39 km). Rudraprayag is approached from Haridwar or Rishikesh by the National Highway, which goes to Badrinath and beyond. It is 178 kilometres (111 mi) from Rishikesh.

24. A 70 bedded TRH at Guptkashi run by GMVN suffered damages during the June-2013 disaster. The retaining walls, approach road in the premises were also damaged. Hence it is proposed to strengthen and upgrade the existing 30 beded old TRH, so as to provide improved accommodation facilities to tourist/ pilgrim visiting the Kedarnath Shrine. I No LGFS Duplex hut with 8 beds capacity is proposed to be constructed in order to enhance the bed capacity of TRH.

Proposed location for construction of LGFS at Guptkashi

6. **Sonprayag**

25. At an elevation of 1829 mts. and on the main Kedarnath route, Son Prayag lies at the confluence of river Basuki and Mandakini. The holy site of Son Prayag is of immense religious significance. It is said that a mere touch of the holy water of Son Prayag helps one to attain the `Baikunth Dham_. Kedarnath is at a distance of 19 kms. from Son Prayag. Triyuginarayan, which is supposed to be the marriage place of Lord Shiva and Parvati, is at a distance of 14 kms by bus and 5 kms on foot from here.
26. During June-2013 disaster, Hotels, Restaurant, owned by locals were washed away. Hence 4 Nos Night Shelters with a total bed capacity of 200 beds to be constructed on Tourism Department Land at Sonprayag, so that the tourist and locals may use these night shelter in case of any emergency. Moreover a Public Toilet is proposed to be constructed to facilitate Tourist/ Pilgrims visiting Kedarnath Shrine.

7. **Rampur**

27. Rampur is situated at an altitude of 1800 mts. and on the main Kedarnath route, 3 Km before Sonprayag. Kedarnath is at a distance of 22 kms from Rampur. Triyuginarayan, which is supposed to be the marriage place of Lord Shiva and Parvati, is at a distance of 17 kms by bus and 5 kms on foot from here.
28. A 40 bedded TRH run by GMVN located at Rampur suffered damages during June- 2013 disaster. Hence it is proposed to restore and upgrade the existing TRH in order to provide improved accommodation facilities to tourist/ pilgrims visiting Kedarnath Shrine.

Proposed location for restoration and upgradation of existing TRH at Rampur

E. Project Implementation Schedule

29. The implementation period for the UEAP is around 3 years with a construction period of around 3 years. All UEAP components are expected to be completed by December 2017

TECHNICAL FEATURES:

A) Seismic resistant structure:

The LGFS Structures will comply with IS 13827:1993 for a seismic resistant structure.

B) Cost effectiveness:

The Area is prone to floods, cloud bursts and other natural calamities. The area is also cold and for many places there is no road connecting the site. The conventional shelters need time, water, labor, regular supply of raw material etc. In such a state LGFS shelters are suitable due to following reasons:

- The panels are light weight and can be erected quickly on the site.
- No maintenance is required for the upkeep ofLGFS structures.
- The LGFS Structure can withstand high pressure, doesn't get spoilt in water/acids/alkali. These shelters don't need any maintenance as well, like painting seepage etc.
- The LGFS shelters can easily be moved in cases of emergency. The light panels (<50 kg.) can easily be transported by men or helicopters.
- Testing standards:

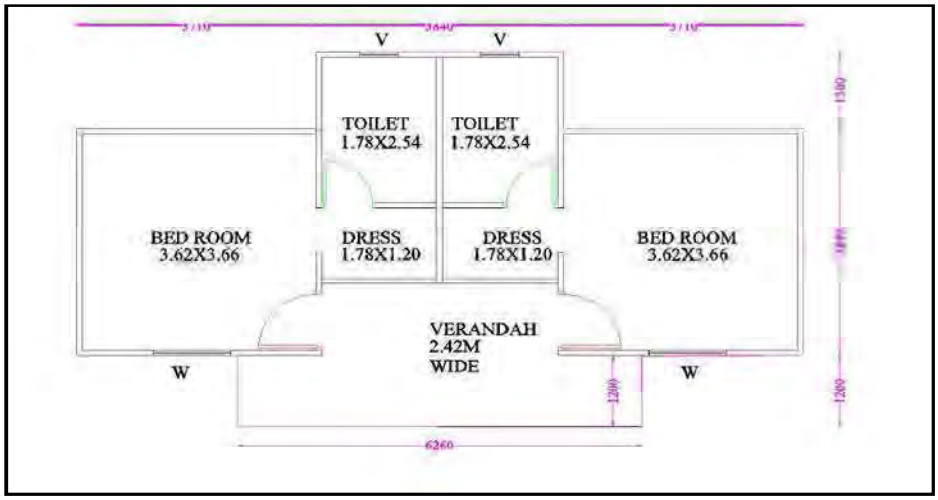
  As specified in Design code AS/NZS 4600:2005 (Steel Structure Buildings LGFS)

  To determine the Load Bearing Capacity of the structural strength the following tests are conducted: Compressive Strength (N/sq mm), Strength in axial (Tension)(N), Strength in bending (Compression) (N/sq mm), Strength in axial (N).

C) Raising design and construction standards:

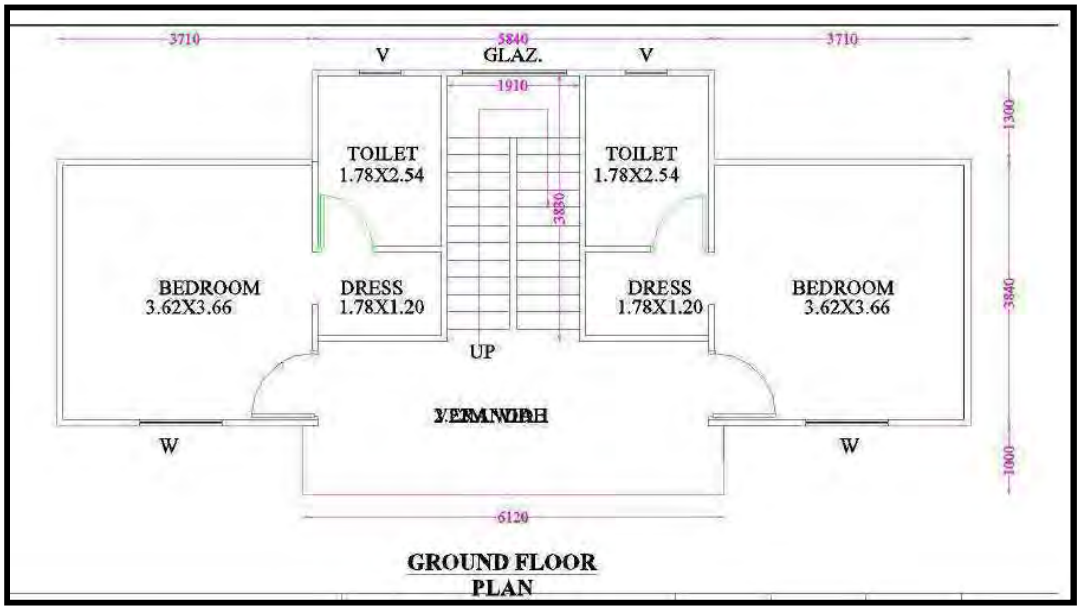
As above Point No .A & B

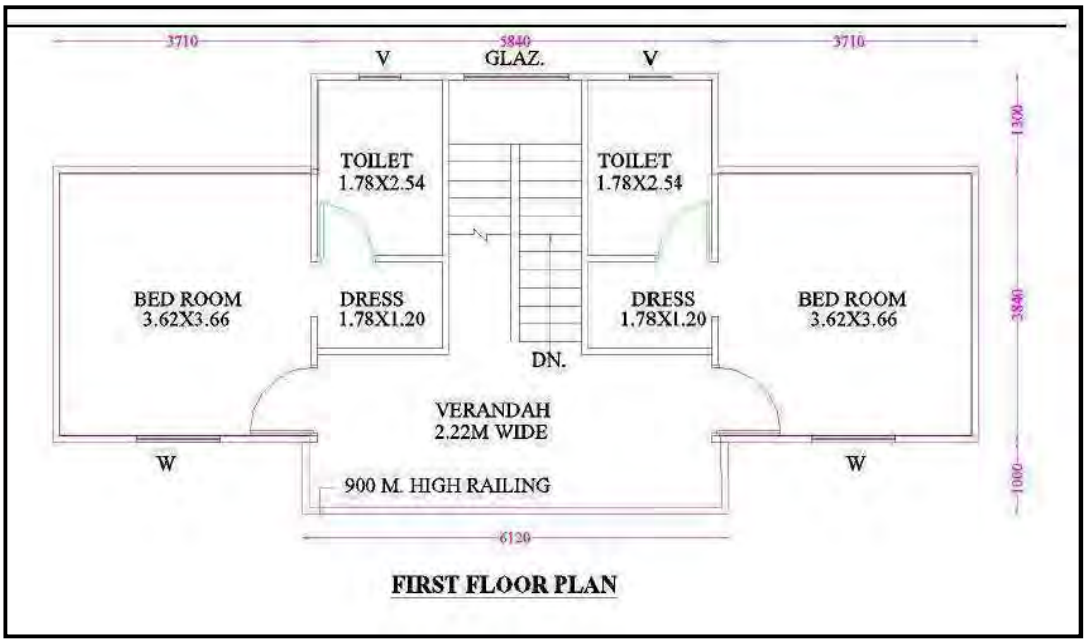
DRAWINGS



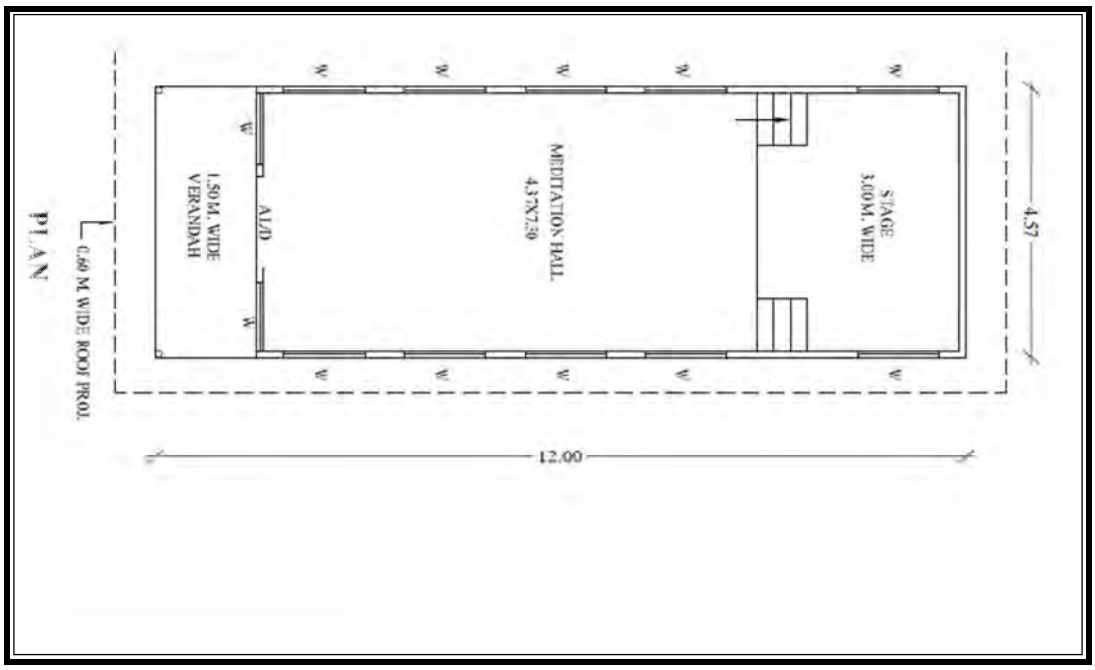
PLAN FOR SINGLE STOREY HUT (2 Nos- double bedded room)
AREA : 53.57 Sqm

Layout plan of single storey hut

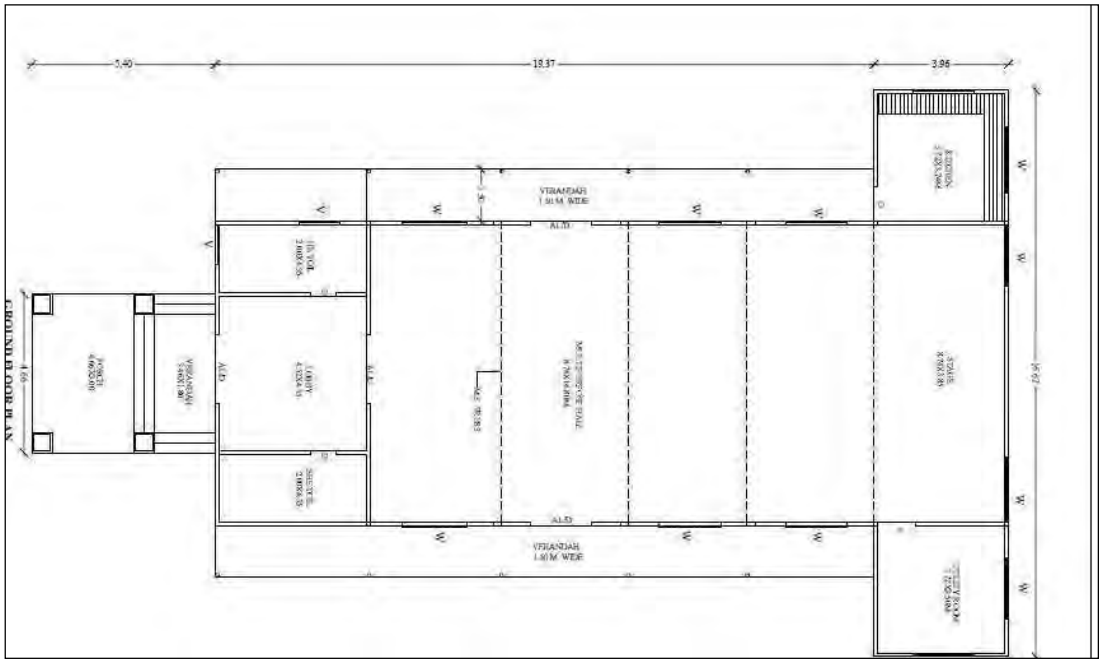




Layout plan of LGFS



Layout of Meditation Hall proposed at Tilwara



Layout of proposed Multipurpose Hall

IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

30. This section presents a brief description of the existing environment, including its physical, ecological resources, and socio-economic development of Sub project of Rudraprayag. Broad aspects on various environmental parameters such as geography, climate and meteorology, physiography, geology, seismology, ecology, socio-cultural and economic development parameters that are likely to be affected by the proposed rehabilitationand reconstruction of damaged tourism assets in Rudraprayag are presented. Secondary information was compiled from relevant government agencies like the Forest Department, Wildlife Department, State Environment Protection, and Pollution Control Board and Metrological Department.

i. Geography

31. 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" to 31°27'50" North latitude and 77°34'27" to 81°02'22" East longitude. The State has an area of 53,484 sq. km. and a population of about 8.48 million as per census 2001.

Figure IV-1 Districts of Uttarakhand

32. Uttarakhand is divided into two regions and also called administrative divisions, basically following terrain: the Kumaon and Garhwal. The Kumaon division located southeast of the state and composed of Almora, Bageshwar, Champawat, Nainital, Pithoragarh, and Udham Singh Nagar. The Kumaon region is part of the vast Himalayan track and and the sub-mountains of Terai and Bhabhar. The region is drained by Gori, Dhauli, and Kali

from the Tibetan mountains, and Pindari and Kaliganga which ultimately joins Alaknanda River. The Garwhal division is composed of Chamoli, Uttarkashi, Rudraprayag, 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.

33. The State is part of the Western Himalaya is further divided into four zones namely, the Tarai-Bhabar-Shivalik (Sub-Himalayas), Lesser-Himalayas, Greater-Himalayas, and Trans Himalaya (Tethys).

ii. Geology

34. The geology of the region shows that the Himalayas are the young mountains in the world. During early Mesozoic times, or the secondary geological period, the land mass now covered by them was occupied by the great geosynclinal Tethys sea . The probable date of the commencement of the elevation of the Himalayas is about the close of the Mesozoic period, but the unraveling of the story of their structure has only just begin, and in many cases no dating of the rocks is yet possible, though they include ancient and relatively recent crystalline intrusive, rocks and sediments allied to the peninsular part of India. The section of the range in the district is deeply cut into by the headwaters of the Alaknanda river, this trunk stream seeming to have reached a latter stage of development than its tributaries. This much, however, is known that there has been intense metamorphosis. In some parts uplift has been considerable since the mid-pleistocene period, in others there are great stretches of high but subdued topography and elsewhere there are the deepest gorges.
35. Geologically, Rudraprayag district comprises of diverse rock types ranging in age from Palaeoproterozoic to Mesoproterozoic in age. The rock succession exposed in the district mainly falls in two groups namely,

    1. The rock sequences exposed between Main Boundary Fault (MBF) and Main Central Thrust (MCT) ¯ Constituting the Lesser Himalaya
    2. The rock sequences exposed to the north of Main Central Thrust (MCT) ¯ Constituting the Higher Himalaya

36. The rock sequences exposed between Main Boundary Fault (MBF) and Main Central Thrust (MCT) in Rudraprayag district are of Mesoproterozoic Period and are exposed at different structural levels and individually occupy very small areas.
37. Regionally metamorphosed rocks, along with granitoids occur as Klippen, over the sedimentary sequence, towards south of Main Central Thrust (MCT) in the district.
    The Central or Higher Himalayas in Rudraprayag district consists of metamorphosed rock sequences of Palaeoproterozoic age and are of green schist to amphibolite facies.
38. The rock sequences of Higher Himalaya and most of the Lesser Himalaya are mainly of :
    Proterozoic age. Lithologically these sequences are regionally metamorphosed rocks emplaced by granitoids of various ages and weakly metamorphosed to unmetamorphosed sedimentaries comprising of quartzites with interbedded volcanics, carbonate rocks associated with slate, quartzite and shale. The ages of regionally metamorphosed sequence is not well known and has been inferred by the ages of intrusive granitoids.
    Rocks of Palaeoproterozoic (2500 ¯ 1600 Ma) Period: The metamorphic rocksassociated with granites, gneisses and migmatites have been referred as Central Crystallines in the Himalayan Region. Generally, these Crystallines occurs as thrust

sheets over metasedimentaries of Lesser Himalaya in varied tectonic setting. South of Main Central Thrust (MCT), the crystalline rocks occur in two settings ¯

1) Bounded by the Main Central Thrust (MCT) on the north and thrust over the sedimentaries of Garhwal Group and
2) As a Klippe occurring over the rocks of Garhwal Group.

Rocks of Mesoproterozoic (1600 ¯ 1000 Ma) Period: The Period is characterized by extensive development of quartzite with penecontemperaneous volcanic flows and carbonates. The section is well exposed in the inner part of the Lesser Himalayas ¯the belt bounded by North Almora Thrust in the south and Main Central Thrust in the north. The basal quartzite metavolcanic group is known as Rudraprayag Formation locally in Rudraprayag area and consists of Garhwal Group of Volcanics.

Granitoids of Mesoproterozoic Period: The granitoids of Rudraprayag district occur at different tectonic levels. Granitoids emplaced in the regionally metamorphosed rocks commonly known as Crystallines of Proterozoic age occur as Klippe in the Lesser Himalayan Zone locally known as Volcanics of Garhwal Group. Granitoids also occur associated with volcanic sedimentary sequences, emplaced in the rocks of Garhwal Group such as Chandrapuri Granite of age 1595 Ma (Pandey, 1981).

Central Crystallines: The Central Crystallines from the basement of Martoli Group and Tethyan Sediments. Central Crystallines probably represent the oldest rocks exposed in Higher Himalaya and thrust over the rocks of Lesser Himalaya along the Main Central Thrust (MCT). These are the metamorphic rocks associated with granites, gneisses and migmatites.

Table IV-1. The generalized Stratigraphic succession of rocks exposed in Rudraprayag district is given below.

Age		Formation	Lithology
Mesoproterozoic	GARHWAL GROUP	Basic Volcanics of Garhwal Group	Biotite granite
		Rautgara Formation	Quartzite interbedded with purple green mottled slate and calcareous phyllites
		Intrusive Granitoids of Chandrapuri (Plutonic Igneous Rocks)	Tourmaline biotite granite, microcline, plagioclase and quartz
	Agastmuni Formation		Schist, schistose quartzite and dolomite
Palaeoproterozoic		Bhilangana Formation	Quartzites, schists, granite gneisses, carbonaceous phyllites & metapeltic rocks.
MAIN CENTRAL THRUST			
Palaeoproterozoic		Central Crystallines	Metamorphosed rocks associated with granites, gneisses and migmatites

Bhilangana Formation: The Bhilangana Formation is bounded by Main Central Thrust on the north and consists of quartzite schists and granite gneisses. It is thrust over the

rocks of Garhwal Group. This formation also includes quartzite, schist, carbonaceous phyllites, limestones and some metapeltic rocks.

Agastmuni Formation: It is the name given to schist, schistose quartzites and thin bands of dolomite exposed in the Mandakini valley. The metamorphosed sequence of orthoquartzite, slates with penecontemperaneous flows has been emplaced by the Chandrapuri gneisses. Many workers consider the Agastmuni Formation as the base of Garhwal Group.

Rautgara Formation: The Rautgara Formation is well exposed along the Srinagar - Rudraprayag section in the Alaknanda valley. Its the name given to a sequence of massive cream coloured, purplish and brownish fine grained quartzite interbedded with purple green mottled slate and calcareous phyllites exposed in Saryu valley of Pithoragarh district by Valdiya (1962). The Rautgara Formation is best developed and mapped by Gopendra Kumar and Agarwal (1975) in the Alaknanda valley.

Granitoids of Chandrapuri: These intrusive granitoids of plutonic origin are best exposed in Chandrapuri area of Rudraprayag district. The granitoid is mainly of tourmaline biotite granite and is made up of hypidiomorphic granular aggregate of feldspars (microcline and plagioclase) and quartz with subordinate greenish biotite.

Volcanics of Garhwal Group: The granitic intrusive in the Grahwal Group is of Biotite granite type and intrudes the Rautgara Formation towards west of Tilwara. The volcanics are composed of very coarse grained, non-foliated, rich in biotite and generally porphyrytic. They are also exposed in Pokhri area of Rudraprayag district.

iii. Physiography

39. 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. The State today with 13 Districts can be grouped into three distinct geographical regions, the High mountain region, the Mid-mountain region and the Terai region. Uttarakhand consists of 13 districts viz., Pithoragarh, Almora, Nainital, Bageshwar, Champawat, Uttarkashi, Udham Singh Nagar, Chamoli, Dehradun, Pauri, Tehri Garhwal, Rudraprayag and Haridwar. The project roads fall in Western Himalayas Physiographic Zones.
40. Physiographically the Rudraprayag district, which lies in a region of tectonic or folded and overthrust mountain chains, has strata are structurally marked by complex folds, reverse faults, overthrusts and nappes of great dimensions, all these as well as frequent earthquake of varying intensity give region to believe that the region is still unstable. Although any movement or tremor of the earths crust in the district is not produced by volcanic activity, the Chaukhamba peak a pair to be the crater of an extinct volcano.

B. Pedology

41. The soils are natural, dynamic, heterogeneous, non-renewable resource, which support plant and animal life. The tract of Rudraprayag district consists of outward succession of ridges viz; Greater Himalaya and Lesser Himalaya of decreasing height. These hills posses very little level land. The soils have developed from rocks like granite, schist, gneiss, phyllites, shales, slate etc. under cool and moist climate.
42. 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. Soil types of Rudraprayg district as follows:

S. No.	Soil type	Characteristics
1.	Brown forest soil and residual sandy loam	Acidic, rocky, stone and gravel and poor moisture regime

43. The baseline data on soil quality will be generated by the contractor before commencement of construction works.
44. The proposed locations of soil quality monitoring at pre construction stage (baseline data) are as follows as per CPCB guideline monitoring location as follows:

S. No.	Name of the Sub Project	No. of Samples	Sampling locations
1	Tilwara- TRH Campus	1	Tilwara Campus
2	Jakholi- TRH Campus	1	Jakholi Campus
3	Guptkashi- TRH Campus	1	Guptkashi Campus
4	Sonprayag	1	Sonprayag
5	Gaurikund TRH Campus	1	Gaurikund Campus
6	Triyuginarayan	1	Triyuginarayan

45. During construction the sampling locations proposed are, where the construction/ restoration/ repair work will be done.

C. Climate and Meterology

46. The State of Uttarakhand, with its highly varying topographical features, has shown an equally variegating climatic condition, ranging from hot and sub-humid tropical in the southern tract of Bhabhar to temperate, cold alpine, and glacial climates in the northern part of the high mountains.
47. 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.
48. 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. The climatic conditions of Almora, Nainital, Pithoragarh, Chamoli, Uttarkashi, Pauri and Dehradun are humid and cold.
49. The climate of Rudraprayag district according to Central Ground water board varies from Sub-tropical monsoon type (mild inter, hot summer) to tropical upland type (mild winter, dry winter, short warm summer). The northern, northwestern, northeastern and western part of the district is perennially under snow cover; here the climate is sub-arctic type as the area is represented by lofty Himalayan Range. Severe winter and comparatively higher rainfall are the characteristic features of the northern part. The year may be divided into four seasons viz. the cold winter season, (December to February), the hot weather season (March to May), southwest monsoon season (June to September) followed by post monsoon season (October to November).
50. Larger part of the district is situated on the southern slopes of the outer Himalayas, monsoon currents can penetrate through trenched valleys, the rainfall reaches its maximal in the monsoon season that spans betweens June to September. Rainfall, spatially, is highly variable depending upon the altitude. In the Lesser Himalayan Zone

(1000-3000m amsl) maximum rainfall occurs about 70 to 80% in southern half. August is the rainiest month. Rainfall rapidly decreases after September and it is the least in November. About 55 to 65% rainfall occurs in the northern half in Central Himalayan Zone. About 17% of the annual precipitation occurs in winter season. The winter precipitation is in association with the passage of the western disturbances and is mostly in the form of snowfall, particularly at higher elevations. The precipitation during the pre-monsoon month, which is about 7% of the annual total and the post-monsoon months, is frequently associated with thunderstorms. In the southern part of the district at Rudraprayag the average annual rainfall is around 1220.18mm while in the central part at Chandrapuri the average annual rainfall is 1750.9mm and the rainfall in the northern part at Okhimath is 1995mm.The overall average rainfall in the district is 1485mm.

D. Ambient Air Quality and Noise Level

51. 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 subproject area and hence any other source of atmospheric air pollution is not expected.

52. The air pollution level is well within the permissible limits because there are no major sources of pollution in the region. The baseline data on ambient air quality will be generated by the contractor before commencement of construction works. The proposed locations of air quality monitoring at pre construction stage (Baseline data) are as follows as per CPCB guideline monitoring location as follows.

S. No.	Name of the Sub Project	No. of Samples	Sampling locations
1	Tilwara- TRH Campus	1	Tilwara Campus
2	Jakholi- TRH Campus	1	Jakholi Campus
3	Guptkashi- TRH Campus	1	Guptkashi Campus
4	Sonprayag	1	Sonprayag
5	Gaurikund TRH Campus	1	Gaurikund Campus
6	Triyuginarayan	1	Triyuginarayan

53. During construction the sampling will be conducted where the construction/ restoration work will be done

Ambient Noise Level

54. 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 town is calm except on the busy roads of Rudraprayag.

55. 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 rehabilitation of water supply system. Suitable noise barriers in the form of vegetation and timely scheduling of construction activities will help minimize these effects better.

    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 air quality monitoring at pre construction stage (Baseline data) are as follows as per CPCB guideline monitoring location as follows:

S. No.	Name of the Sub Project	No. of Samples	Sampling locations
1	Tilwara- TRH Campus	1	Tilwara Campus
2	Jakholi- TRH Campus	1	Jakholi Campus
3	Guptkashi- TRH Campus	1	Guptkashi Campus
4	Sonprayag	1	Sonprayag
5	Gaurikund TRH Campus	1	Gaurikund Campus
6	Triyuginarayan	1	Triyuginarayan

56. During construction the sampling will be conducted where the construction/ restoration/ repair work will be done

B. Hydrology

57. 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 Project area.

58. 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 (Rawat et. al) 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**

59. The region of Uttarakhand is well drained by numerous rivers and rivulets locally known as Gad, Gadhera and Naula. 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.

60. 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/or Bhagirathi, ultimately contributing to the waters of Ganges. 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**

61. The Rudraprayag town is situated on the confluence of Mandakini and Alaknanda River. There is very little documentation on the pollution status of rivers except that of the holy river Ganga and some other water bodies where there were at least limited monitoring studies recently. In terms of quality, the surface water of the State is unprotected from untreated wastewater, and runoffs from chemical fertilizers and pesticides. No proper sewage treatment facilities exist in the project area. The increasing pollution of water bodies constitutes the biggest threat to public health. At present, there is limited information available on the quality of fresh water resources in the State.

62. Based on limited records, the water quality of Uttarakhand˜s rivers, rivulets, and other natural water sources is generally good and no major source of water pollution was found. The hand pumps, natural water seeping out from mountains 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 proposed locations of water quality monitoring in pre construction stage are as follows as per CPCB guideline monitoring location as follows:

S. No.	Name of the Sub Project	No. of Samples	Sampling locations
1	Tilwara- TRH Campus	1	Tilwara Campus
2	Jakholi- TRH Campus	1	Jakholi Campus
3	Guptkashi- TRH Campus	1	Guptkashi Campus
4	Sonprayag	1	Sonprayag
5	Gaurikund TRH Campus	1	Gaurikund Campus
6	Triyuginarayan	1	Triyuginarayan

63. During construction the sampling will be conducted where the construction/ restoration/ repair work will be done

F. MINERAL RESOURCES

64. Uttarakhand state is not rich in mineral resources. Moreover, it is also part ecologically sensitive area, extensive quarrying is not practiced in the state. However, there are some mineral sparsely distributed in the state. It includes limestone, Gypsum, Iron Ore, Graphite and Copper.

65. 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 succeeding Table.

Table IVV-2. Availability of Important Minerals (million tonnes)

Sl. No.	Mineral	Quantity
1.	Limestone	430.5
2.	Marble	6.4
3.	Rock Phosphate	25.0
4.	Barytes	0.085
5.	Greyphite	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/Uttrakhand.htm)

66. The minerals that are found in the district are the following-

Asbestos-This is of the amosite variety and can be used for the production of asbestos, cement bricks, laboratory asbestos sheet and paper, but is not considered to be of economic importance.

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 to occur in the district.

Soapstone or Steatite - This 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.

Copper - The copper mines in the district 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.

Iron - Small and sporadic occurrence of iron are known to occur in several parts of district but are of hardly any economic important. Iron ore, rich in haematite, and magnetic ore, with haematite and siderite, also occur in the district.

Graphite - In the 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.

Gypsum - This mineral is found on the bank of some river 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.

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.

Slate - This dense, fine grained metamorphic rock, which is produced from a fine clay, can be split into thin, smooth plates and is quarried throughout the district. It is suitable for roofing purposes, the thin dark blue slates being somewhat inferior in quality.

Building Stone - Stone which can be used for building purposes is available in most parts of the district. Sand stone is found in abundance in the lower hills. Gneiss and chlorite schists which are available throughout the district are frequently used for building purposes.

Sulphur - This yellow mineral, also known as brimstone is found in the district as 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 in the district.

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 in it.

67. Some other minerals found in the district are Antimony, Arsenic, Lignite or Brown Marble, Mica and silver.

G. Seismology

68. 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.

69. 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 zone V. The modified mercalli intensity broadly associated with the zone V is IX. The succeeding Figure shows the seismic zones of India.

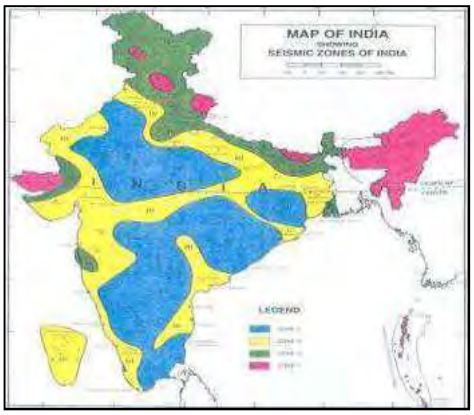


Figure IV-2 Seismic Zone of India

C. Ecology

1. Forestry

70. According to The India State of Forest report 2011, the recorded forest area of the Uttarakhand state is 34,651 km^2 which constitutes 64.79% of its geographical area. Reserve forests constitute 71.11%. Protected Forests 28.52% and Unclassed Forests constitutes 0.35% of the total forest area.

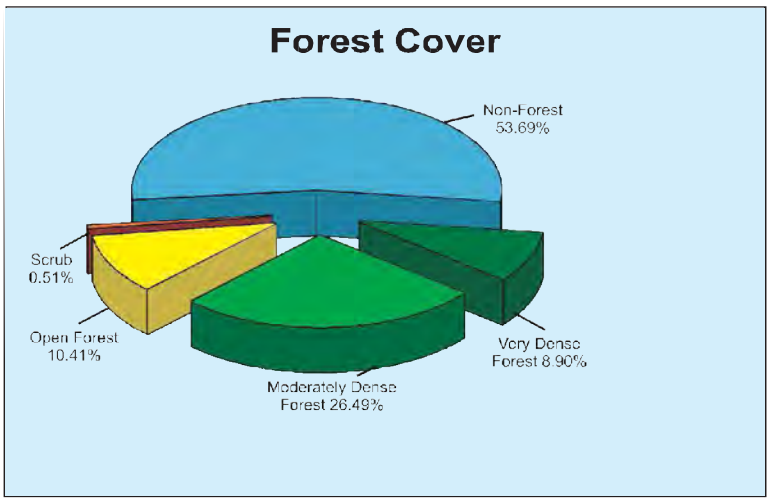


Figure IV-3 Forest Cover by State, 2011.

71. The distribution of forest cover by district is presented in the succeeding Figure and Table. The Garhwal region has more forest cover with 14,626 km compared to the Kumaon region with 9,869 km^2. 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.

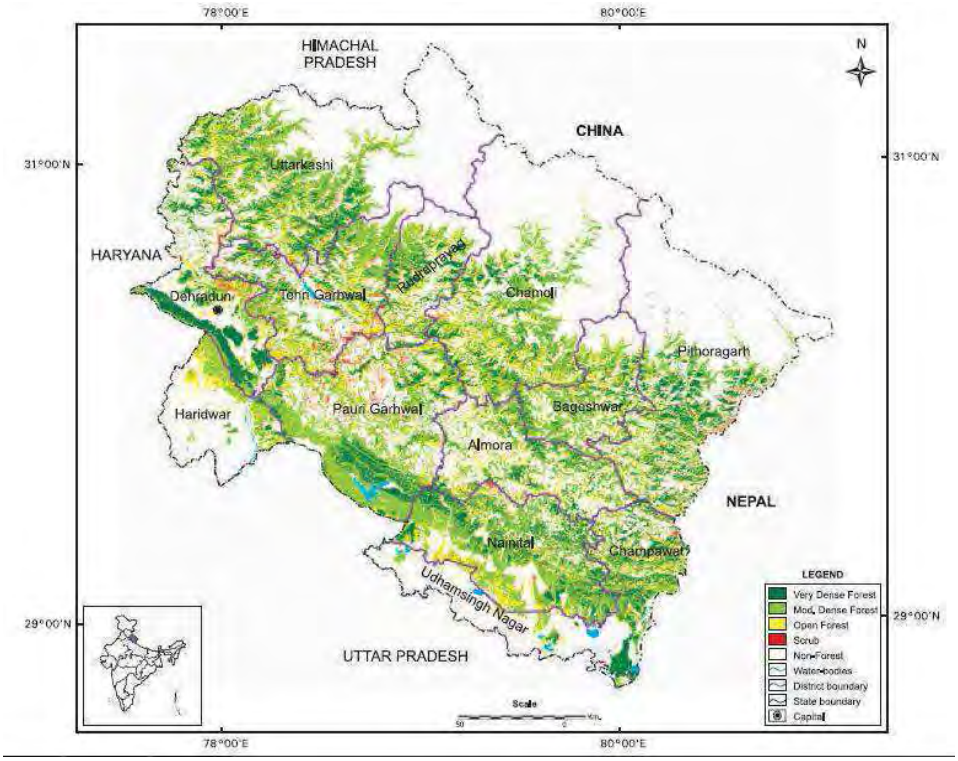


Figure IVV-4 Uttarakhand˘s Forest Cover Map

Table IVV-3 District-wise Forest Cover, Uttarakhand

Region	District	Geographic Area	Forest Cover			Total Forest 2007	% of Total 2007
			Very Dense	Moderate Dense	Open Forest		
Garhwal	Uttarkashi	8,016	567	1959	619	3145	39.23
	Rudraprayag	1,984	246	581	298	1125	56.70
	Chamoli	8,030	427	1,586	682	2695	33.56
	Pauri Garhwal	5,329	523	2,094	672	3289	61.72
	Tehri Garhwal	3,642	298	1,232	617	2147	58.95
	Dehradun	3,088	584	695	328	1,607	52.04
	Haridwar	2,360	26	354	238	618	26.19
Sub-Total		32,449	2,671	8,501	3,454	14,626	**46.91**
Kumaon	Pithoragarh	7,090	567	1,115	412	2,094	29.53
	Bageshwar	2,246	194	883	304	1,381	61.49
	Almora	3,139	222	928	427	1,577	52.04
	Nainital	4,251	601	1,919	573	3,093	72.76
	Champawat	1,766	336	571	274	1,181	66.87
	Udham Singh Nagar	2,542	171	248	124	543	21.36
Sub-Total		21,034	2,091	5,664	2,114	9,869	**50.38**
Grand Total		**5,3483**	**4,762**	**14,165**	**5,567**	**24,496**	**48.65**
Note	Very Dense Forest ¯ All lands with tree cover of canopy density of 70% and above Moderately Dense Forest ¯ Canopy density between 40%-70% Open Forest ¯ Canopy density between 10%-40%						

72. Forest type mapping using satellite data has been undertaken by Forest Survey of India with reference to Champion and Seth (1968) classification. As per this assessment, the state has 34 forest types which belong to eigth forest type groups, *viz.* Tropical Moist Deciduous, Tropical Dry Deciduous, Subtropical Pine, Himalayan Moist Temperate Forests, Himalayan Dry Temperate Forests, Sub-Alpine Forests, Moist Alpine Scrub and Dry Alpine Scrub. Percentage wise distribution of forest in different forest type groups found in the state is given in the pie diagram.

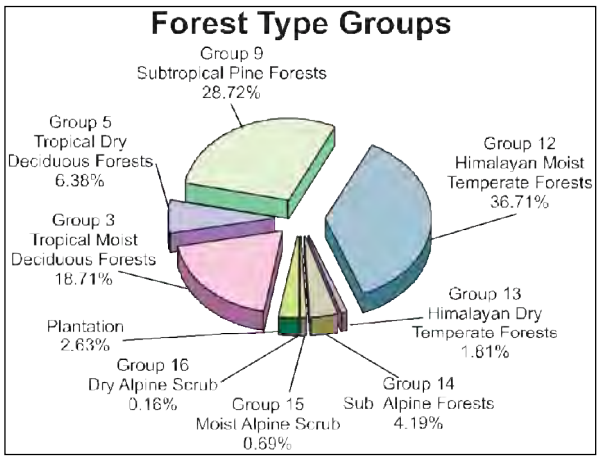


Figure IV-5. Forest type groups of Uttarakhand

73. A wide variety of tree species is found in the mountains of Uttarakhand and enumerated in the succeeding Table according to altitude location. 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*) and Seesam (*Dalbergia sissoo*) for their ecological and economic importance. Sal (*Shorea robusta*), which is 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 very heavy hard with twisted fibers. 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. Deodar grows in the temperate to alpine climate that is found between 3500 and 12000 feet in this region. Finally Chir pine (*Pinus roxburghii*) a source of resin, which is used for producing resin and terpentine.

Table IV-4 . Predominant Top-Canopy (Tree) Species According to Altitude

Sl. No.	Common Name	English Name	Botanical Name	Altitude (m.)
1.	Kachnar	Orchid tree	*Bauhinia variegata*	600-900
2.	Cheed	Chir Pine	*Pinus roxburghii*	600-900
3.	Shal tree	Shal tree	*Shorea robusta*	600-750
4.	Banj	Oak tree	*Quercus incana*	1700-2000
5.	Kail	Blue pine	*Pinus wallichiana*	1800-2400
6.	Buransh	Rose tree	*Rhododendron arboretum*	200-2100
7.	Deodar	Cedar tree	*Cedrus deodara*	1800-2400
8.	Raga	Himalayan fir-low level	*Abies pindrow*	2100-2900
10.	Raga	Himalayan fir-high level	*Abies spectabilis*	2900-3600
11.	Spruce	Spruce	*Picea smithiana*	2400-2900
12.	Thuner	Himalayan Yew	*Texus baccata*	2400-2700
13.	Surai	Cypress	*Cupressus torulosa*	2300-2400
14.	Pangar	House Chestnut	*Aesculus indica*	1800-2100
15.	-	Strawberry tree	*Cornus capitata*	2000-2300
16.	Bhojpatra	Betula	*Betula utilis*	3000-3500
17.	Buransh	Rose Wood	*Rhododendron arboreum*	1700-2000
18.	Simaru	Rose Wood	*R. campanulatum*	2200-3000
19.	Moru	Oak tree	*Quercus dilatata*	2000-2500
20.	Kharsu/Khoru	Oak tree	*Quercus semicarpifolia*	2200-2400

2. Biodiversity

74. The State of Uttarakhand is endowed with rich bio-diversity as manifested by its approximately 64 percent forest cover. The State has established six national parks and six 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, 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-5. Wildlife in Uttarakhand

Sl. No.	Protected Areas	Year	Unit	Statistics
1.	**National Parks**			
	(i) Number	2011-12	No.	6
	(ii) Area	2011-12	Sq. Km.	4915
2.	**Wildlife Sanctuaries**			
	(i) Number	2011-12	No.	6
	(ii) Area	2011-12	Sq. Km.	2420
3.	**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

75. 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.

76. The State of Uttarakhand is represented by Biogeographic Zones 2B Western Himalaya and 7B Siwaliks[1] 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-6. National Parks in Uttarakhand

Sl. No.	National Park	Year of Establishment	Area (sq.km)	District
1.	Corbett NP	1936	521	Garhwal
2.	Nanda Devi NP	1982	630	Chamoli
3.	Valley of Flower NP	1982	87	Chamoli
4.	Rajaji NP	1983	820	Dehradun and Haridwar
5.	Gangotri NP	1989	2390	Uttarkashi
6.	Govind NP	1990	472	Uttarkashi

Source: Wildlife and Protected Areas, ENVIS, 2002

[1] Negi, A.S., Status, Distribution and Management of Mountain Ungulates in Uttaranchal, Envis Bulletine, 2002

Table IV-7 Wildlife Sanctuaries in Uttarakhand

Sl.No.	Sanctuary	Year of Establishment	Area (sq.km.)	District
1.	Govind WLS	1955	521	Uttarkashi
2.	Kedarnath WLS	1972	957	Chamoli
3.	Askot WLS	1986	600	Pithoragarh
4.	Sonanadi WLS	1987	301	Garhwal
5.	Binsar WLS	1988	46	Almora
6.	Musoorie WLS	1993	11	Dehradun

Source: Wildlife and Protected Areas, ENVIS, 2002

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

Table IVV-8 List of Major Flora

Sr No	Local Name	Scientific Name
Trees		
1.	Buransh	*Rhododendron arboretum*
2.	Deodar	*Cedrus polycarpos*
3.	Chir	*Pinus roxburghii*
4.	Surai	*Cupressus tourulose*
5.	Padam	*Prunus cornuta*
6.	Mehal	*Pyrus pashia*
7.	Otis	*Alnus nepalensis*
8.	Ayar	*Lyonia ovalifolia*
9.	Kafal	*Myrica sapida*
10.	Akhrot	*Juglana regia*
11.	Bhimal	*Grewia optiva*
12.	Ritha	*Sapijdus mukorossi*
13.	Tun	*Toona ciliate*
14.	Nimla	*Ficus auriculata*
15.	Timur	*Zanthoxylum tamala*
16.	Kharik	*Celtis eriocarpa*
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*
Shrubs		
1.	Kala Hisalu	*Rubus lasiocarpus*
2.	Karoz	*Carissa spinarium*

Sr No	Local Name	Scientific Name
3.	Kobra Plant	*Arisama helleborifollium*
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*
18.	Jatamasi	*Nardostachys grandiflora*
Grasses		
1.	Dub	*Cynodon dactylon*
2.	Kush	*Sucharum spontanour*
3.	Gol ringal	*Chimonobambusa falcate*
4.	Tachita	*Apluda muticr*
5.	Dev ringal	*Thamnocalamus faclouerі*
6.	Jhugra ringal	*Arundinaria jaunsarensis*
7.	Thamgil	*Thamnocalamus spathiflorus*

Table IVV-9 List of Major Fauna

Sl. No.	Wild Animals	
	Local Name	**Scientific Name**
1	Guldar	*Panthera Pardus*
2	Kala Bhalu	*Selenarctos thibetanus*
3	Ghural	*Memorhaedus goral*
4	Kakar	*Muntiacus muntjak*
5	Khirao	*Capricornis sumatraensis*
6	Jangli Suar	*Sus-scrofa cristatus*
7	Chitrola	*Martes flarigula*
8	Langoor	*Presbyits entallus*
9	Khargosh	*Lepus nigricollis*
10	Sehi	*Hystrix indica*
11	Gidar	*Canis aureus indicus*
12	Jangli Billi	*Felis chaus*
13	Gilehri	*Eurambulus pennanti*
14	Bandar	*Macaques mulatta*
Birds		
1	Chir Fijent	Catreus wallichii
2	Kalij Fijent	*Lophura Leucomelana*
3	Koklaj Fijent	*Pucrassia macrolophus*
4	Kala Irgal	*Letinaetus makavensis*
5	Karorla	*Urocissa erythsorhyncha*

Sl. No.	Wild Animals	
	Local Name	Scientific Name
6	Ullu	*Strix aluco nivicola*
7	Baaj	*Flaco severaus*
8	Kala Titar	*Francolinus francolinus*
9	Papiha	*Cuculus varius*
10	Tota	*Psittacula humalayana*
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 macrornynchos*
19	Saat Bahen	*Teyrdoides striatus*
20	Neelkanth	*Garrulus Lanaclatus*

3. **Biosphere Reserves**

78. 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 Zanskar range and Himalayan foothills with 97 species of plants including many rare and almost extinct plants like *Saussurea sudhanshui*, N*ardostachys 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

79. 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. Noteable animals seen in the par are the Wild Cat, Goral, Rhesus Macaque, Himalayan Yellow Throated Marten, Monitor, Lizard, Indian Hare, Sloth, Himalayan Black Bear, King Cobra, Jackal, Barking Deer, Sambar, Wild boar, Indian Langur, Indian Porcupine and Pythons. The population of birds consists of the Great

Pied Hornbill, Himalayan Pied Kingfisher, Sparrows, Fire Tailed Sunbird and the Peacock (Indian National Bird).

80. 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, Throated Martem, Himalayan Palm Civet, Indian Grey Mongoose, Para, Kakka, Ghoral, Bar-headed Goose, Duck, Grepe, Snipe, Turtles, Python, Common Otter, Porcupine, Clack-taped Hare, Chital, Spotted Deer, Viper, Cobra, Krait, King Cobra, Tortoise, Graylag, Sandpiper, Gull, Cormorants and Egrets. There are 488 species of flora found protected in the Park including Sal, Savannah Grass, Anogeissus-*Acacia catechu* forests, *Mallotus philippensis*, Jamun and *Diospyros tomentosa*.

81. 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, Brown bear, Musk deer, Bharal, Himalayan Tahr, Serow and Common leopard. The endangered birds found in this region are Monal Pheasant, Koklas Pheasant, Bearded Vulture Himalayan Snow Cock, Golden Eagle, Western Tragopan, Steppe Eagle and Black Eagle. Other varieties of birds include Owls, Pigeons, Minivets, Thrush, Warblers, Bulbul, Cuckoo and Finches.

82. 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.

4. **Fishery**

83. Fish abound in almost all streams of the district and riparian villages find in it an important supplement to their ordinary food. The common species found here are asela or saul, mahasher, kalabans or karaunch and fucta or phar kata. Other species found in the district include gadara, gadiyal or guluwa, tarra, symplu and nama, nawoo or japa. No interference with fishery activities is envisaged by execution of the proposed subprojects.

I. Socio-Economic

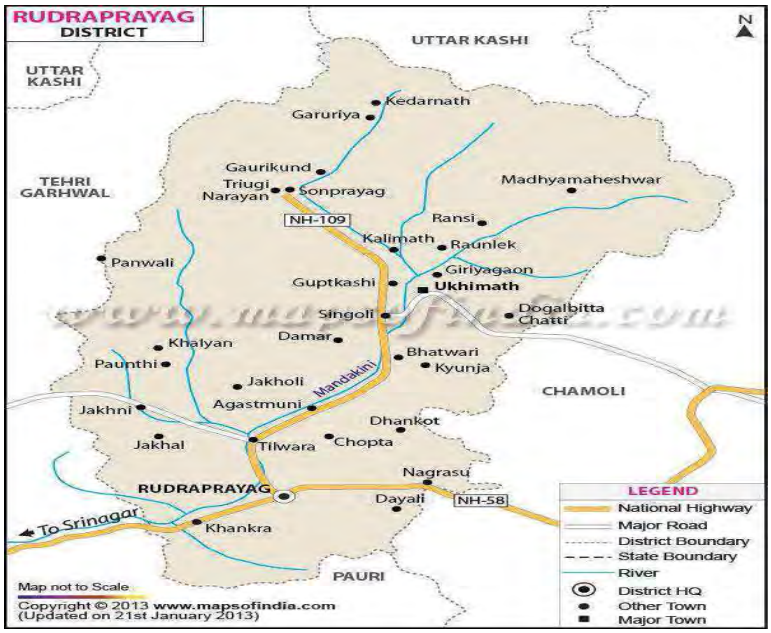
1. Social and Cultural Development

84. The State of Uttarakhand occupies a total land area of 53,483 sq. km. which is 1.73 percent of India˜s total land area. 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. According to the 2011 census of India, Uttarakhand has a population of 10,116,752 comprising 5,154,178 males and 4,962,574 females, with 69.45% of the population living in rural areas. The state is the 20th 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 per square kilometre having a 2001˜2011 decadal growth rate of 19.17%. The gender ratio is 963 females per 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.

85. The State is divided into Garhwal and Kumaon divisions. Administratively, the State is divided into 13 districts, 49 tehsils and 95 blocks. Garhwal division has seven hill districts with one located in the foothills (Haridwar). Kumaon division, on the other hand, has six districts´ one in the foothills (Udham Singh Nagar). There are 16,177 villages in the State and 7,227 gram panchayats. Of the total number of villages, 5,868 are not connected to all weather roads.

86. In 2011, Rudraprayag had population of 2,42,285 of which male and female were 114,589 and 127,696 respectively. In 2001 census, Rudraprayag had a population of 227,439 of which males were 107,535 and remaining 119,904 were females. Rudraprayag District population constituted 2.40 percent of total Uttarakhand population. In 2001 census, this figure for Rudraprayag District was at 2.68 percent of Uttarakhand population.



2. Land Use and Land Use Pattern

87. The land use pattern of Uttarakhand is strongly governed by the following: elevation, climate, mountainous terrain, lithological type, topography, surface hydrology, sunlight in the fields of forestry and agriculture, alpine meadows, sparse vegetation (scrub), grazing land, barren land, and human settlement. The human settlements are mainly located in the shallow water zones or around the localities nearer to springs.

88. Forest is the main land use in the State and nearly 64 % of the geographical area is under the varying forest densities (cover). Tree line is clearly demarcated above 2900 m elevation. 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 11.5 % 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.

Table IVV-10 Land Utilisation in Uttarakhand

Sl. No.	Land-use	Period / Year	Unit	Statistics
1.	Total Reported Area	2006-07	Hectare	5,666,878
2.	Forest Area	2006-07	Hectare	3,465,057
3.	Culturable Waste Land	2006-07	Hectare	366,713
4.	Fallow Land	2006-07	Hectare	108,132
	(i) Current Fallow	2006-07	Hectare	44,064
	(ii) Fallow Land other than Current Fallow	2006-07	Hectare	64,068
5.	Barren & Unculturable Land	2006-07	Hectare	311,849
6.	Land under Non-agricultural Uses	2006-07	Hectare	160,649
7.	Permanent Pasture & Other Grazing Land	2006-07	Hectare	220,286
8.	Land under Misc., Tree Crops and Groves not included in Net Area Sown	2006-07	Hectare	269,042
9.	Net Area Sown	2006-07	Hectare	765,150

Source: Uttarakhand at a Glance 2009-10, Govt. of Directorate of Economics and Statistics

J. Health

89. The Infant Mortality Rate is 38 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). Comparative figures of major health and demographic indicators are as follows :

Table IVV-11 Demographic, Socio-economic and Health profile of Uttarakhand State as compared to India figures

Indicator	Uttarakhand	India
Total Population (In Crore) (Census 2011)	1.01	121.01
Decadal Growth (%) (Census 2011)	19.17	17.64
Crude Birth Rate (SRS 2011)	18.9	21.8
Crude Death Rate (SRS 2011)	6.2	7.1
Natural Growth Rate (SRS 2011)	12.8	14.7
Infant Mortality Rate (SRS 2011)	36	44
Maternal Mortality Rate (SRS 2007-09)	359	212
Total Fertility Rate (SRS 2011)	NA	2.4
Sex Ratio (Census 2011)	963	940
Child Sex Ratio (Census 2011)	886	914
Schedule Caste population (In Crore) (Census 2001)	0.15	16.67
Schedule Tribe population (in crore) (Census 2001)	0.02	8.43
Total Literacy Rate (%) (Census 2011)	79.63	74.04
Male Literacy Rate (%) (Census 2011)	88.33	82.14
Female Literacy Rate (%) (Census 2011)	70.70	65.46

Source: RHS Bulletin, March 2007, M/O Health & F.W., GOI

90. The health infrastructure of the State is described in succeeding Table. There are only 14 Obstetricians / Gynecologists 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.

Table IVV-12 Health Infrastructure of Uttarakhand

Indicators	Required	In position	shortfall
Sub-centre	2341	1848	493
Primary Health Centre	351	257	94
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

91. Average literacy rate of Rudraprayag in 2011 were 81.30 compared to 73.65 of 2001. If things are looked out at gender wise, male and female literacy were 93.90 and 70.35 respectively. For 2001 census, same figures stood at 89.81 and 59.57 in Rudraprayag District. Total literate in Rudraprayag District were 170,933 of which male and female were 91,803 and 79,130 respectively. In 2001, Rudraprayag District had 141,078 in its district.

L. Cultural and Archeological resources

92. 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 Mela, 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, Shravan Mela (Jageshwar), Kartik Poornima at Dwarahat, Kasar Devi fair, and Nanda Devi melas.
93. Living in the mountains mostly in places that are not easily accessible the people of the district have been able to preserve their culture, folklore, folksongs and folkdances, the last, a distinctive feature of the district, being seasonal, traditional and religious, some of the better known being described below -
94. The Thadiya dance, which is accompanied by song, is performed on Basant Panchami, the festival celebrating the advent of spring, the Mela, another dance, is perform on Deepawali and the Pandava during the winter after the harvesting of the 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. Another dance perform during the fairs and accompanied by song is the Chanchari in which both men and women participate.
95. 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.

96. The houses in the district have not been 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 valley. 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 mrts. 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. The height of the upper storey is generally 2.1 mtrs. 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.
97. 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 topmost 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.
98. The staple grains consumed by the people of the district are wheat, rice, maze, mandua and jhanjora, the last three being coarse grains generally eaten by the poorer sections. The pulses consumed are urad, gahat, bhatt, soontha, tur, lopia 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 want of fund or local unavailability often resulting to a vegetarian diet.
99. There is no Archaeological Survey of India (ASI) listed heritage sites within the study area.

M. Economic Development

1. Transportation and Communication

100. Transportation system is a key factor in the socio-economic development of any State. 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 lone airport present in the State. As per statistical data from 2006-07, Uttarakhand has a total road network of 23,274 km of which 2,228.90 km comprises the National Highway (1,328.30 km with State PWD and 900.60 km with BRTF); 1,553.00 km comprises the State Highway; 579.85 km covers the MDR; 7,154.88 km comprises the ODR (6723.90 km with State PWD and 430.98 km with BRTF), and 7,250.53 km to the Village Road. Light vehicle roads constitute of about 2,633 km.

101. 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.

102. The road density per 100 sq. km. of the total area in Garhwal region is 30 km whereas road density in Kumaon region is 37 km. In terms of population, Garhwal region has 234 km of roads per lakh and the corresponding figure in Kumaon is 266 km. Motor vehicles has increased with the annual growth rate of 11 percent accounting to 44,7000 vehicles in 2003. PWD is the principal agency responsible for the management of roads in the State.

TableIV-13. Transportation of Uttarakhand state.

S.N.	Items	Year/ Period	Unit	Statistics
(A)	**Motor Roads Maintained by PWD**			
	(i)National Highways	2011-12	Km.	1375.76
	(ii)State Highways	2011-12	Km.	3788.20
	(iii)Major District Roads	2011-12	Km.	3289.74
	(iv)Other District Roads	2011-12	Km.	2945.04
	(v)Rural Roads	2011-12	Km.	14543.89
	(vi) L.V. Roads	2011-12	Km.	858.22
(B)	**Motor Roads Maintained by BRTF**			
	(i)Total length of Roads	2011-12	Km.	1281.32
(C)	**Motor Roads Maintained by Local Bodies**			
	(i)District Panchayats	2011-12	Km.	862.45
	(ii)Urban Local Bodies & Others	2011-12	Km.	1974.30
(D)	**Roads Maintained by Other Departments**			
	(i)Irrigation	2011-12	Km.	741
	(ii)Cane Development	2011-12	Km.	885
	(iii) Forest	2011-12	Km.	3257
	(iv) Others	2011-12	Km.	1685
(E)	**Postal and Communication Services**			
	(i)Post Offices	2011-12	No.	2718
	(ii)Telephone Exchanges	2011-12	No.	477
	(iii)Telegraph Offices	2011-12	No.	2
	(iv)PCOs	2011-12	No.	8429
	(v)Telephone Connections (Including WLL)by BSNL	2011-12	No.	278751
	(vi) Mobile phone by BSNL	2011-12	No.	1360674

2. **Industrial Development**

103. The State has very few industrial units mainly because of lack resources. In the hilly terrains, industries promoted include food processing, fruit processing, medicinal/herbal plants, and horticultural/floriculture-based industries. In the plain districts of Haridwar, Udham Singh Nagar, and other places, capital intensive and high-value addition industries are being encouraged by the government.

104. 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 in establishing small and medium sized agro parks,

food parks, and the likes which in turn are expected to provide common infrastructure facilities for storage, processing, grading, and marketing.

105. Main and traditional business of the state is, Handicrafts, Handlooms, Wool Based Industry, Khadi and Village Industries. Hydro Power, tourism are the backbone of economic development in the state. No recognizable industry is located along the project corridor.

3. **Agriculture, Forestry and Fishery**

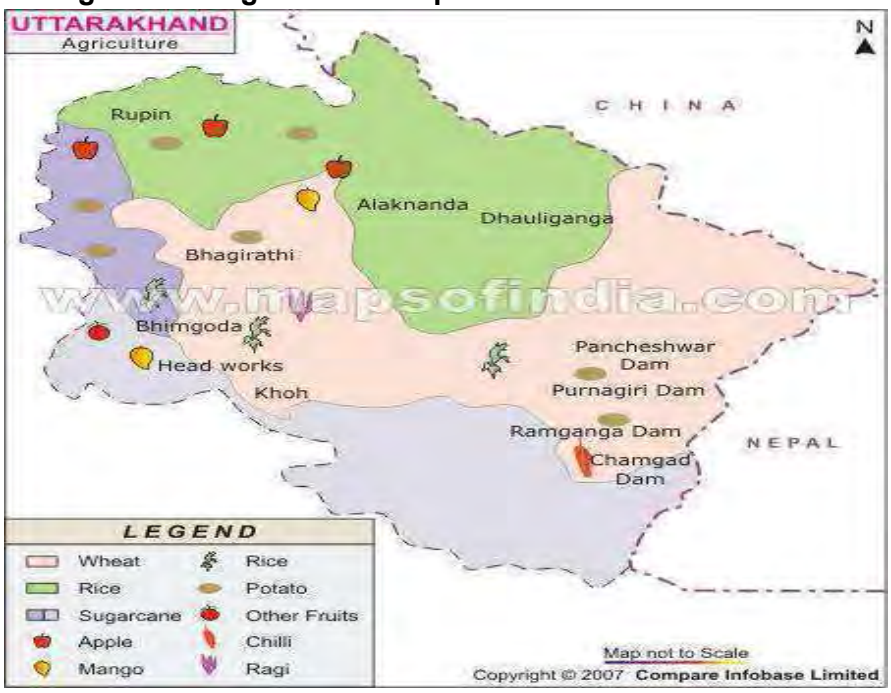
106. Agriculture is the main economic activity in the State as per latest land-use statistics. The total reported area for agricultural activity is 55.66 lakh hectares. In the hills, the major crops grown include wheat, paddy, mandua, ramdana and potato whereas in the plains the major crops are wheat, paddy, pulses, and sugarcane.

107. 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 sharecropping are rare while landholdings are generally small and limited to family farms´ approximately 50 percent of all landholdings 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.

108. Agriculture in Uttarakhand is very complex and is interlinked with crop husbandry, animal husbandry and forestry to form a production system. During the year 2001-02, contribution of agriculture to Net State Domestic Product (NSDP) of the State was about 30 percent and engaged about 58 percent of the total workers. Agriculture in the State is characterised by the following:

1. Out of 7.93 lakh hectare of agriculture land, hilly region covers 56.8 percent and plain region covers 43.2 percent.
2. The cropping intensity in Uttarakhand is 163.79, which is much higher than country˘s average of 129.
3. Both rain-fed and irrigated agriculture is practised in the State. Cereals are emphasised in the irrigated agriculture and two crops are taken in an agriculture year. In the rain-fed system millets, pulses and tuber crops are grown.
4. Monocropping is a common practice in the irrigated areas whereas mixed cropping is common in rainfed areas.
5. Eighty five percent of the gross cultivated area is used only for growing food grains where value addition is low.
6. More than 62 percent of the State Net Domestic Product comes from the three major towns of Dehradun, Nainital, and Haridwar.
7. In the mountain regions and the Himalayan agriculture specifically, farmers deviate substantially from the kinds practiced in less precipitous altitudes. Hill farmers have adapted to the difficult geography, and the terrain has likewise influenced cultural modes in mountain societies. Patterns of land ownership, subsistence versus surplus production, and level of market penetration have also been decisively affected. However, traditional Himalayan agricultural systems and knowledge-base are being steadily eroded by market pressures, bringing both economic and cultural changes in Uttarakhand. Age-old self-reliance has given way to dependency on imports from the productive plains that bear pesticide/chemical fertilizer-enhanced yields. Cultural domination from the plains also threatens Uttarakhand's traditional foods as an increasing taste for mill-polished rice is outcompeting mountain crops. Activists in the hills have responded with a :Save the Seeds˘movement and are raising awareness about the need for agricultural biodiversity.

Figure IV-6. Agricultural Map of Uttarakhand State



109. Agriculture is also practiced in the river valleys of Uttarakhand´ a small 10-15 percent of the total land area. Over hundreds of years, many of the slopes have been cut into field terraces, a common characteristic of mountain agriculture throughout the world. The region's farmers have also developed advanced manure, crop rotation, and intercropping systems. Most of the land on hilly slopes is non-irrigated. Three types of agriculture can be found in most river valleys with each particularly suited to the type of land. These are as follows:

- Katil (Forest edge land)
  - Hoe cultivation, with a standard rotation of 3 crops in 5 years
  - Major crops are Finger millet/Mandua *(Eleusine coracana)*, Barnyard millet/Jhangora *(Echinochloa frumentesia)* and Chaulai/Ram Dana *(Amaranthus polygamous, Amaranthus blitum)*
- Upraon (Hillside land)
  - Permanently terraced but unirrigated
  - Major crops are Finger millet/Mandua *(Eleusine coracana)*, Barnyard millet/Jhangora *(Echinochloa frumentesia)* and Chaulai (*Amaranthus polygamous*) *etc.*
- Talaon (Valley bottom land)
  - Paddy cultivation, low-lying, irrigated, double cropped
  - Major crops area Wheat (*Triticum aestivum*), Paddy (*Oryza sativa*), Sugarcane (*Saccharum officinarum*) *etc*.

Table IV-14. Area under Principal Crops and Productivity in Uttarakhand

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

Table IV-15. 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 (*Triticum aestivum*), Paddy (*Oryza sativa*) and Sugarcane (*Sachharum officinarum*).
2.	Upper Dun, Bhabar, lower Shivaliks	600-1,200	Wheat (*Triticum aestivum*), Paddy (*Oryza sativa*), Maize (*Zea mays*) Chaulai (*Amaranthus* species) Finger millet/ Mandua (*Eleusine coracana*) and Barnyard millet (*Echinochloa frumentesia*)
3.	Middle Garhwal-Kumaon	1,200-1,800	Wheat (*Triticum aestivum*), Paddy (*Oryza sativa*), Cheena (*Panicum miliaceum*), Potato (*Solanum tuberosum*), Barley (*Hordeum vulgare*) Finger millet (*Eleusine coracana*) and Barnyard millet (*Echinochloa frumentesia*),
4.	Upper Garhwal-Kumaon	1,800-2,400	Wheat (*Triticum aestivum*) Barley (*Hordeum vulgare*) Potato (*Solanum tuberosum*), Chaulai (*Amaranthus* species), Cheena (*Panicum miliaceum*) and Phaphra (*Fagopyum tataricum*)
5.	Cold Zone	2,400-3,600	Summer Crops: Wheat (*Triticum aestivum*), Barley (*Hordeum vulgare*) Potato (*Solanum tuberosum*), Phaphra (*Fagopyum tataricum*) Chaulai (*Amaranthus* species), Kauni (*Setaria etalica*) Ogal (*Fagopyrum esculentum*) and Uva Jau (*Hoycleum himalayanse*)

110. Various pulses (*e.g.*, "Masur" - *Ervum lens*; "Kulat" ¯ *Mycrotoma biflorus*) are grown intercropped during the two harvest seasons´ early winter after the rainy season (millet), and midsummer before the hot dry season (barley-wheat). Dry and wet rice, taro, pumpkins, beans, corn, ginger, chili, cucumbers, leafy vegetables, and tobacco are also grown in the area. Likewise, potatoes have become an important cash crop being grown in areas unsuitable for other plants (Berreman, 1963).
111. The irrigation facility is only available adjoining to rivers in valleys. The cross drainages are required in project roads for durability of strengthening work. The irrigation and drainage system in Uttarakhand is described below.

Table IV-16. Mode of Irrigation and Drainage System in Uttarakhand

Sl. No.	Items	Year/ Period	Unit	Statistics
Net and Gross Irrigated Area				
1.	Canals	2011-12	Hectare	83687
2.	Tube Wells	2011-12	Hectare	216100
3.	Other Wells	2011-12	Hectare	11519
4.	Tanks/ Ponds	2011-12	Hectare	83
5.	Other Sources	2011-12	Hectare	24747
6.	Net Irrigated Area (NIA)	2011-12	Hectare	336136
7.	Gross Irrigated Area (GIA)	2011-12	Hectare	561733
Irrigational Infrastructure				
1.	Length of Canals	2011-12	Km.	11588
2.	Length of Lift Canals	2011-12	Km.	242
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 Hect.	3.302
9.	Revenue Collection by Irrigation	2011-12	Rs. Lakh	252.27

Fisheries

112. 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*, *Labeio calbase*, *Cirrihinus mirigale*, Clarius, batrachus, *Rita rita*, *Heteropneuptus fonilis*, *Notopterus nontopterus*, *N. Chitala*, *Macrobrachum rosenbergii*, *M. malconsoni*, *M. Chapral*, *Channa punetatus*, *C. gaehua*, and *C. striatus*.

N. Energy and Electric Power Potential

113. Uttarakhand has an estimated hydro power potential of approximately 20,200 MW. However, only 1,130 MW has been tapped at present. Meanwhile, 4,170 MW projects are under implementation and 3,800 MW projects are allotted to Central, State and private sectors. Thirty-nine projects with a potential of 6,374 MW have been identified for PFR under PMs Hydro Initiatives.

114. 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

115. 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 10.5 million domestic tourists in the year 2000-01, 11.6 million in the year 2001-02, and 12.9 in the year 2002-03, registering an average growth of 10.7 percent. Expenditure on schemes for tourism development and promotion in the State has progressively increased over the years. In the current five year plan, about Rs. 860 million have been spent, which is about 10 times the amount spent during 1980-85. 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.
116. Tourist travelling to Rudraprayag can visit shrine named Jagdamba Temple located in the close vicinity of the Rudraprayag Temple. Agastmuni Town is also visited by numerous tourists for the Agasteshwar Mahadev Temple. According to legend, Saint Agastmuni mediated in this place for many years.
117. Deoria Tal is an enchanting lake to visit in Rudraprayag. Nestled at an elevation of 2438 m above sea level, this lake offers breathtaking reflections of the Chaukhamba Ranges alongwith Gangotri, Badrinath, Kedarnath, Yamunotri and Neelkanth peaks. Birdwatching, boating and angling are the popular activities to enjoy here. Visitors can also go to Triyuginarayan, a small village of Rudraprayag, where they can see the ever burning flame of the Havan Kund. According to beliefs, this village was the capital of Himvat, where Goddess Parvati was married to the Lord Shiva in the light of this Havan Kund.
118. The other important tourist sites of district Rudraprayag are Guptkashi, Ukhimath, Vasuki Tal, and Tunganath. Tourists can also go to Kalimath, Kartik Swami Temple, Indrasani Mansa Devi Temple, Chandrashila, Maa Hariyali Devi Temple, Koteshwar Temple, and Madmaheshwar .
119. So many temples are also situated at Rudraprayag district namely, Kedarnath, Omkareshwar Shiva, Tungnath, Madmaheshwar, Trijuginarayan, Maa Hariyali Devi, Koteshwar, Kalimath, Kartik Swami, Chandrashila, Indrasani Mansa Devi tec.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

120. The assessment for environmental impacts due to the implementation of this project has been carried out for potential impacts during the following stages of the project planning and implementation:
    - **Location impacts.** Impacts associated with site selection, including impacts on environment and resettlement or livelihood related impacts on communities
    - **Design impacts.** Impacts arising from project design, including the technology used, scale of operations, discharge standards, etc
    - **Construction impacts.** Impacts resulting from construction activities including site clearance, earthworks, civil works, etc
    - **O&M impacts.** Impacts associated with the operation and maintenance of the infrastructure built in the project.
121. The ADB Rapid Environmental Assessment Checklist for Tourism as per EARF is used during preparation of this IEE to screen the subproject for environmental impacts and categorization of the project (Appendix 2). Table V-1 provides the potential environmental impacts and the mitigation measures including the responsibilities for implementing the same. Subproject components are assessed to have similar impacts and hence are grouped together.

A. Land Acquisition and Resettlement

122. The proposed subproject locations are within the lands available with the government. There are no impacts envisaged on land acquisition or resettlement due to the proposed subproject components.

1. Land Ownership

123. The sub-project area is covering 1 Districts of Garhwal region in Uttarakhand namely- Rudraprayag. A total of 7 locations are proposed for Reconstruction & Rehabilitation of Damaged Tourism Assets in Disaster Affected District Rudraprayag Uttarakhand under UEAP (Tourism). The District wise list of locations as per the land availability with ownership status was finalized after site visits by the environmental experts of PIU/PMU/ADB.
124. Due to tough hilly terrain, flat land is the major crisis. Most of the land belong to forest department or surrounded by restricted areas, which is again a major problem to get land transfers and clearances. Keeping this fact in mind the land available with Tourism department is selected for this purpose. There is no case of private land acquisition. In most of the cases the locations are proposed within the Garhwal Mandal Vikas Nigam campus.
125. There is no resettlement issue envisaged in case of all 7 locations for the sub project. Since there is no encroachment noticed during site visit, also there is no livelihood loss of the community due to the construction of these structures, social due diligence is not needed to be prepared for these locations as per ADB safeguard Policy Statement 2009.

126. The location selected for construction of the FRP Huts with an objective to restore tourism in the affected areas and also use the structure as Emergency Evacuation Point. The selection criteria are as follows:
- Land Availability- Department land
- Easy access

- Easy access to basic facilities like- water supply, electricity.
- Long term sustainability of the structure and proper maintenance.

2. Impact on existing or proposed land use

127. The proposed LGFS, Multipurpose Hall, Night Shelter and meditation centre are inside the premise of the existing Tourist Rest Houses. There is no land acquisition as such involved. The connecting Roads to LGFS, Multipurpose Hall, Night Shelter and meditation centre proposed are not new constructions but only involve raising and strengthening of the existing roads if needed. As such, there is no land acquisition involved. While proposing the development of these roads, adequate attention is being paid to the natural flow of water and drainage. There is no scope for change in land-use pattern. Hence the land use pattern in the locality will not change.

B. Environmental Impacts

1. Location Impacts

128. The locations considered for the subproject are within the areas designated for eco-tourism as part of developing Uttarakhand:s conservation, heritage, natural and cultural attractions (since most of the sites are extension to existing Tourist rest houses), and are outside areas demarcated for habitat protection and conservation.

Table V-1: Location Impacts for Damaged Tourism Assets in District Rudraprayag

S.No	District	Land Availability	Location Impacts
A	Rudraprayag	Govt. owned land	All of the proposed locations are on Tourism land since LGFS, Multipurpose Halls, and Night Shelter are proposed as extension of Tourist rest houses or en route popular tourist destinations and are outside areas demarcated for habitat protection and conservation. The proposed infrastructures will not impact any environmentally-sensitive or protected areas.

129. Though minor civil works are involved in the sub project as major component comprises of the installation of pre-fab structures, priority is to locate construction work camps, stockpile areas, storage areas, and disposal areas near the subproject area. However, if it is deemed necessary to locate elsewhere, sites to be considered will not promote instability and resultant destruction of property, vegetation, irrigation, and drinking water supply systems. Residential areas will not be considered to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Extreme care will be taken to avoid disposals near the sensitive areas. All locations will be included in the design specifications and on plan drawings.

2. Design Impacts and Pre-Construction Impacts

130. Impacts arising from the inappropriate designs of proposed facilities 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 aesthetics of the 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 the there is a need for disposal of construction wastes, the contractors will be required to consult with the Field Project Implementation Unit- GMVN (PIU) and Uttarakhand Environment Protection and Pollution Control Board (UEPPCB) for safe disposal sites.

3. Construction Impacts

131. The impacts are generic to the construction activities, in all subproject 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 supervised by the DSC. Key impacts during construction are envisaged on the following aspects: (i) drainage, (ii) quarry/borrow pit operations, (iii) slope cutting and slope Stability (iv) water bodies and drainage courses (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

4. Operation and Maintenance Impacts

132. Impacts during operation of the LGFS, Multipurpose Hall, Night Shelter and Meditation Hall created in the Sub project will be due to lack of appropriate maintenance of the facilities created including the sites around the tourist rest houses, 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 cleanup of waste disposed by the tourists and aesthetics through appropriate maintenance of landscaping.

C. Benefits

Construction of LGFS Duplex Units, Multipurpose Hall and Night Shelter

133. The LGFS Duplex units, LGFS, Multipurpose Hall and meditation centre will restore the tourism in affected areas and will act as ecofriendly solution to the accommodation needs and the extra tourist pressure during peak tourism season. It will also enhance the attractiveness of these destinations. While the enhanced tourist generation due to these improvements may not be significant, the facilities will enhance the site experience of the tourist/pilgrim and will also enhance tourist safety as the structures are designed for earthquake resistance. The project will facilitate environmental improvements through the provision of training to operators for all sanitation and solid waste facilities provided by the Project, in order to sustain any improvements made.

D. Cumulative Impact Assessment

134. The cumulative impact assessment (CIA) examined the interaction between the subprojects 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.
135. Since the subprojects will be built in existing infrastructures, government-owned land, and areas designated for tourism activities, these will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. 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 improved infrastructures and services, added residential developments, commercial and business facilities increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject.
136. Increased tourist influx is expected to impact the 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.
137. Implementation of the project will not have any bearing on ecology and environment of the locality. Since the buildings will be constructed in vacant government lands it will not involve any displacement of people or disruption of any economic activity. All the infrastructure units are proposed to be constructed outside ecological sensitive area. The design and constructions are consistent with the surrounding landscape. The construction activity will involve only minor building foundation excavation which will be filled up with soil after the construction. The project will not influence the flora or fauna of the locality in any way.

VI. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Public participation during the preparation of the IEE

138. The public participation process included identifying interested and affected parties (stakeholders); informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; creating opportunities and mechanisms whereby they can participate and raise their viewpoints (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.

139. 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. The stake holders of the project include project affected communities and institutional stake holders such as PCB, local bodies, Water Resource Department, Environmental Department, Mines and Geology Department, Forest Department, etc. Consultations at micro-level and macro-level (e.g. 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.

140 During Project preparation, consultations have been held with the EA, IA, Garhwal Mandal Vikas Nigam (GMVN), District Administration and other agencies on selection of subprojects and identification of key issues including addressing the current gaps in provision of basic services and improvement of tourist infrastructure.

Table VI-1 List of stakeholders consulted

S.No	Date	Place	People Consulted	Designation
1	20.05.2014	Tilwara	Mr. D.S Semwal	Manager GMVN
2	20.05.2014	.	Mr. D.S Rawat	Supervisor, GMVN
3	20.05.2014		Mr. V.S. Negi	Caretaker, GMVN
4	20.05.2014	Triyuginarayan	Mr. Bhatt	Local Resident
5	20.05.2014		Mr. Pandey	Forest Guard
6	20.05.2014		Mr. D.D. Nautiyal	Local Resident
7	20.05.2014		Mrs. Krishna Devi	Ex Pradhan
8	20.05.2014		Mr. Prahlad	Local Resident
9	21.05.2014	Guptkashi	Mr. Girvir Singh Rawat	Manager TRH
10	21.05.2014		Kalam Singh Bhatta	TRH Guptkashi
11	21.05.2014		Mr. Uday Singh Negi	TRH Guptkashi
12	21.05.2014		Mr. P.D Gairola	TRH Guptkashi

13	21.05.2014		Mr. Shukhchain Singh	TRH Guptkashi
14	21.05.2014	Gaurikund.	Mr. Harish Chauhan	Junior Engineer, PIU-GMVN
15	21.05.2014		Mr. R.S. Butola	Manager GMVN
16	21.05.2014		Mr. Bhanesh Ghildiyal	Regional Manager, GMVN
17	21.05.2014		Mr. Puneet	GMVN
18	22.05.2014	Rampur.	Mr. R.D. Uniyal	Regional Manager GMVN
19	22.05.2014		Mr. P.P Khanduri	Manager GMVN
20	22.05.2014		Mr. Chauhan	GMVN
21	22.05.2014		Mr. D.C. Khanduri	Manager GMVN
22	23.05.2014	Rudraprayag.	Mr. Raghav Langer	District Magistrate
23	23.05.2014		Mr. Rahul Goyal	Additonal District Magistrate
24	23.05.2014		Mrs. Seema Nautiyal	District Tourism Development Officer
25	05.06.2014	Dehradun	Mr. Rajesh Kumar	Managing Director, PIU-GMVN
26	05.06.2014		Mr. Sanjay Gupta	Procurrement Officer, PIU-GMVN
27	05.06.2014		Mr. Gambhir Singh	Specialist- Engineering & Construction Supervison, PIU-GMVN
28	05.06.2014		Mr. Ramjatan	Support Engineer, PIU- GMVN
29	05.06.2014		Mr. M.M. Dhasmana	Junior Engineer, PIU- GMVN

Place: Tilwara **District:** Rudraprayag **Date:** 20/05/2014 **Participants:** GMVN officials and Villagers	
1.	**Issues Discussed:** • Impact on the local environment, due to construction activities. • People's expectation for employment generation during construction. • Any nuisance or health hazard due to construction activity. • Any impact on any historical, cultural or religious monument. • Any loss of housing, agricultural land and other property or displacement of people fully or partially. • Lack of accommodation facilities for tourist during pilgrim season
2.	**Stakeholder's Response:** • No any major impact on environment, flora and fauna due to construction activity but due care should be taken to preserve flora. • Villagers think for better livelihood and overall development. • Villagers want employment for local village people for construction. • Construction activity is not causing any major health hazard. • More structures should be built to accommodate tourist during peak season time
3.	**Recommendations & Suggestions:** • Local labor should be engaged during construction

Place: Guptkashi **District:** Rudraprayag **Date:** 21/05/2014 **Participants:** GMVN officials and Villagers	
1.	**Issues Discussed:** • Impact on the local environment, due to construction of structures. • Expectation of people for employment generation during construction activity. • Any nuisance or health hazard due to construction activity. • Any impact on any historical, cultural or religious monument. • Lack of facilities. • Need of the structures
2.	**Stakeholder's Response:** • No any major impact on environment, flora and fauna due to construction activity but due care should be taken to preserve flora. • Villagers think for better livelihood and overall development. • Villagers want employment for local village people for construction. • Construction activity is not causing any major health hazard. • Lack of suficient rooms to accommodate tourist during peak season time
3.	**Recommendations & Suggestions:** • Efforts should be taken for the generation of employment for local people in construction work

Place: Sonprayag **District:** Rudraprayag **Date:** 21/05/2014 **Participants:** GMVN officials and Villagers	
1.	**Issues Discussed:** • Impact on the local environment, due to construction of structures. • Expectation of people for employment generation during construction activity. • Any nuisance or health hazard due to construction activity. • Any impact on any historical, cultural or religious monument. • Lack of facilities. • Need of the structures
2.	**Stakeholder's Response:** • No any major impact on environment, flora and fauna due to construction activity but due care should be taken to preserve flora. • Villagers think for better livelihood and overall development. • Villagers want employment for local village people for construction. • Construction activity is not causing any major health hazard. • Lack of suficient rooms to accommodate tourist during peak season time
3.	**Recommendations & Suggestions:** • Efforts should be taken for the generation of employment for local people in construction work

Place: Triyuginarayan **District:** Rudraprayag **Date:** 21/05/2014 **Participants:** GMVN officials and Villagers	
1.	**Issues Discussed:** • Impact on the local environment, due to construction of structures. • Expectation of people for employment generation during construction activity. • Any nuisance or health hazard due to construction activity. • Any impact on any historical, cultural or religious monument. • Lack of infrastructure facilities. • Need of the structures • Approach road for the TRH campus at Triyuginarayan
2.	**Stakeholder's Response:** • No any major impact on environment, flora and fauna due to construction activity but due care should be taken to preserve flora. • Villagers think for better livelihood and overall development. • Villagers want employment for local village people for construction. • Construction activity is not causing any major health hazard. • Lack of suficient rooms to accommodate tourist during peak season time
3.	**Recommendations & Suggestions:** • Efforts should be taken for the generation of employment for local people in construction work

B. Future Consultation and Information Disclosure

141. The public consultation and disclosure program will remain a continuous process throughout the subproject implementation and shall include the following

C. Consultation during Detailed Design

142. Focus-group discussions with affected persons and other stakeholders to hear their views and concerns, so that these can be addressed in subproject design wherever necessary. Regular updates on the environmental component of the subproject will be kept available at the PIU/PMU of UEAP.

143. PIU/PMU 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.
144. The PIU/PMU, with assistance of DSC will conduct information dissemination sessions in the subproject area. During EMP implementation PIU, DSC, and PMU shall organize public meetings and will apprise the communities about the progress on the implementation of EMP in the subproject works

D. Consultation during Construction

145. 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.
146. Smaller-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 subproject monitoring and evaluation.

E. Project Disclosure

147. A communications strategy is of vital importance in terms of accommodating traffic during road closure. Local communities will be continuously consulted regarding location of construction camps, access and hauling routes and other likely disturbances during construction.
148. For the benefit 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/PMU office; (ii) District Magistrate Office; and, (iii) 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 creating wider public awareness. Electronic version of the IEE will be placed in the official website of the SDMA UEAP 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 subproject. Copies of the IEE will be kept in the PMU/PIU office and will be distributed to any person willing to consult the IEE.

Figure VI-1 Photographs of Consultations

VII. ENVIRONMENTAL MANAGEMENT PLAN AND GRIEVANCE REDRESS MECHANSIM

A. Environmental Management and Monitoring Plan (EMMP)

149. The EMMP designed will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between the Design & Supervision Consultants (DSC) ¯ also an Engineer for the project, Contractors, and Field-Project Implementation Unit (F-PIU)/Project Management Unit (PMU). The EMMP identifies the three phases of development as: (i) Pre-Construction (ii) Construction Phase; and (iii) Post-Construction/Operational Phase.
150. The purpose of the EMMP 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 subproject; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensure that safety recommendations are complied with.
151. A copy of the EMMP must be kept on site during the construction period at all times. The EMMP 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/or environmental damage.
152. The Contractor is deemed not to have complied with the EMMP if:
    - Within the boundaries of the site, and site extensions, there is evidence of contravention of clauses;
    - If environmental damage ensues due to negligence;
    - The contractor fails to comply with corrective or other instructions issued by the Engineer/F-PIU/PMU within a specified time; and
    - The Contractor fails to respond adequately to complaints from the public.

B. Institutional Arrangements

153. The institutional arrangements specify the arrangements for the implementation of environmental provisions of the proposed subproject. The Executing Agency (EA)¯ State Disaster Management Authority (SDMA) will work closely with the Implementing Agency (IA)¯ Garhwal Mandal Vikas Nigam (GMVN) Limited for effective implementation of environmental safeguards related requirements of the tourism infrastructure sub-projects. The institutional arrangements and responsibilities are detailed below.
154. The sub-project will be implemented and monitored by the F-PIU, GMVN under Uttarakhand Emergency Assistance Project (UEAP), which will be supported by DSC (also working as Engineer) and overall management support shall be provided by PMU, UEAP, SDMA.
155. The Safeguard Staff of UEAP, SDMA (EA) in PMU, and IA will monitor the implementation of environmental covenants with assistance of Engineer (DSC).
156. UEAP, SDMA (EA) shall be responsible for ensuring compliance to environmental requirements of the ADB as well as central/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 the IA 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 IA and the civil works contractors in this regard. , DSC with IA and EA, UEAP will act as monitoring agency as delegated in EMMP. All applicable statutory environmental clearances, consents, and/or permits (at national, state and local levels) as required for the implementation of

the sub-project would be obtained by the IA or by the civil works Contractor in line with India's national/state/local laws and regulations, and in accordance with ADB's SPS 2009 requirements.

UEAP, SDMA (PMU)

- Complies with all applicable legislation and is conversant with the requirements of the EMMP;
- Assesses all activities requiring special attention as specified and/or requested by the Engineer (DSC) and/or Safeguards Staff of UEAP, SDMA for the duration of the Contract;
- May, on the recommendation of the Environmental Expert (EE), DSC and/or Safeguards Staff of UEAP, SDMA, through the DSC order the Contractor to suspend any or all works on site if the Contractor or his subcontractors/ suppliers fail to comply with the said contractual stipulations with respect to environment and EMMP; and
- Act as overall monitoring agency.
- Addressing complaints and redressal of grievances.

UEAP, IA & F-PIU)

- Ensures along with Engineer (DSC) that EMMP and all necessary environmental stipulations are carried in bidding documents and Contract documents with Contractor.
- Complies with all applicable legislation and is conversant with the requirements of the EMMP;
- Assesses all activities requiring special attention as specified and/or requested by the Engineer (DSC) and/or Safeguards Staff of UEAP SDMA for the duration of the Contract;
- 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 Engineer and/or Safeguards Staff of UEAP SDMA;
- May, on the recommendation of the EE, DSC and/or Safeguards Staff of UEAP, SDMA, through the DSC order the Contractor to suspend any or all works on site if the Contractor or his sub-contractors/ suppliers fail to comply with the said contractual stipulations with respect to environment and EMMP; and
- Act as supervising & monitoring agency as delegated in EMMP.

The Engineer (DSC)

- Guides EA, IA, F-PIU 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 is forwarded to the Project Manager of F-PIU on weekly basis;
- Enforces and monitors compliance the requirements of the EMMP on site;
- Assesses the Contractor's environmental performance in consultation with Environmental Expert; and
- Documents in conjunction with the Contractor, the state of the site prior to commencing construction activities.

Environmental Expert of Engineer (DSC)

- Briefs the Contractor about the requirements of the Environmental Specification and/or EMMP, as applicable;
- Facilitates statutory compliance related activities for the IA and contractors;
- Advises 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 Contractor/project in terms of environmental compliance with the EMMP to the Engineer and UEAP, SDMA ; and
- Provides technical advice relating to environmental issues to the Engineer.

The Contractor

- Appoints one full-time suitably qualified and experienced Environmental Safeguard Officer for implementation of EMMP 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;
- Ensures any sub-contractors/ suppliers who are utilized within the context of the contract comply with the environmental requirements of the EMMP. The Contractor will be held responsible for non-compliance on their behalf;
- Supplies method statements for all activities requiring special attention as specified and/or requested by the Engineer or Environmental Expert (of Engineer) during the duration of the Contract;
- Provides environmental awareness training to staff;
- Bears the costs of any damages/ compensation resulting from non-adherence to the EMMP or written site instructions;
- Conducts all activities in a manner that minimizes disturbance to directly affected residents and the public in general, and foreseeable impacts on the environment;
- Ensures that the Engineer is timely informed of any foreseeable activities that will require input from the Environmental Expert (of Engineer);
- Receives complaints/grievances from public, discuss with DSC, F-PIU & IA and take steps for implementation of remedial measures in consultation with the Engineer (DSC), and reports to the Engineer (DSC) on the status in its each monthly report till satisfactory resolution.

157. The proposed sub-project will be implemented by the F-PIU, Tourism (GMVN). The F-PIU will be responsible for supervision and monitoring of day-to-day implementation of subprojects including EMMP.

158. 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 based on sub-project specific monitoring plans) or by the IAs for the monitoring works not included in the civil works contracts.

C. Environment Management

159. 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:

- Abide by all existing Environmental Regulations and requirements of the Government of Uttarakhand and Government of India, local level ULBs and Gram Sabha etc. during implementation.
- Compliance with all mitigation measures and monitoring requirements set out in the EMMP.
- Submission of a method statement detailing how the subproject 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 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.

160. The detailed provisions for specific environmental issues shall be as outlined in the EMMP table on impacts and mitigation measures. Key clauses are outlined in the following sections.

a. Quarry and Borrowing

161. The Contractor will identify and seek prior approval of the Engineer for quarrying and borrowing operations. Quarry and borrowing will be carried only from locations approved by the Department of Geology & Mining and State Pollution Control Board and no new quarries will be opened for the purposes of the project. Any deviation from the provisions will be immediately notified and approval of the Engineer is to be sought.
162. 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 (topsoil, fill material, gravel, aggregates, and other construction materials) shall not be allowed during rainy season unless covered by a suitable material. Storage on private property will be allowed if written permission is obtained from the owner or authorized lessee.
163. 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.

b. Debris Disposal

164. Dismantling of existing structures: Debris Disposal shall be maximum utilized and disposed as per norms after consultation with DSC/F-PIU/PMU Safeguard Specialist. Due care shall be taken that any material falling under hazardous waste category is disposed in accordance with Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and amendments till date Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and amendments till date & applicable norms.

c. Precautions for Protection of Environmental Measures

165. 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. For cleaning activities and operation of equipment, the Contractor will utilize such practical methods and devices as are reasonably available to control, prevent and otherwise minimize air/noise pollution.
166. Unless otherwise provided in the specifications, 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. The Contractor shall protect trees and vegetation from damage to the satisfaction of the Engineer.

d. Air, Water & Noise Pollution, and Soil Contamination

167. 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, the Contractor will take all precautions outlined in the EMMP to avoid the air, water, soil and noise pollution.
168. The Contractor shall monitor the environmental parameters periodically as specified in the monitoring plan and report to the Engineer.
169. The Contractor shall reduce the dust emission due to construction activities by regular water sprinkling in the affected areas.

170. All the construction equipment and vehicles shall have Pollution under Control (PUC) Certificate to ensure that no air pollution is caused due to operation of their equipment and vehicles.
171. All the construction equipment and vehicles should remain all time in good conditions up to satisfaction of site engineers.
172. 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.

e. Occupational & Community Health and Safety During Construction

173. 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 work areas, through application of preventive and protective measures consistent with international good practices, as reflected in internationally recognized standards. The contractors, Engineer, IAs and the EA will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by:
    - Providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances;
    - Providing appropriate equipment to minimize risks and requiring and enforcing its use;
    - Training workers and other staff; and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment;
    - Documenting and reporting occupational accidents, diseases, and incidents;
    - Having emergency prevention, preparedness, and response arrangements in place;
    - Provide First Aid facilities in all the work sites and workers camp and having qualified first aider to give first aid at the time of any accident. Contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camp. Contact information of Doctor, availability & location of first aid box shall be displayed in appropriate language both at work site and workers camp;
    - 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. Contractor will ensure proper sanitation and would provide soak pits and septic tanks for disposal of waste water and sewage;
    - 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 health and safety.
174. 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.

f. Post-Construction Clearance

175. 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.
176. 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 F-PIU) a certificate to this effect from the Owner.

D. Environmental Monitoring Plan

177. To ensure the effective implementation of mitigation measures and Environmental Management Plan during construction and operation phase of the sub-project, it is essential that an effective Environmental Monitoring Plan be followed as given in table below.

178. 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 air, water, soil, and noise. Indicators and Targets for Environmental Performance are provided in the annexed table (No.) in Section E of this EMMP. The frequency of sampling and selection of sampling sites are sub-project specific.

179. 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. The monitoring plan is outlined in Table 1 below.

Table VIIII-1: Environmental Monitoring Plan

Indicators	Parameters to be Monitored	Frequency	Responsibility
Pre- Construction Stage			
Legislation, permits and Agreements	Permissions,/ NoCs/Consents other statutory requirement	Once in Pre-Construction Stage	Contractor, DSC, IA & EA
Environmental Baseline Data Generation	Ambient Air Quality, Noise level, Water Quality & Soil characteristics as per parameters outlined in EMMP	Once in Pre-Construction Stage	Contractor
Debris disposal	Safe disposal of construction wastes including bituminous wastes	Random checks	Contractor
Construction Stage			
Legislation, permits and Agreements	Permissions,/ NoCs/Consents other statutory requirement	Continuous	Contractor, DSC, IA & EA
Dust suppression	No. of tankers for water sprinkling, Timing of sprinkling, Location of sprinkling (log books to be maintained)	Random checks	Contractor
Ambient air quality	RPM, SPM, SO_2, NO_x, 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	Contractor, to be monitored through approved Monitoring Agency
Ambient noise	Equivalent Day & Night Time Noise Levels	Once in a quarter where work is in progress and near sensitive receptors during construction stage	Contractor, to be monitored through approved Monitoring Agency
Water Quality	TDS, TSS, pH, Hardness, BOD, Faecal Coli form	Once in a quarter where work is in progress and near	Contractor, to be monitored through

Indicators	Parameters to be Monitored	Frequency	Responsibility
		sensitive receptors during construction stage	approved Monitoring Agency
Soil	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	Contractor, to be monitored through approved Monitoring Agency
Heritage Protection, if needed	Visual Inspection of works, compliance with ASI regulations and norms	Continuous	DSC/ASI/F-PIU
Supply of PPE	Usage of PPE on site, adequacy of equipment	Continuous	Contractor
Establishing Medical facilities	Access to health facilities for the construction workers	Continuous	Contractor
Accident record	No. of fatal accidents at work site, No. of injuries, No. of disabilities	Continuous	Contractor
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	Contractor
Operation & Maintenance Stage			
Water quality	All parameters as per CPCB standards	Once in year during operation stage	PMU, SDMA
Disposal of Solid Waste	Proper disposal of Solid Waste (domestic) generated shall be ensured in accordance with the prevalent norms		

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.

E. Environmental Budget

180. As part of good engineering practices in the project, there have been several measures as erosion prevention, rehabilitation of borrow ar eas, 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.

181. 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 and Uttarakhand Jal Sansthan as Implementing Agency and DSC to

ensure the compliance. 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.

182. These are small construction projects, therefore, it is not expected to cause much significant air, water, soil and noise pollution. The main EMMP cost will arise from monitoring of environmental parameters (air, soil, water and noise).

183. 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 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 preparation. 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 in the Table VIII-2 below.

184. 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 summary budget for the environmental management costs for the subproject based on construction period stipulated in the bidding document is presented in Table below:

Table VIIII-2: Environmental Management & Monitoring Costs

Sl. No.	Particulars	Stages	Unit	Total No.	Rate (INR)	Cost (INR) *	Source of fund
A.	Legislation, permits and Agreements	Consent to Establish and Consent to Operate for plants and machinery of the contractor					The cost for clearances, permits and consents required by IA & Contractors shall be borne by them respectively.
B.	Public consultations and information disclosure	Pre Construction phase Construction phases		Lump sum	5,00,000	5,00,000	
C. Environmental Baseline Data Generation							
1.	Ambient Air Quality monitoring	Pre-Construction	Per Sample	6	15000	90,000	Contractors cost
2.	Noise Quality monitoring			6	5,000	30,000	
3.	Water Quality monitoring			6	9,200	55,200	
4.	Soil			6	8000	48,000	
D.	**Environmental Monitoring**						
1	Air quality	Construction	Per sample	18	15,000	2,70,000	
2	Water quality		Per sample	18	9200	1,65,600	
3	Noise Levels		Per location	18	5000	90,000	
4	Soil			18	8000	1,44,000	
5.	Dust Suppression at subproject sites	construction and defect liability phases	lump sum		lump sum	500000	
6	Ambient Air Quality	Operation/ Defect Liability Period	Per Sample	6	15000	90,000	Implementing Agencies cost/ Contractors cost
7	Water quality		Per year	6	9200	55,200	
8	Ambient Noise Quality		Per	6	5000	30,000	

Sl. No.	Particulars	Stages	Unit	Total No.	Rate (INR)	Cost (INR) *	Source of fund
			Sample				
E.	**Capacity Building (Includes cost estimates for entire sub project area not included in the package costs)**						
1	Capacity Building expenses 2 sessions	EMP Training at Site Implementation of EMMP for field PIUs and Engineer			50,000	1,00,000	PMU/DSC
					Total INR	21,68,000	

F. Environmental Monitoring and Reporting

185. The PMU will monitor and measure the progress of EMMP implementation. Safeguards Staffs of IA / FPIU 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 FPIU, who will take follow-up actions, if necessary. FPIU/IA will submit quarterly monitoring and implementation reports to PMU. The PMU will submit semi-annual monitoring reports to ADB based on reporting of FPIU/ IA and its safeguards staff assessment of the implementation performance and its verification by the PMU safeguards specialist. PMU will also take corrective actions as required.

186. Monitoring reports will be posted in a location accessible to the public.

187. 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.

Table VIIII-3: Standardized EMMP to guide the contractor in mitigating environmental impacts

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
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/F-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	F-PIU, IA & PMU	
1.2	Education of site staff on general and Environmental Conduct[2]	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	F-PIU, IA & PMU	
		No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor	Contractor and EE	F-PIU, IA & PMU	
		All employees must undergo safety training and wear the necessary protective clothing /equipment	Contractor and EE	IA & PMU	

[2] 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	Fund Source
		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: • No alcohol / drugs to be present on site; • Measures for abatement of noise due to construction related activities and conduct of work force; • Construction staff are to make use of the 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); • Trespassing on private / commercial properties adjoining the site is forbidden; and • 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.	Contractor and EE	IA & PMU	
1.3	Social Impacts[3]	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 & F-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 & F-PIU	IA & PMU	
		Provide sign boards for pedestrians to inform	Contractor with the	IA & PMU	

[3] 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	Fund Source
		nature and duration of construction works and contact numbers for concerns/complaints.	Engineer, EE & F-PIU		
		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 cloth, temporary walls, or other suitable materials prior to the beginning of construction.	Engineer and EE	IA & PMU	
		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 F-PIU	IA & PMU	
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 F-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 F-PIU	IA & PMU	
2.3	Selection of materials and construction technologies, if not	Selection of materials will be from approved sources and construction technologies proposed	Engineer, EE, and F-PIU	IA & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
	carefully chosen, will adversely impact the aesthetic appeal of the destinations	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.			
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 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.	Engineer, EE, and F-PIU	Contractor, IA & PMU	
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 F-PIU	IA & PMU	
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	Contractor	Engineer, EE, and F-PIU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		the EE of DSC.			
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 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 though septic tanks and solid waste management though local ULB system or other alternate measures.	Contractor with the Engineer and EE	F-PIU, IA & PMU	
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	
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	Contractor with the Engineer	F-PIU, IA & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		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.			
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	F-PIU, IA & PMU	
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 arrangements. The Contractor shall obtain materials from approved quarries only after consent of the Department of Mines and Geology and District Administration. 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.	Contractor with the Engineer	F-PIU, IA & PMU	
3.6	Arrangement for construction water	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 & line agencies before finalizing the locations. The Contractor shall provide a list of locations and type of sources from where water for construction shall be extracted. The Contractor shall need to comply with the	Contractor with the Engineer	F-PIU, IA & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		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.			
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	
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, F-PIU & PMU	
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 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.	Contractor	EE of DSC, Engineer, F-PIU & PMU	
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	Contractor	Engineer, F-PIU & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		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.			
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, F-PIU & PMU	
3.12	Emission from Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery used for construction shall confirm 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 for all vehicles and machinery used during the contract period which shall be produced for verification whenever required.	Contractor	Engineer, F-PIU & PMU	
3.13	Noise Pollution	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. 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. Noise limits for construction equipment used in this project will be in conformity to the BIS/SPCB/CPCB standards Regular monitoring of ambient noise levels to	Contractor with the Engineer	EE, F-PIU & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		ensure compliance to Uttarakhand Environment Protection &Pollution Control Board standards.			
3.14	Material Handling at Site	Workers Employed on mixing cement, lime mortars, concrete etc., will be provided with protective footwear and protective masks and goggles. Workers, who are engaged in welding works, will be provided with welder˜s protective eye-shields. Workers engaged in stone breaking activities will be provided with protective goggles, masks, and clothing. 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.	Contractor	Engineer, F-PIU & PMU	
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 construction waste will be disposed around the project site indiscriminately.	Contractor	Engineer, F-PIU & PMU	
3.16	Safety Measures During Construction	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. 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	Contractor	Engineer, F-PIU & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		work. Contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camp. Contact information of Doctor, availability & location of first aid box shall be displayed in appropriate language both at work site and workers camp. The Contractor will conform to all anti-malaria instructions given to him by the Engineer. 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.			
3.17	Clearing of Construction of Camps and Restoration	Contractor to prepare site restoration plans for approval by the Engineer. The plan is to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, all rubbish burnt, 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.	Contractor	Engineer, F-PIU & PMU	
3.19	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, F-PIU & PMU	
3.20	Conflict with locals	Contractor shall ensure that mostly the local labourers are employed and migratory laborer shall be employed only in case of unavoidable	Contractor	Engineer, F-PIU & PMU	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		circumstances.			
3.21	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, F-PIU & PMU	
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	
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 alternate measures. 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. 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 & allied facilities Tourism Infrastructure and emergency rescue, evacuation facilities. As per Loan covenants of UEAP: a) EA shall prepare guidelines for new infrastructure to be developed under the sector;	IA, EA and Tourism Department	SDMA, PMU & GoUK	

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		(b) prepare master plan for redevelopment of Kedarnath Dham; and (c) undertake the carrying capacity and tourist regulation studies and measures thereof .			
4.3	Unhygienic condition due to poor maintenance of sanitation facilities and irregular solid waste collection	Tourism department 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, Tourism Department	IA / Dept. Of Tourism, GoUK	

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

G. Performance Indicator

188. The performance indicators of implementation of environmental management and monitoring plan has been provided in below table.

Table VIIII-4: Performance Indicators of EMMP

S.No	Performance Indicators	Target	Achievement in Semi-annually and annually
1.	Budget	Environmental Budget (EMMP Budget)	Expenditure till date
	Performance Indicators of Monitoring Plan		
2.	Ambient Air Quality	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
Performance Indicators of Environmental Management Plan			
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 Amebient air Qaulity ¯ NAAQS, 2009 standards, Drinking water ¯ IS:10500 etc, Residual Chlorine ¯ UEPPCB standards and CPHEEO manual for handling.	Implementation status of EMP items till date
15.	Reporting	List and number of Report to be submitted	List and number of reports submitted

H. Grievance Redress Mechanism

189. The EA will establish a mechanism to receive and facilitate resolution of affected peoples:concerns, complaints, and grievances about the Project:s environmental performance. The project-specific grievance redress mechanism (GRM) is not intended to bypass the government:s 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.
190. The PMU and PIUs will make the public aware of the GRM through public awareness campaigns. Grievances can be filed in writing using the Complaint Register and Complaint Forms (Appendix 5) or by phone with any member of the PMU or PIU. The contact phone number of the PIUs and the PMU will serve as a hotline for complaints and will be publicized through the media and placed on notice boards outside their offices and at construction sites. The safeguard documents made available to the public in an accessible version will include 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.
191. The PIUs will convene Grievance Redress Committees (GRC) within one week 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 committee forming. If the grievance cannot be solved, the PMU is notified to further advice on the situation with higher government and legal bodies.

192. 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.

193. 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.

194. 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

195. The proposed subproject components do not involve any interventions in and around the natural and cultural heritage destinations and have less significant (direct/indirect) environmental impacts. It is expected that the proposed subproject 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 Facility is provided to support the State of Uttarakhand, to enhance and develop the tourism sector as a key driver for economic growth.
196. 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 tourist areas, will better the environmental conditions and minimize the pollution related and aesthetic quality.
197. The specific management measures laid down in the IEE will effectively address any adverse environmental impacts due to the subproject. The effective implementation of the measures proposed will be ensured through the building up of capacity towards environmental management within the PMU/PIU 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.
198. On the basis of the IEE It is expected that the proposed project components have only minor, negative, localized, temporary and less significant environmental impacts. These impacts can be easily mitigated through adequate mitigation measures and regular monitoring during the Design, Construction and Post Construction Phase of the project. It is recommended that PMU/PIU should have monitoring responsibility in environmental issues of all program components and to ensure the environmental sustenance.
199. In conclusion, the sub-project will have overall beneficial impacts after completion in terms of enhancement in emergency preparedness by construction of LGFS, Multipurpose Halls, Night Shelters and promotion of climatic resilient tourism by construction of eco friendly dwelling units. Though the construction work entails very less civil works, since major part involves installation of LGFS structures, designed for the weather extremes and sensitivities of the affected areas. Negative impacts on water & air quality, noise levels, and soil during civil works & operation phase, which will be appropriately monitored and adequately mitigated. This report has not identified any comprehensive, broad, diverse or irreversible adverse impacts caused by the sub project. It is recommended that project can be implemented with proper mitigation measures to protect the environment.
200. The IEE carried out for the subproject 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 subproject; 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 subproject elements have been consulted with the stakeholders and no significant issues requiring redressal in terms of environmental safeguards exist.

201. Based on the findings of the IEE, the classification of the subproject as Category (s)B is confirmed, and no further special study or detailed EIA needs to be undertaken to comply with ADB SPS (2009).

Appendix 1

ENVIRONMENT CATEGORIZATION

A. Instructions

(i) The project team completes and submits the form to the Environment and Safeguards Division (RSES) for endorsement by RSES Director, and for approval by the Chief Compliance Officer (CCO).
(ii) The classification of a project is a continuing process. If there is a change in the project components or/and site that may result in category change, the Sector Division submits a new form and requests for re-categorization, and endorsement by RSES Director and by the CCO. The old form is attached for reference.
(iii) In addition, the project team may propose in the comments section that the project is highly complex and sensitive (HCS), for approval by the CCO. HCS projects are a subset of category A projects that ADB deems to be highly risky or contentious or involve serious and multidimensional and generally interrelated potential social and/or environmental impacts.

B. Project Data

Country/Project No./Project Title	:	**Loan 3055 – IND Uttarakhand Emergency Assistance Project (UEAP)**
Department/ Division	:	Tourism Department, Government of Uttarakhand
		Sub-Projects: **Reconstruction & Rehabilitation of Damaged Tourism Assets in Disaster Affected Rudraprayag District Uttarakhand**
Processing Stage	:	Sub-Project Appraisal Report (SAR) preparation
Modality	:	

[ ] Project Loan [ ] Program Loan [ ] Financial Intermediary [ ] General Corporate Finance
[ ] Sector Loan [ ] MFF [√] Emergency Assistance [ ] Grant
[ ] Other financing modalities:

C. Environment Category

[√] New [ ] Re-categorization – Previous Category [ ]

☐ Category A	{√} Category B	☐ Category C	☐ Category FI

D. Basis for Categorization/ Re-categorization (pls. attach documents):

[√] REA Checklist as **ANNEXURE A**
[ ] Project and/or Site Description
[ ] Other:

E. Comments

Project Team Comments:	**ESMC Comments:**
In Tourism Sector under ADB Emergency assisted UEAP, the **Reconstruction & Rehabilitation of Damaged Tourism Assets in Disaster Affected Rudraprayag District** is proposed to restore the loss to the Tourism sector due to the damage of its Tourist Rest Houses & other amenities. The proposed structures are designed in view of the environmental sensitivity of the area and also emergency preparedness measure since they will be utilized for evacuation purposes in case of any calamity in future. The proposed project of **Reconstruction & Rehabilitation of Damaged Tourism Assets in Disaster Affected Rudraprayag District** falls under the Environmental Category "B" as its potential environmental impacts are less adverse than those of category A projects. The impacts are site specific and can be mitigated readily through EMP.	The Project Category as per ADB Safeguard Policy (SPS) 2009 is "B" and IEE is required.

F. Approval	
Proposed by: Field PIU Garhwal (Garhwal Mandal Vikas Nigam)	**Reviewed by:** Environment Safeguard Specialist, PIU Tourism - Environment & Social Management Cell (ESMC)
(Sanjay Gupta) **(Sign. of Deputy Team Leader, Field PIU Garhwal)**	5/3/14 **(Sign. of Environment Safeguard Specialist, PIU Tourism)** Environment Officer UEAP-PMU
Date:	Date:
03/3/2014 S.L. Semwal General Manager (Tourism) Garhwal Mandal Vikas Nigam Ltd. Dehradun **(Sign. of Team Leader, Field PIU Garhwal-GMVN)**	13/3/14 **Endorsed by: Additional Project Manager, PIU Tourism**
Date:	Date:
Endorsed by: Authorised Signatory, Field PIU Garhwal-GMVN 03/3/2014 for Managing Director Garhwal Mandal Vikas Nigam Ltd. Dehradun	**Approved by: Project Manager, PIU Tourism**
Date:	**Chief Compliance Officer: The project is not coming under HCS.** Date:

RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST
Reconstruction and Rehabilitation of Damaged Tourism Assets in Disaster Affected Rudraprayag District of Uttarakhand

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

Country/Project Title: India/Loan 3055-IND Uttarakhand Emergency Assistance Project (UEAP): Reconstruction & Rehabilitation of Damaged Tourism Assets in Disaster Affected Rudraprayag District of Uttarakhand

Sector/Division: Tourism Department, Government of Uttarakhand

Screening Questions	Yes	No	Remarks
A. Project Siting is the project area adjacent to or within any of the following environmentally sensitive areas:			
▪ Cultural heritage site		√	
▪ Legally Protected Area (core Zone or buffer Zone)		₹	
▪ Wetland		NA	
▪ Mangrove		NA	
▪ Estuarine		NA	
▪ Special area for protecting biodiversity		₹	
b. potential environmental impacts will the project cause.			
• Impairment of historical/cultural areas: disfiguration of landscape or potential loss/damage to physical cultural resources?		₹	
• Disturbances to precious ecology (e.g. sensitive or protected areas) ?		₹	

Screening Questions	Yes	No	Remarks
• Alternation of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?		∓	
▪ Deterioration of surface water quality due to silt run off and sanitary wastes from worker-based camps and chemicals used in construction?	∓		Minor deterioration anticipated during the construction activities. The Environmental Management Plan (EMP) provides mitigation measures to reduce the impacts Minor works involving installation of LGFS structures, hence no worker camps envisaged.
▪ Increased air pollution due to project construction and operation	∓		During construction phase only minor amount of dust may arise which should be mitigated through water sprinkling, no other significant emission is expected as no use of heavy equipment is proposed and work involves installation of LGFS structures.
▪ Noise and vibration due to project construction or operation?	∓		Anticipated during the construction activities. The Environmental Management Plan (EMP) provides mitigation measures to reduce the impacts.
▪ Disproportionate impacts on the poor, women and children, indigenous people or other vulnerable groups?		∓	
▪ Poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?		∓	
▪ Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		∓	
▪ Social conflicts if workers from other regions or countries are hired?		∓	
▪ Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems) ?		∓	
▪ Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological and radiological hazards during project construction and operation?		∓	
▪ Risks to community health and safety due to the transport, storage and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		∓	

Screening Questions	Yes	No	Remarks
▪ Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		₸	LGFS structures are designed to ensure safety of the community in case of natural calamity or accidental causes.
▪ Generation of solid waste and/or hazardous waste?	₸		Waste disposal shall be done in legitimate manner and will not cause water pollution.
▪ Use of chemicals?		₸	
▪ Generation of wastewater during construction or operation?	₸		Construction activities involve installation of LGFS structures only which does not involve much water usage. During operation provisions for waste water management shall be ensured.

Climate Change and Disaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	Yes	No	Remarks
▪ Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)?	₸		Hazard prone area, hence structures are designed for ensuring resistance
▪ Could changes in precipitation, temperature, salinity, or extreme events over the Project lifespan affect its sustainability or cost?		₸	
▪ Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g. high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?		₸	
▪ Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., increasing traffic or housing in areas that will be more prone to flooding, by encouraging settlement in earthquake zones)?		₸	

Appendix 2

Public Consultation Record

Name of Project :: Uttarakhand Emergency Assistance Project (UEAP)
Name of the Project ::

Project Package No. :: UK/UEAP-T(GMVN)/DDN/06 (ADB LOAN No. 3055 - IND)
Locations to be Improved ::
Place of Public Consultation ::
Tehsil ::
District :: RUDRAPRAYAG
Date ::

List of Stakeholders/ Participants in Public Consultation Meeting(PCM)

Sl.No.	Name and Address	Occcupation	Signature
1	Birendra Rana Jakholi	Generalist	
2	Narendo Singh Jakholi	Banker	
3	Akhilesh Bhatt Jakholi	Business	
4	[illegible]	[illegible]	
5	Vijay Singh Chuhan Jakholi	Service	
6	Sanjeet Puspwan Jakholi	Computer center	
7	[illegible]	[illegible]	
8	[illegible]	[illegible]	
9	Veeradhar Bhatt	Photo State	
10	[illegible]	[illegible]	
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Public Consultation Record

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Tehsil ::

District :: RUDRAPRAYAG

Date ::

List of Stakeholders/ Participants in Public Consultation Meeting(PCM)

Sl.No.	Name and Address	Occupation	Signature
1	श्री संजय पुरी - तिलवाड़ा	कृषि	[illegible]
2	" शम्भू प्रसाद "	दुकानदार	[illegible]
3	श्रीमती कौशल्या देवी रायड़ी तिलवाड़ा	नौकरी	[illegible]
4	श्रीमती [illegible] देवी	"	[illegible]
5	श्रीमती [illegible] देवी	"	[illegible]
6	श्री - [illegible] सिंह	"	[illegible]
7	श्री अनिल रावत	दुकानदार	अनिल
8	" पवन रावत - तिलवाड़ा	ड्राईवर	Pawan
9	" देवेन्द्र पुरी	दुकानदार	[illegible]
10	" [illegible] भट्ट - तिलवाड़ा	[illegible]	[illegible]
11	शान्ति भट्ट - तिलवाड़ा	विद्यार्थी	[illegible]
12	विक्रम सिंह [illegible] - गौड़	ग्राम प्रधान गौड़	[illegible]
13	[illegible]	प्रधान गौड़	[illegible]
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List of Stakeholders/ Participants in Public Consultation Meeting(PCM)

Sl.No.	Name and Address	Occupation	Signature
1	गिरजा शंकर त्रियुगीनारायण	तीर्थ पुरोहित 9927992423	गिरजा शंकर भट्ट
2	बृजमोहन बिजल्वाल त्रियुगीनारायण	" 9756820684	
3	उमानाथ प्रसाद भट्ट "	" 9756820557	
4	दीनानाथ गैरोला "	— —	दीनानाथ
5	सोहनलाल सेमवाल "	— —	सोहन लाल
6	महादेवप्रसाद गैरोला "	9456533657	महादेव
7	इन्द्रमोहन भट्ट " तीर्थ पुरोहित	8958658200	इन्द्रमोहन
8	महेशचन्द्र पुरोहित तीर्थपुरोहित	7351675818	महेशचन्द्र
9	[illegible] त्रियुगीनारायण	तीर्थपुरोहित 8449191522	[illegible]
10	हीरालाल शर्मा त्रियुगीनारायण "	तीर्थपुरोहित	हीरालाल शर्मा
11	कृष्णानन्द तिवारी त्रियुगीनारायण	तीर्थपुरोहित 9761888060	[illegible]
12	रामस्वरूप भट्ट [illegible]	तीर्थपुरोहित 8449744276	[illegible]
13	पारेश्वर [illegible] त्रियुगीनारायण	9639193156	[illegible]
14	[illegible]		
15	गोविन्द राम "	तीर्थ पुरोहित 9411379847	
16	दयाराम शर्मा " " "	8057922337	[illegible]
17	[illegible]	9927415696	[illegible]
18	Kapish Prasad Bhatt	Social Worker 9639193535	[illegible]
19	[illegible]	9639193045	[illegible]
20	[illegible]	— —	[illegible]
21	श्री कृष्णानन्द तिवारी [illegible]	[illegible]	[illegible]
22	श्री [illegible]	[illegible]	[illegible]
23	महादेव भट्ट	त्रियुगीनारायण त्रियुगीनारायण	9858305
24	[illegible]	[illegible]	महादेव 705
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Public Consultation Record

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Date ::

List of Stakeholders/ Participants in Public Consultation Meeting(PCM)

Sl.No.	Name and Address	Occcupation	Signature
1	राजेन्द्र सिंह पंवार रामपुर	[illegible]	9639645434
2	देवी सिंह रावत रामपुर	होटल	9557443100
3	राहुल सिंह रावत रामपुर	होटल	9568240127
4	[illegible]	होटल	8650833452
5	[illegible]	[illegible]	9997999964
6	[illegible]	[illegible]	9639792781
7	[illegible]	होटल	8958804682
8	[illegible]	[illegible]	7351729367
9	[illegible]	[illegible]	8958651780
10	[illegible]	[illegible]	9927469410
11	Madhav Singh Rawat	Service	8979295810
12	[illegible]	[illegible]	7110368537
13	[illegible]	[illegible]	9639210297
14	[illegible]	[illegible]	9639201295
15	[illegible]	[illegible]	8979201113
16	[illegible]	[illegible]	8650820957
17	[illegible]	[illegible]	9639201491
18	[illegible]	[illegible]	8006044022
19	[illegible]	[illegible]	—
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Public Consultation Record

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Place of Public Consultation ::
Tehsil ::
District :: RUDRAPRAYAG
Date ::

List of Stakeholders/ Participants in Public Consultation Meeting(PCM)

Sl.No.	Name and Address	Occcupation	Signature
1			
2	Ashutosh Pandey		
3	Kamal Rawat		
4	Anil Kumar Bhatt	Shop Keeper	
5	Rajesh Kernadakh	Shop.	
6	Anil Gairola	Shop	
7	Rupesh Semwal		
8	S.P. Goswami.	Teaching.	
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14	Sandeep		
15	Hemant Kumar Tiwari	Employee	
16	Tejpal Gusain		
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Public Consultation Record

Name of Project :: Uttarakhand Emergency Assistance Project (UEAP)
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Tehsil ::
District :: RUDRAPRAYAG
Date ::

List of Stakeholders/ Participants in Public Consultation Meeting(PCM)

Sl.No.	Name and Address	Occupation	Signature
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Appendix 3

Site Photographs

Plate 1: Damaged Tourism Asset Gaurikund

Plate 2: Damaged Tourism Asset Gaurikund

Plate 3: Proposed site for Night Shelter at Sonprayag

Plate 4: Damaged Tourism Asset at Sonprayag

Plate 5: Site for construction of LGFS, Multipurpose Hall and Meditation centre at Tilwara

Plate 6: TRH Tilwara

Plate 7: Site for construction of LGFS units at Triyuginarayan

Plate 8: Site for construction of LGFS units at Triyuginarayan

Plate 7: TRH Guptkashi

Plate 8: Site for construction of LGFS units at Guptkashi

Appendix 4

MoEF issued specific guidelines in July 2013 for State of Uttarakhand for expediting forest clearances to carry out the emergency work in forest areas (excluding works in national parks and sanctuaries)

F. No. 11-298/2013-FC
Government of India
Ministry of Environment and Forests
(FC Division)
*****

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi - 110 510.
Dated: 24th July, 2013

To

The Principal Secretary (Forests),
Government of Uttrakhand,
Dehradun

Sub: General approval under section 2 of the Forest (Conservation) Act, 1980 for diversion of forest land, not more than one hectare in each case for restoration/reconstruction including realignment of roads damaged in the recent floods and construction of helipads and ropeways in flood affected areas in Uttarakhand.

Sir,

It has been brought to notice of this Ministry that recent floods in Uttarakhand have caused extensive damage to the road network in the State. Restoration of roads damaged/washed out during these floods may require minor realignment also. It has also been brought to notice of this Ministry that expeditious delivery of relief and rehabilitation services to flood affected areas requires creation of a network of helipads and ropeways. Formulation and processing of proposals to obtain approval under the Forest (Conservation) Act, 1980 for restoration/reconstruction including realignment of roads/ bridges and construction of helipads and ropeways in forest areas may take some time, which may hamper the delivery of relief and rehabilitation services to the flood affected areas.

The Central Government, keeping in view the extraordinary situation and also keeping in view the urgent necessity to restore and strengthen the communication network to ensure expeditious rehabilitation of the flood affected areas, hereby accords general approval under section 2 of the Forest (Conservation) Act, 1980 for diversion of forest land, not more than one hectare in each case, for restoration/reconstruction including realignment, by the Government Departments, of roads/ bridges damaged in the recent floods and construction of helipads and ropeways in flood affected areas in Uttarakhand, subject to fulfillment of the following conditions:

(i) General approval shall be applicable for restoration/reconstruction including realignment of the existing roads/bridges damaged by the recent floods and construction of helipads and ropeways only. Use of forest land for construction of new roads will be governed by the existing provisions;

(ii) User agencies shall explore all feasible alternatives to minimize use of forest land for restoration/ reconstruction including realignment of roads/ ropeways. Additional forest land to be used for restoration/ reconstruction including realignment of existing roads/bridges and construction of helipads and ropeways shall be restricted to the bare minimum and shall be used only when it is unavoidable;

(iii) Additional forest land utilized for restoration/reconstruction including realignment of a stretch of road/ bridge and construction of helipads and ropeways shall not be more than 1.00 hectare in each case;

(iv) Revised alignment of each stretch of the road/ bridge and location of each helipad and ropeway shall be jointly finalized by the representative of the user agency and the State Forest Department;

(v) Trees standing on the forest land proposed to be utilized for restoration/ reconstruction including realignment of the existing roads/ bridges and construction of helipads and ropeways shall be jointly enumerated by representatives of the user agency and the State Forest Department, before felling;

(vi) For every tree cut for restoration/ reconstruction including realignment of the existing roads/ bridges and construction of helipads and ropeways in accordance with this approval, at least ten trees shall be planted by the user agency;

(vii) State Forest Department shall within six months realize NPV of the forest land utilized for restoration/reconstruction including realignment of the roads/ bridges and construction of helipads and ropeways from the user agency and transfer the same to the ad-hoc CAMPA under intimation to this Ministry;

(viii) Nodal Officer, Forest (Conservation) Act, 1980, Uttarakhand shall within one year submit to the Regional Office (Central Zone), Lucknow and to this Ministry, survey of India toposheet, indicating original as well as revised layout of each stretch of road/ bridge, for whose restoration/ reconstruction including realignment forest land in accordance with this approval has been utilized. Survey of India toposheet, indicating location of each helipad and ropeway for whose construction forest land in accordance with this approval has been utilized, shall also be submitted to the Regional Office (Central Zone), Lucknow and to this Ministry within one year. Such survey of India toposheets shall be authenticated by the concerned Divisional Forest Officer and the representative of the user agency;

(ix) Nodal Officer, Forest (Conservation) Act, 1980, Uttarakhand shall submit half yearly report on the forest land utilized for restoration/ reconstruction including realignment of the roads/bridges and construction of helipads and ropeways to the Regional Office (Central Zone), Lucknow and to this Ministry;

(x) This dispensation of general approval shall not be valid for use of forest land located within the National Parks and Wildlife Sanctuaries; and

(xi) **This approval shall be valid for a period of one year from the date of its issue.**

Yours faithfully,

(H.C. Chaudhary)
Assistant Inspector General of Forests

Copy to:-

1. Shri Sanjay Lohia, Director, Prime Minister's Office, New Delhi for kind information.
2. The Cabinet Secretariat, New Delhi for kind information.
3. The Secretary, Ministry of Home Affairs, New Delhi for kind information.
4. The Principal Secretary, Public Works Department, Government of Uttrakhand Dehradun.
5. The Principal Chief Conservator of Forests, Government of Uttarakhand, Dehradun.

6. The Nodal Officer, Forest (Conservation) Act, 1980, Government of Uttarakhand, Dehradun.
7. Regional Office (Central Zone), Ministry of Environmental and Forests, Government of India, Lucknow.
8. All AIGs/ Directors in the Forest Conservation Division MoEF.
9. The Director, RoHQ Division, MoEF.
10. Sr. PPS to DGF&SS, MoEF.
11. PPS to Addl. DGF (FC), MoEF.
12. PS to IGF (FC), MoEF.
13. Guard File.

(H.C. Chaudhary)
Assistant Inspector General of Forests