Initial Environmental Examination

Project Number: 47229-001
December 2014

IND: Uttarakhand Emergency Assistance Project

Submitted by

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

Asian Development Bank

17/11 ~~LBS~~/AS/Aamit

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

Uttarakhand Tourism

GMVN

Project Implementation Unit (PIU),
Uttarakhand Emergency Assistance Project (Tourism Sector Program),
Garhwal Mandal Vikas Nigam Limited (GMVN),
74/1, Rajpur Road, Dehradun – 248001, Uttarakhand, India
Tel:+91-135-2746817/2749308/2742171, Fax:+91-135-2746847,
Email: gmvn@gmvnl.com/ueap.piutourism.gmvn@gmail.com
Websites: www.gmvnl.com

Ref.: 228/PIU-GMVN Dated: 13/11/14

To,

The Country Director
Asian Development Bank
South Asia Department
India Resident Mission
4 San Martin Marg, Chanakyapuri
New Delhi – 110021, India

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Sub.: ADB Loan No. 3055-IND, UEAP (Tourism)
Reg: Submission of Corrected IEE along with Compliance Sheet of ADB Comments for Construction of FRP/Hybrid Huts in 3-Diasaster Affected Districts of Garhwal Division under UEAP Works

Madam,

This is with reference to your letter dated 22 October 2014 with regards to the IEE of Construction of FRP/Hybrid Huts in 3-Diasaster Affected Districts of Garhwal Division under UEAP

Please find enclosed the Corrected IEE along with the Compliance Sheet of ADB Comments of the same. This is for your kind perusal and record please.

Yours Sincerely,

(Dr Anand Srivastava)
Program Manager
UEAP-PIU (Tourism), GMVN

Encl.: As Above (Hard Copy as well as a CD).

Copy to:

1. Program Director, PMU, UEAP for kind information please
2. Dy Program Manager, UEAP-PIU(T), GMVN
3. Project File

Program Manager
UEAP-PIU (Tourism), GMVN

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Compliance Sheet ADB comments on IEE of Construction of FRP/ Hybrid Huts in 3 Disaster Affected Districts of Garhwal Division under Uttarakhand Emergency Assistance Project

S. No.	Comments/Suggestions	Status of Compliance	Remarks
1	We refer to the submission of revised initial environmental examination (IEE) report incorporating ADB observation communicated through latter of 5 August, 2014 for construction of FRP/ hybrid huts at 12 locations in three disaster affected districts, Uttarkashi, Chamoli, and Rudraprayag of Garhwal division, proposed for financing under UEAP (tourism portion). We also note that no activities related to roads are included in the scope of works.	All the sites proposed under the sub project through contract packages 03, 04 and 05 are accessible by existing roads.	This was clarified vide email dated 23 Sep 2014
2	We would like to request that the documents are checked thoroughly for consistency and appropriate references prior to submission to ADB. We observe that (i) the change in the name from "Ministry of Environment & Forest" to "Ministry of Environment, Forests and Climate Change" or inclusion of implantation agency Garhwal Mandal Vikas Nigam is not in the list of abbreviation is not reflected; (ii) Para 72 states 'ambient air quality ' in place of 'ambient noise level' , and (iii) while most of the data provided in table IV-10 (Para 105, page 52) is for year 2011, the source is stated to be dated March, 2007. We request that such oversights in the documents may please be avoided. We also like to request that the data provided in the report should be appropriately cross referenced.	(i) GMVN, KMVN and MoEF&CC has been added to list of abbreviations as per your comment. (ii) IEE report stands corrected at Para no 72 Page 35 (now page 30). (iii) The reference source has been corrected in Table IV-10 (now Para 106 Page 44). (iv) All the data stands cross referenced in the revised report. Data at Para 40, 87, 88, 91, 103 and 130 has been updated with latest	The corrections were incorporated earlier and submitted through email dated 23 Sep 2014.

DPIU

S. No.	Comments/Suggestions	Status of Compliance	Remarks
		data. Figure IV-3 is updated and added table IV-13.	
3	In case of any changes in the location for any of the subprojects, you are requested to reassess the environmental implications associated with such changes, inform ADB immediately, and proceed further with works only after securing ADB's prior approval. Kindly follow the guidelines outlined in the environmental assessment and review frameworkagreed for UEAP.	Noted for compliance.	
4	Please ensure compliance with Para 3 and Para 7 of ADB letter 5 August, 2014. Kindly incorporate our observation and resubmit the corrected IEE report for ADB master records. The corrected IEE would then be disclosed on ADB website in accordance with ADB's Public Communication Policy, 2011 and SPS 2009. Please retain all backup documents, and photographs associated to respond to quarries, if any.	Compliance with serial numbers 3 and 7 of ADB letter 5 August 2014 shall be ensured.	

DPW

Uttarakhand Tourism

GMVN

Garhwal Mandal Vikas Nigam Limited

(A Government of Uttarakhand Undertaking)
under Department of Tourism
UTTARAKHAND EMERGENCY ASSISTANCE PROJECT
(Tourism Sector Program)
ADB LOAN No. 3055 – IND

INITIAL ENVIRONMENTAL EXAMINATION REPORT (IEER)

For

CONSTRUCTION OF FRP/HYBRID HUTS IN 3 DISASTER AFFECTED DISTRICTS UTTARKASHI, RUDRAPRAYAG & CHAMOLI OF GARHWAL DIVISION

[Package No.: UK/UEAP-T(GMVN)/DDN/03
UK/UEAP-T(GMVN)/DDN/04 &
UK/UEAP-T(GMVN)/DDN/05]

Submitted by:
The Program Manager
Project Implementation Unit (PIU),
Uttarakhand Emergency Assistance Project (Tourism Sector Program)
Garhwal Mandal Vikas Nigam Limited (GMVN),
74/1, Rajpur Road, Dehradun – 248001, UK

Initial Environmental Examination

November 2014

India: Construction of FRP/ Hybrid Huts in 3 Disaster Affected Districts of Garhwal Division 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.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

Abbreviations

ADB	Asian Development Bank
CFE	Consent for Establishment
CFO	Consent for Operation
dB	Decibel
IEE	Initial Environmental Examination
EA	Executing Agency
EIA	Environmental Impact Assessment
EC	Environmental Clearance
FRP	Fibre Reinforced Plastic
GMVN	Garhwal Mandal Vikas Nigam
GoI	Government of India
GoU	Government of Uttrakhand
Ha	Hectare
KMVN	Kumoan Mandal Vikas Nigam
Leq	Sound level
MFF	Multitranche Financing Facility
MoEF&CC	Ministry of Environment, Forests and Climate Change
NAAQM	National Ambient Air Quality Monitoring
NA	Not Applicable
O & M	Operation and Maintenance
PMU	Project Management Unit
PWD	Public Works Department
PIU	Project Implementation Unit
PUF	Polyurethane Foam
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
UEAP	Uttarakhand Emergency Assistance Project
UJS	Uttarakhand Jal Sanasthan
SPM	Suspended Particulate Matter
SO_2	Sulphur dioxide
ST	Scheduled Tribes
SC	Scheduled Castes
UJS	Uttaranchal Jal Sansthan

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EXECUTIVE SUMMARY

1. The Uttarakhand Emergency Assistance Project for Tourism sector envisages economic and social recovery in Uttarakhand in the aftermath of the June 2013 disaster. The project will assist the Government of Uttarakhand (GoU) to meet reconstruction needs due to disaster in Uttarakhand in June 2013 that severely affected several parts of Uttarakhand. The districts of Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi were directly affected by this disaster. These regions are among the country's most important pilgrimage centers which suffered massive losses as the disaster occurred during the peak pilgrimage season. Several towns have been washed away by the unprecedented flash floods and landslides and a large number of houses, public buildings, roads and bridges, urban and rural infrastructure have been damaged.
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. 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, construction of Fibre Reinforeced Plastic (FRP)/Hybrid/Polyurethane Foam(PUF) huts are proposed in the disaster affected district of Rudraprayag, Uttarkashi and Chamoli are proposed so as to increase the accommodation capacity of the existing Rest houses run by GMVN 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 urban areas.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 locatedinside 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 SDMAwebsite.
12. **Environmental Management Plan**.The Environmental Management and Monitoring Plan (EMMP), to form part of the bidding documents, adopted the procurement package schcmc and facilitate subsequent compliance monitoring by the contractor.

Conclusion. The initial environmental examination ascertains that the sub-project is unlikely to cause any significant environmental impacts. No additional studies or need of undertaking detailed EIA is envisaged at this stage. The Executing Agency shall ensure that EMP and EMoP is included in Bill of Quantity (BOQ) and forms part of bid document and civil works contract. The same shall be revised if necessary during project implementation or if there is any change in the project design and with approval of ADB.

The IEE is based upon the Environmental Assessment and Review Framework (EARF) which is in consistent with the ABD's Safeguard Policy Statement (SPS) 2009. The subproject is classified as —Category "B" for Environment and does not require further Environmental Impact Assessment. In the present IEE certain baseline data is not available forwater, 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) throughKumaon Mandal Vikas Nigam Limited, and Garhwal Mandal 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 main purpose of this IEE is to provide environmental assessment of the proposed Construction of FRP Huts in 3 Disaster Affected Districts of Garhwal. 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. The key environmental impacts on natural and human environments have been assessed.
5. The Objectives of this Initial environmental examination (IEE) were to:

- Assess the existing environmental conditions in the project area including the identification of environmentally sensitive areas
- Assess the proposed planning and development activities to identify their potential impacts, evaluate the impacts, and determine their
- Assess the compliance with ADB environmental safeguard requirements and applicable environmental laws,
- Incorporate mitigation measures in the project design and preparation of environmental management and monitoring plan.

6. This IEE has been carried out to ensure that the potential adverse environmental impacts are appropriately addressed in line with *ADB Safeguard Policy Statement, 2009*

D. Extent of IEE

7. 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

8. The IEE has been largely structured as per SPS, 2009 ADB's Environmental Assessment Guidelines (2003) and environmental safeguards- A Good Practice Source Book (December 2012). Following this introduction this report contains seven more sections including (ii) Policy, Legal and Administrative Framework, (iii) Description of Project, (iv) Description of Environment, (v) Anticipated Impacts and Mitigation Measures, (vi) Information Disclosure, Consultation, and Participation, (vii) Environment Management Plan and Grievance Redress Mechanism, and (viii) Conclusion and Recommendation

9. This IEE is based mainly on secondary sources of information, field reconnaissance surveys, review of legal requirements, identification of impacts and mitigation measures, impact assessment and institutional review and public consultation undertaken specifically for this study was also undertaken.

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&CC	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&CC 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 Working in Protected Area	The Indian Wildlife (Protection) Act, 1972, amended 1993, The Wild Life (Protection) Amendment Act, 2002 This Act provides guidelines for protection of Wild animals, birds and plants] and for matters		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
		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 (UEPPCB) - 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
4	Consents to establish &operate Hot mix plant, Crushers, Batching Plant	Air (Prevention and Control of Pollution) Act 1981	UEPPCB	Yes	Contractor	
5	Authorization for Disposal of Hazardous Waste	Hazardous Waste (Management and Handling) Rules 1989 as amended 2003	UEPPCB	No	Contractor	
6	Consent for Disposal of Sewage from Labour camps	Water (Prevention and Control of Pollution) Act 1974	UEPPCB	No	Contractor	

S. No	Clearances	Acts/Rules/Notifications/Guidelines and Application to Road Projects	Concerned Agency	Applicable to Contract package	Responsibility	Status of Compliance
7	Use of Fly ash within 100 kms around Thermal Power plants	Fly Ash Notification, 1999 as amended up to 17th August 2003:	MoEF&CC	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	UEPPCB	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 explosives	Petroleum Rules, 2002. Hazardous Waste (Management and Handling) Rules 1989.	Commissioner of Explosives and UEPPCB	No	Contractor	
	C. Implementation Stage					
13	Consent to Establish & Cosent to Operate for Installation of Generators	The Air (Prev. & Con. of Pollution) Act, 1980	UEPPCB	Yes	GMVN	

III. DESCRIPTION OF THE PROJECT

A. Project Location

11. The locations for FRP /Hybrid Huts have been identified in these areas because the effect of climatic mishaps in this part of Uttarakhand is maximum, and also some of the most frequented tourist destinations for adventure and pilgrim are situated here. This area includes pilgrim destinations of entire "Char Dham Circuit", namely Badrinath in Chamoli, Kedarnath in Rudraprayag, Gangotri & Yamunotri in Uttarkashi district. Thus three districts of the State have been identified as project area in Garhwal region.

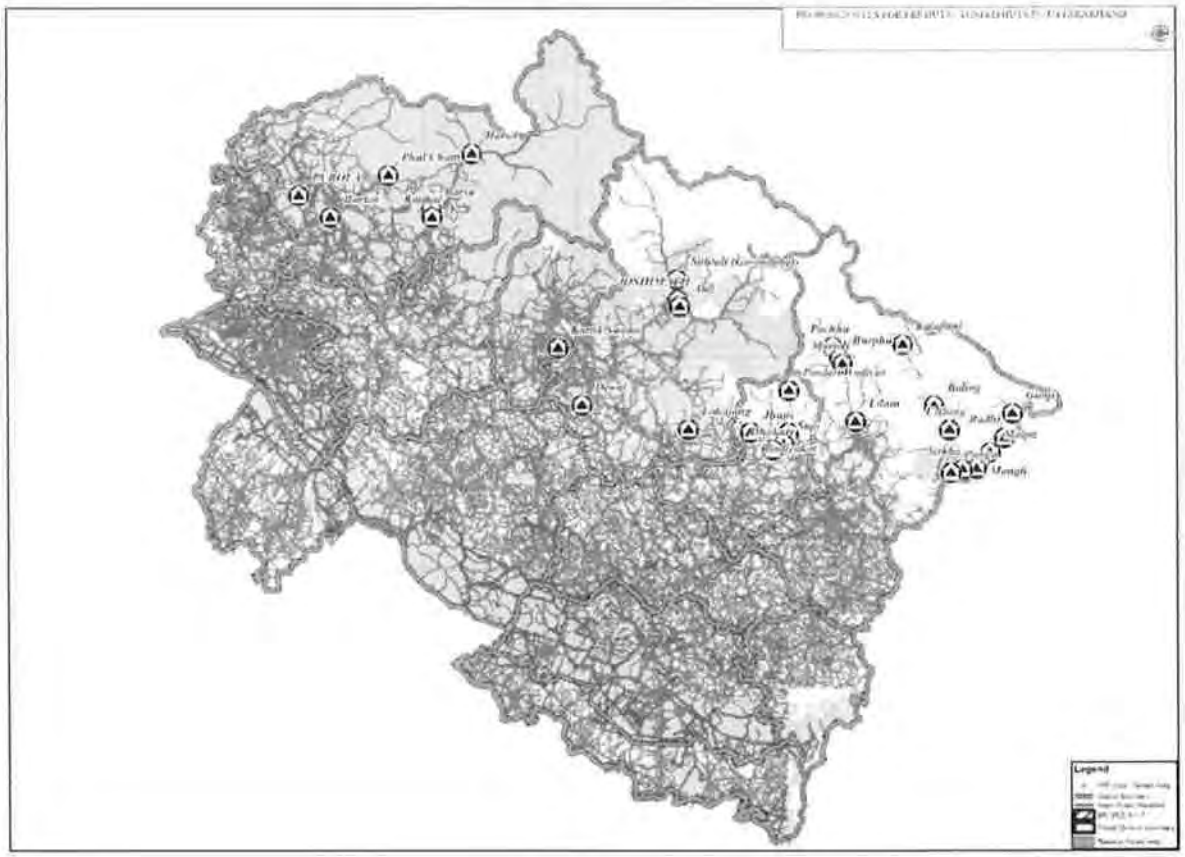


Figure 1.Map of Uttarakhand showing proposed locations of FRP/Hybrid Huts

B. Proposed Category of the Project

12. Pursuant to the requirements of the ADB Safeguard Policy Statement (2009) proposedConstruction of FRP Huts in 3 Disaster affected Districts of Garhwal 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 Garhwal Mandal Vikas Nigam. Consistent with the Environmental Assessment and Review

Framework, the subproject was screened using the ADB rapid environmental assessment (REA) checklist-General (Tourism).

13. 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

14. 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.
15. As a part of Tourism Restoration Drive, it was decided to construct dwelling units in the form of cottages/ tented accommodation made of eco- friendly FRP material in disaster affected Districts. This would compensate for the loss of tourist accommodation units and would involve minimum concrete works thus saving time and would be in tune with the ecological balance of the region. 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 the State during the tourist season. Provision of affordable accommodation to tourists at various destinations in the form of cottages which are aesthetically and eco-friendly designed, taking into consideration the natural landscape of the area will be a boost for tourism sector. These accommodation facilities would encourage tourists to stay at most frequented locations. These huts can be either extension to existing Tourist Rest Houses or new units, en route some popular destinations in the affected areas.

D. Subproject Description

16. The locations for FRP huts/ tented accommodation have been identified in these areas because the effect of climatic mishaps in this part of Uttarakhand is maximum, and also some of the most frequented tourist destinations for adventure and pilgrim are situated here. This area includes pilgrim destinations of entire "Char Dham Circuit", namely Badrinath in Chamoli, Kedarnath in Rudraprayag, Gangotri & Yamunotri in Uttarkashi district. Thus three districts of the State have been identified as project area in Garhwal region.

a. Pandukeshwar

17. Pandukeshwar is a sacred place located in route to abode of Lord Vishnu Badrinath at an elevation of 1829 metres. As per belief, Pandukeshwar is the place where king Pandu, father of Pandavas of Mahabharat Epic, worshipped Lord Shiva. There are two famous temples in Pandukeshwar, Yogdhyan Badri Temple one of the Sapta Badri or

seven Badri's and other is Lord Vasudev Temple. Yogdhyan Badri Temple is the abode of Utsava-murti in winters when Badrinath is closed.

18. In order to compensate for the loss of accommodation facilitics, 20 bedded (10 huts) FRP/Hybrid structure is proposed to be created on available Power Transmission Corporation of Uttarakhand Ltd (PTCUL) land at Pandukeshwar.

Proposed location for construction of FRP/Hybrid Huts at Pandukeshwar

b. Joshimath

19. Jyotirmath, also known as Joshimath is a city and a municipal board in Chamoli District in the Indian state of Uttarakhand. Located at a height of 6150 feet it is gateway to several Himalayan mountain climbing expeditions, trekking trails and pilgrim centres like Badrinath. It is home to one of the four cardinal pīthas established by Adi Shankara.
20. It is the uttarāmnāya matha or northern monastery, one of the four cardinal institutions established by Adi Shankara, the others being those at Shringeri, Puri and Dwaraka. Their heads are titled "Shankaracharya". According to the tradition initiated by Adi Shankara, this matha is in charge of the Atharvaveda. Jyotirmath is close to the pilgrimage town of Badrinath. This place can be a base station for travellers going to Guru Gobind Ghat or the Valley of Flowers National Park. The temple Narasimha, is enshrined Badrinarayan along with a pantheon of deities. The presiding deity Lord Narasimha is believed to have been established by Adi Sankara. It is one of the "Divya Desams", the 108 temples of Vishnu revered by the 12 Tamilpoet-saints or Alvars.
21. In order to compensate for the loss of accommodation facilities, 10 (5 Huts) bedded accommodation facilities in the form of FRP/Hybrid Structure is proposed to be created on available Tourism Department land.

Proposed location for construction of FRP/Hybrid Huts at Joshimath

c.Auli

22.Auli is an important ski destination in the Himalayan Mountains of Uttarakhand, India. Auli, also known as a 'bugyal' or Auli Bugyal, in the regional language, which means meadow, is located at an elevation of 2500 to 3050 meters above sea level. It was only in the recent time, after the creation of new state Uttarakhand (formerly Uttaranchal) carved out from Uttar Pradesh, Auli was marketed as a tourist destination. The state is called "Dev Bhoomi" which means "Land of Gods" as there are important pilgrimage destination in this state mainly the '**Char Dham**' (Gangotri-Yamunotri-Kedarnath-Badrinath). Auli lies on the way to Badrinath. Auli is surrounded by coniferous and oak forests, with a panoramic view of the lofty peaks of the greatest mountain range in the world, the Himalayas. The slopes here provide enough thrill to professional skier and novice as well. The Garhwal Mandal Vikas Nigam Limited (GMVNL) a govt agency which takes care of this resort, and Uttaranchal Tourism Department conduct winter sports competitions at this place to encourage skiing in India. Auli also boasts the Asia's longest - 4 km - cable car (Gondola). There is a training facility of Indo-Tibetan Border Police. A small temple having connection to great epicRamayana is also present.

23. To enhance the bed capacity, 5 huts in the form of FRP/Hybrid structures are proposed to be constructed on available land at existing GMVN campus.

Proposed location for construction of FRP/Hybrid Huts at Auli

d.Deval

24. Deval is located in Tharali Tehsil of Chamoli District. It is also the main route for Nanda Devi Raj Jaat and also for the trekkers who trek to Roopkund, Bedni and Ali Bugyal. A 10 bedded TRH run by GMVN is located here. In order to enhance the bed capacity, 5 huts in the form of FRP/Hybrid structures are proposed to be constructed on available land at existing GMVN campus.


Proposed location for construction of FRP/Hybrid Huts at Deval

e. Lohajung

25. Lohajung (8,300 ft), a tiny pass, in the heart of the greater Himalayan range, Roopkund - An unusual Himalayan trek starts from Lohajung. Approach-By-Bus: 68 kms by road from Karnaprayag, 22 KM from Gwaldam & 10 km by road from Deval.
26. A 10 bedded TRH at Lohajung is run by GMVN. 5 FRP/Hybrid Huts with 10 beds capacity is proposed to be constructed in order to enhance the bed capacity of TRH.


Proposed location for construction of FRP/Hybrid Huts at Lohajung

f. Barkot

27. Barkot is situated at an elevation of 1,220mts above sea level in Uttarkashi district of Uttarakhand state. It is located on the bank of Yamuna River. Barkot is a popular destination of northeast region of Uttarakhand state and is located 49 Kms from the sacred Yamunotri Dham. It is an ideal holidaying and adventure destination as the place

offers many trekking excursions. A large number of devotees stays at Barkot while their visit to Yamunotri Dham.

28. In order to enhance the bed capacity of the existing TRH, 4 FRP/Hybrid Huts are proposed in the available land inside the TRH campus.

Proposed location for construction of FRP/Hybrid Huts at Barkot

g. Purola

29. Purola is a beautiful hill town situated in the Uttarkashi district of Uttarakhand, India. This beautiful town is situated at an altitude of 1524 mts above sea – level. The beautiful small town is surrounded by snow capped mountains, dense deodar and coniferous forests and scenic environments. Purola has become popular in recent years with travel enthusiasts and nature lovers due to it's proximity with Har - ki - Doon valley and Govind Wildlife Sanctuary. Purola is frequented by tourist and sight seekers from all over the world.

30. In order to enhance the bed capacity of the existing TRH, 5 FRP/Hybrid Huts are proposed in the available land inside the TRH campus.

Proposed location for construction of FRP/Hybrid Huts at Purola

h. Harsil

31. Harsil is a village and a cantonment area, on the banks of Bhagirathi River, on the way to Hindu pilgrimage, Gangotri, in Uttarkashi district of Indian state of Uttarakhand.

Situated at a height of 7,860 ft (2,620 metres.) from sea level, Harsil lies 73 km. from Uttarkashi, and 30 km away from Harsil, lies the Gangotri National Park, spread over 1,553 square km. Harsil was popular for the legend of 'Pahari' Wilson, or Raja Wilson. Frederick E. Wilson, an adventurer, deserted the British Army just after the Sepoy Mutiny of 1857. He escaped into Garhwal and met the Raja of Tehri seeking refuge. But the Raja was faithful to the British and refused to accommodate Wilson. Wilson moved into the mountains to escape detection. Fate landed him in Harsil, a remote beautiful village on the banks of the Bhagirathi river, with dense deodar slopes on either side. Wilson married a very beautiful pahari girl by the name of Gulabi. This was the time the British were building the Railways in India and there was great demand for quality wooden sleepers for the rails. Wilson cashed in on this and sent huge cut deodar trees floating down the river to the plains. Initially, Wilson had not taken permission from the Raja of Tehri-Garhwal for his logging business. But later, he acquired a lease from the Raja, giving him a share in the profits. It is said that the revenue of the Raja of Tehri went up tenfold. Little wonder that Wilson was a welcome guest. It is said that in course of time, Raja Wilson, as he was known by then, minted his own currency and as late as the 1930s, his coins were found with the local people. According to some historians, the timber trade had made Wilson so wealthy and powerful that the local Raja of Tehri-Garhwal was unable to protect his subjects, whom Wilson brutalised and used as slaves. Raja Wilson seemed to have been a sort of architect and built, what is known today as Wilson's Cottage, a huge mansion, now in ruins. He also built the Charlieville Hotel in the hill station of Mussoorie, which now houses the Government of India training institute for the Indian Administrative Service recruits.

32. In order to enhance the bed capacity of the existing TRH, 2 Hybrid/FRP Huts are being proposed to be constructed on the available land inside the TRH campus.

Proposed location for construction of FRP/Hybrid Huts at Harsil

i. Barsu

33. Barsu village is situated in Uttarkashi district amidst scenic surroundings at a distance of 45 km by road from District HQ Uttarkashi. It is the starting point of the trek to Dayra Bugyal. The scenic Dayra Bugyal is situated 8 kms from Barsu village.
34. To enhance the bed capacity of the existing TRH, 5 FRP/Hybrid Huts have been proposed to be constructed in the existing TRH campus.

Proposed location for construction of FRP/Hybrid Huts at Barsu

j. Raithal

35. Raithal is a small village situated in Uttarkashi district. It is a base camp for the trek to Dayra Bugyal. Raithal is at a distance of 35 km by road from District HQ Uttarkashi. To enhance the bed capacity of the existing TRH, 2 FRP/Hybrid Huts have been proposed to be constructed in the existing TRH campus.

Proposed location for construction of FRP/Hybrid Huts at Raithal

k. Phoolchatti

36. Perched at 2561 mts above mean sea level, Phoolchatti is surrounded with fragrent flowers, fruit trees, and ayurvedic medicinal plants. To enhance the bed capacity of the existing TRH, 4 FRP/Hybrid Huts have been proposed to be constructed in the existing TRH campus

Proposed location for construction of FRP/Hybrid Huts at Phoolchatti

I. Kartik-Swami (Kanakchauri)

37. Kartikyaswami has a temple and idol of Lord Shiva's son Kartikeya, situated at an elevation of 3048 mts., the place abounds in natural beauty and one can have aclose and panoramic view of the Himalayan peaks. Kanakchauri village is locatedamidst beautiful natural set up on the way to Kartik-Swami. 10 FRP/Hybrid Huts are being proposed to be constructed on the government land.

Proposed location for construction of FRP/Hybrid Huts at Kartik-Swami (Kanakchauri)

E. Project Implementation Schedule

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

F. Technical features:

A) Seismic resistant structure:

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

B) Cost effectiveness:

Being hilly tarrian, most of the areas in state of Uttarakhand are prone tocloud bursts and other natural calamities. The construction of conventional shelters need time, water, labor, regular supply of raw material etc. In such a state FRP 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 of FRP/HYBRID structures.
- The "Dome" shaped FRP can withstand high pressure (8000 psi), doesn't get spoilt in water/acids/alkali. These shelters don't need any maintenance as well, like painting seepage etc.
- The FRP shelters can easily be moved in cases of emergency. The light panels (<50 kg.) can easily be transported by men or helicopters.

C) Testing standards:

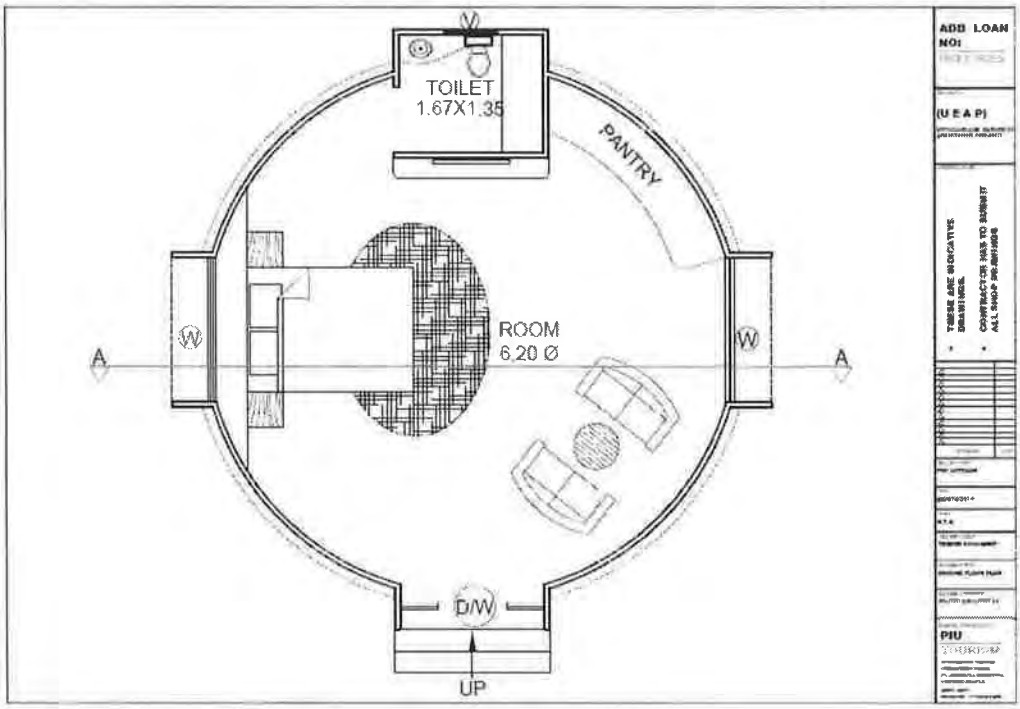
- To determine the Load Bearing Capacity of the structural strength the following tests are conducted: Compressive Strength (N/sq mm), Strength in axial (Tension)(N), Strength in bending (Compression)(N/sq mm), Strength in axial (N).

D) Raising design and construction standards:

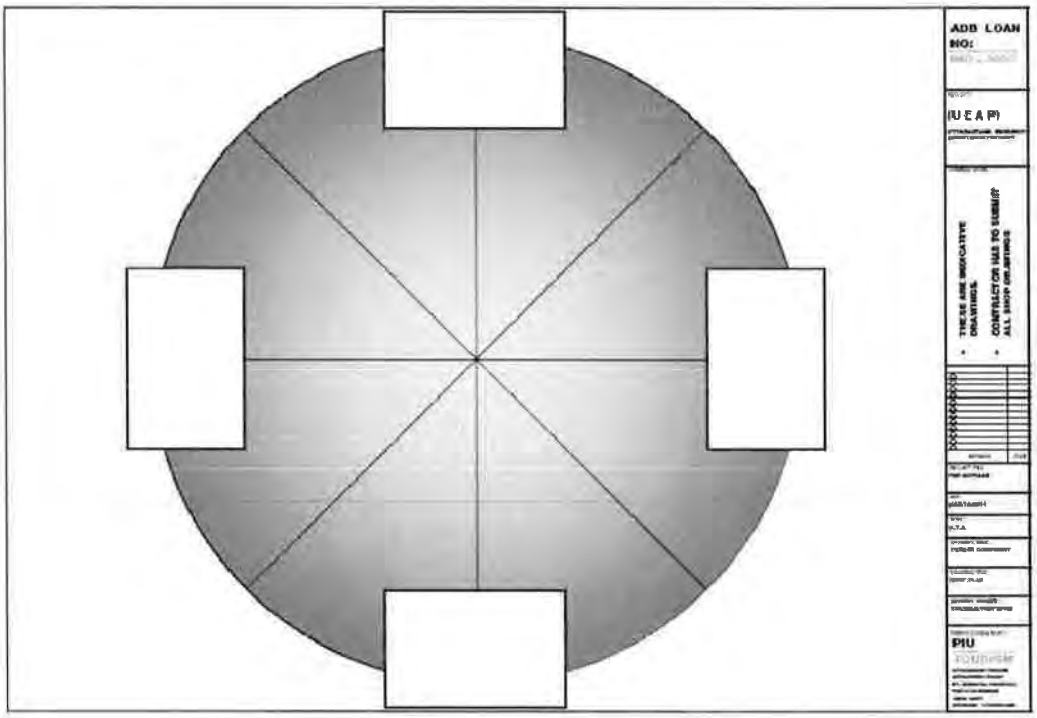
As above Point No.A & B

Drawings

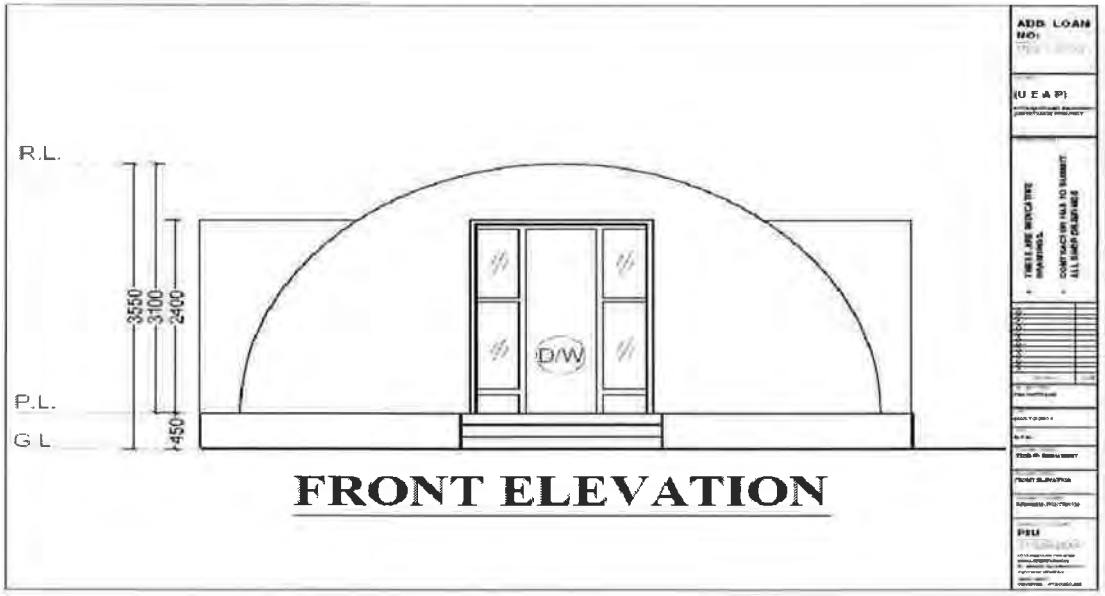
(i) Hut Floor Plan

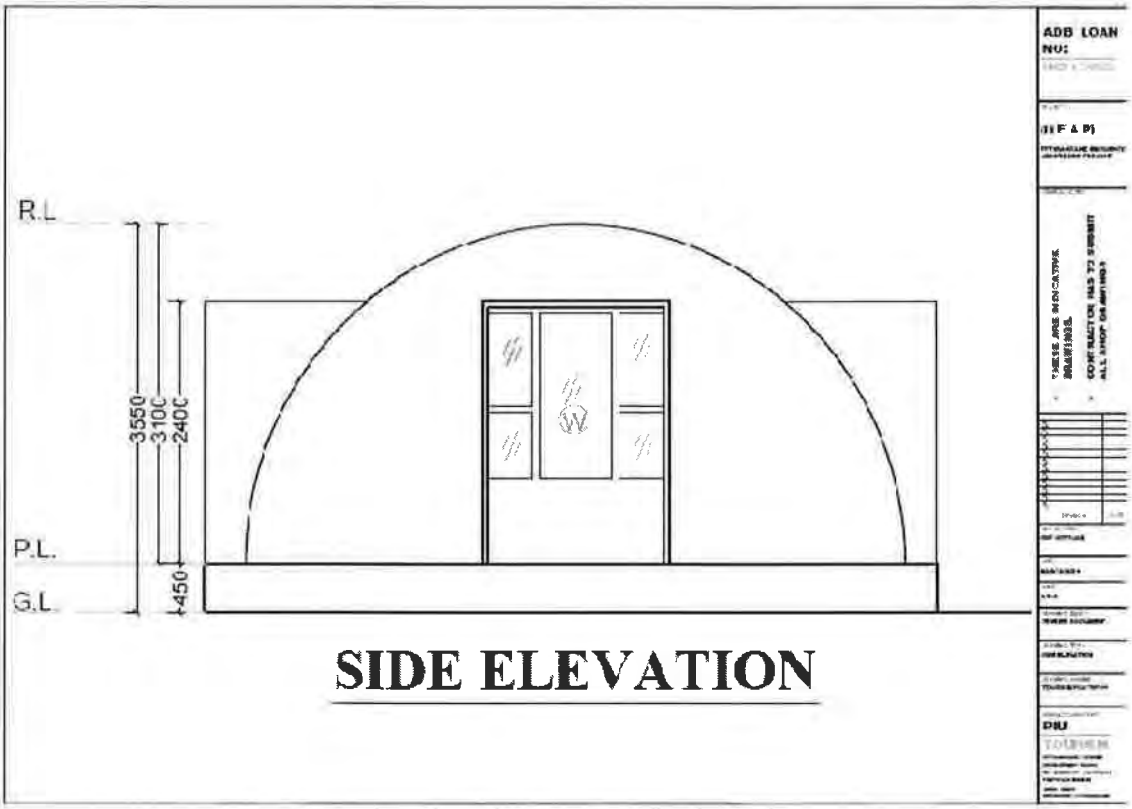


(ii) Hut Roof Plan

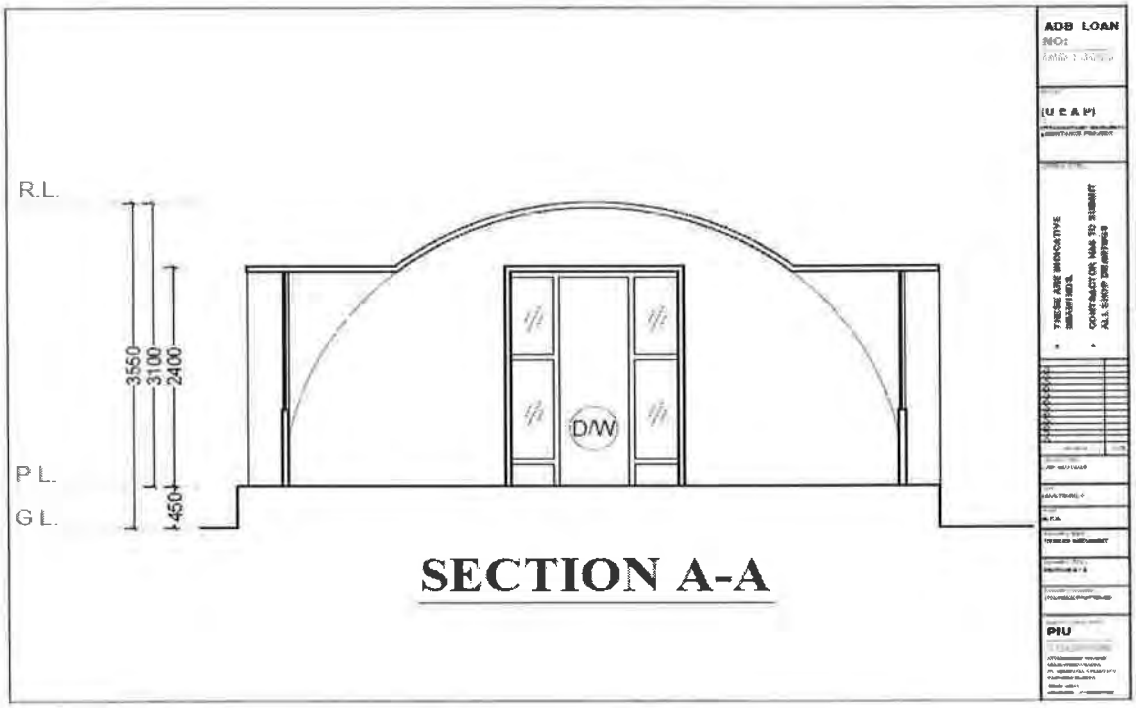


(iii) Elevation Plan

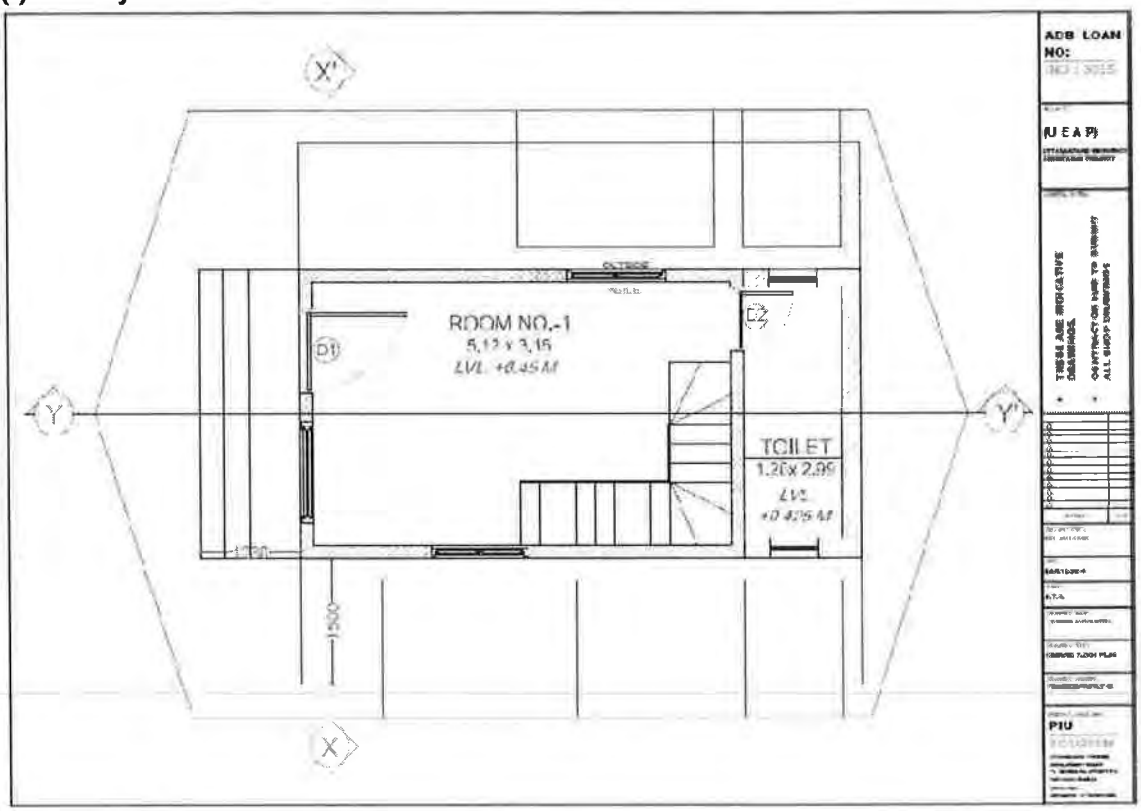




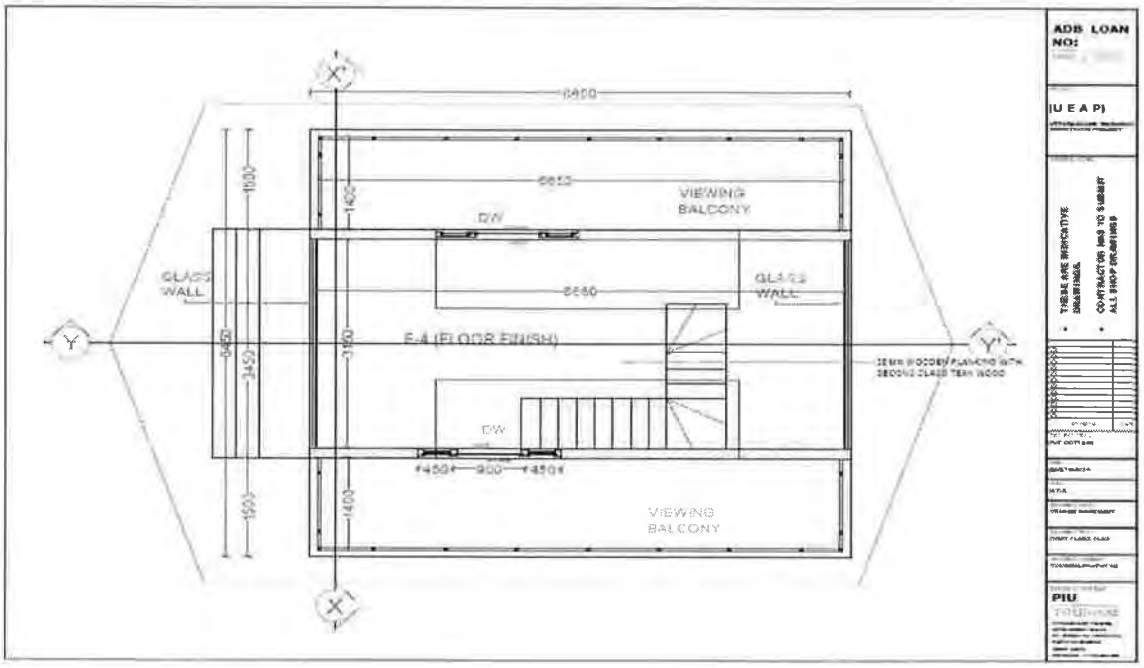
(iv) Section Plan



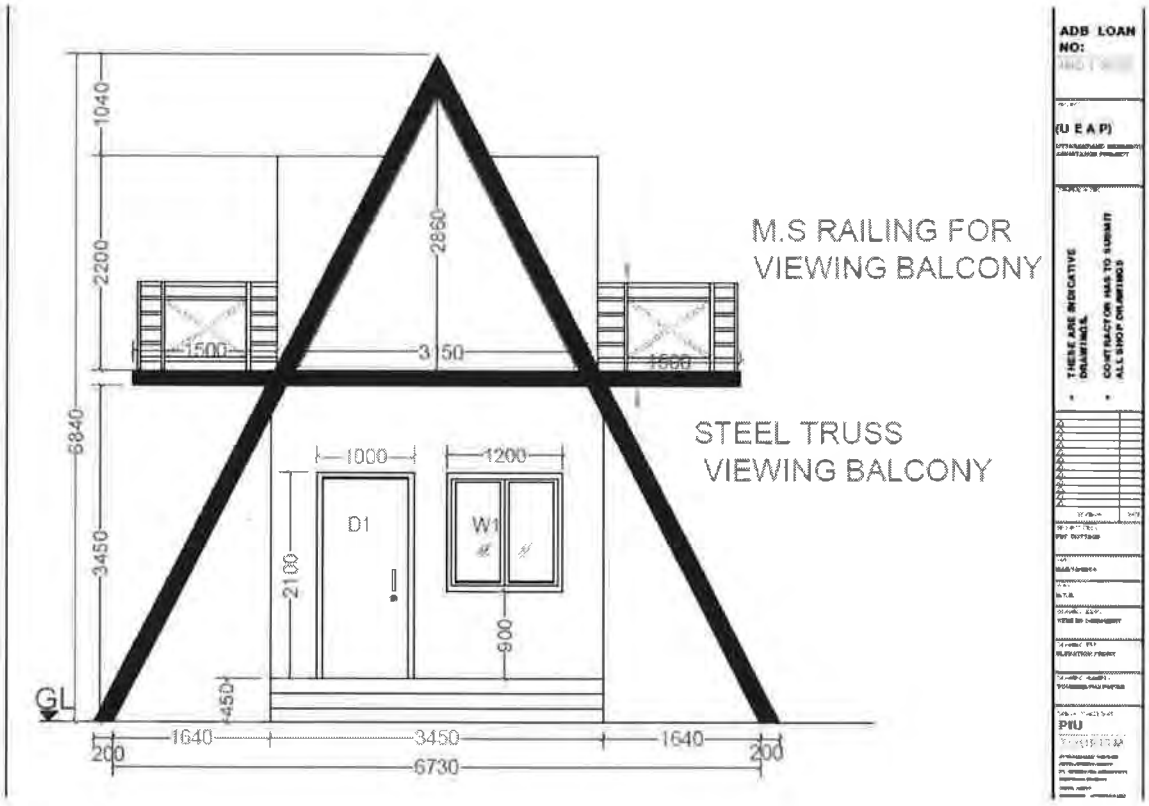
(i) Hybrid Ground Floor Plan



(ii) First Floor Plan

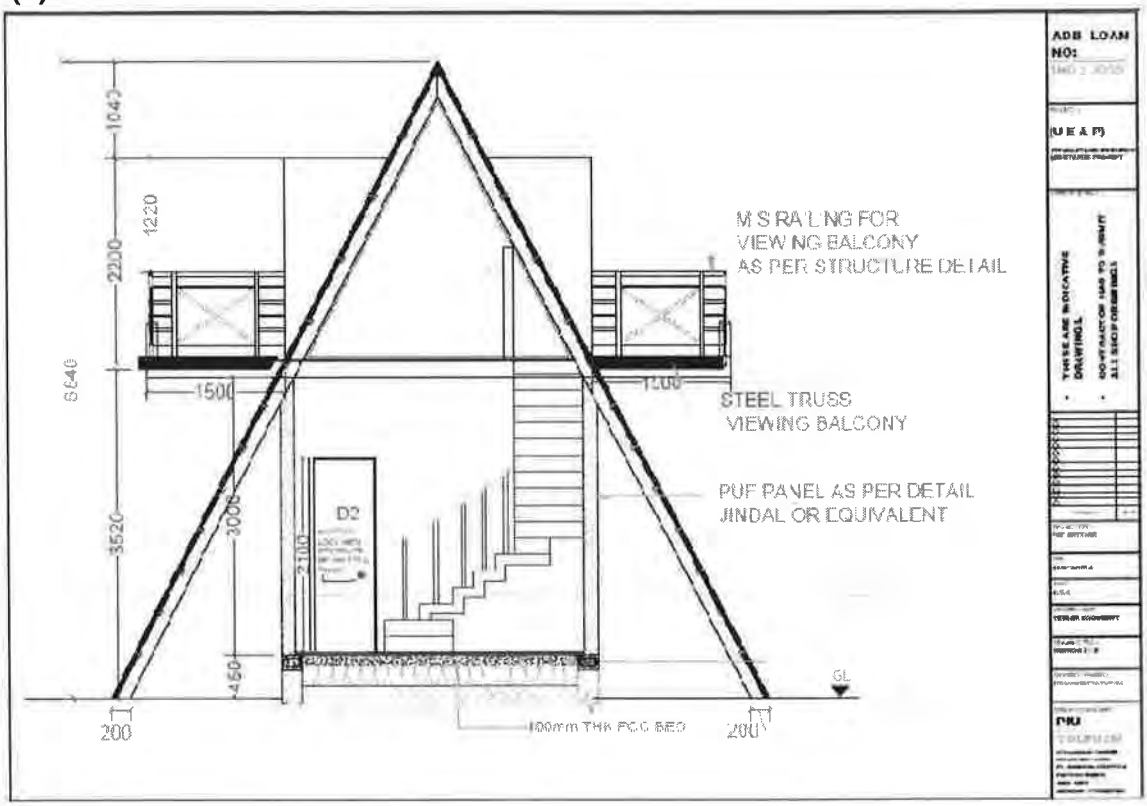


(iii) Front Elevation

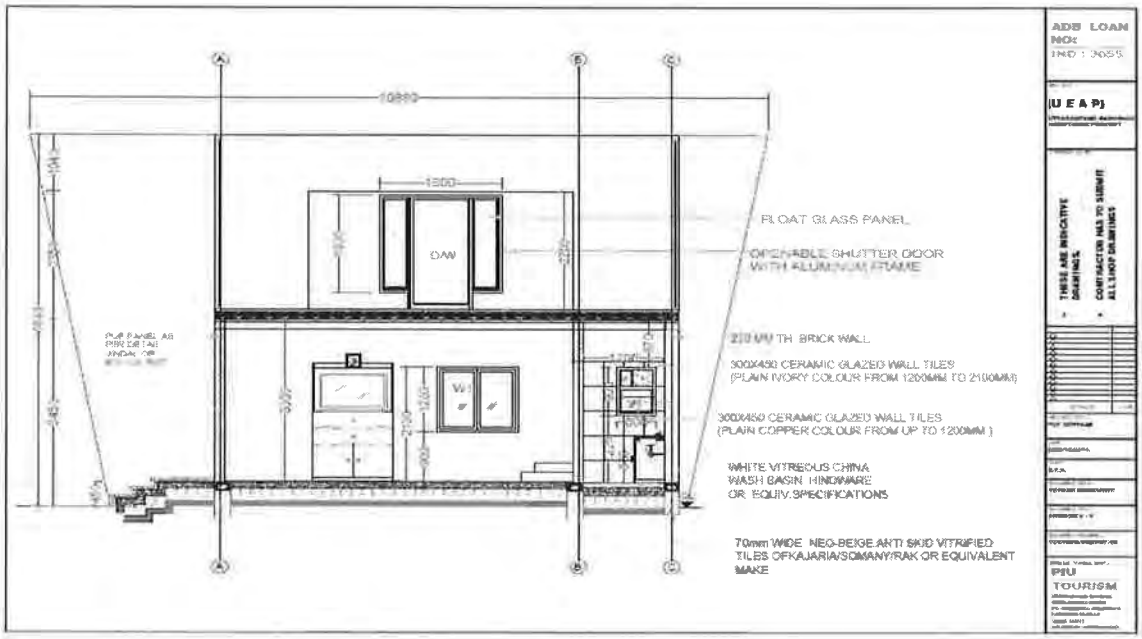


(iv) R.H. Elevation

(v) Section X-X Plan



(vi) Section Y-Y Plan



IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

39. This section presents a brief description of the existing environment, including its physical, ecological resources, and socio-economic development of Sub project of Rudraprayag, Chamoli and Uttarkashi. 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 Construction of FRP/Hybrid Huts 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

40. 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 1.01 crore as per census 2011.

Figure IV-1 Districts of Uttarakhand

41. 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.

42. 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

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

iii. Physiography

46. The Himalayas have precise morphological and physical-geographical boundaries. The longitudinal tectonic valleys of the upper courses of the Indus and Tsangpo (Brahmaputra) rivers form the northern border, while the northern edge of the Indo-Gangetic plain forms the southern border. The Hindu Raj Range and the gorge of the Brahmaputra define the north-western and south-eastern boundaries, respectively. The Himalayas form the major orographic, climatic, and floristic barriers between the deserts of Central Asia and the tropical landscapes of South Asia. The Himalayas also constitute the highest, youngest, and longest E-W trending mountain system in the world. Lying between the Tibetan Plateau on the north and the alluvial plains of the Indian subcontinent on the south, they contain most of the world's highest peaks—eleven of which rise above 8,000 m. The mountain system is located in the territories of India, China, Nepal and Pakistan, extending in a broad arc for 2,500 km from the Nanga

Parbat peak in the west to Namcha Barwa peak at the sino-Indian border in the east. Widths vary from 200-400 km while the area covered is some 650,000 sq km.

47. The State can be divided into two distinct physiographic regions i.e. the Himalayan region in the north and part of the Gangetic plain in the south. The Himalayan region is characterised by high mountains broken by valleys and deep gorges. The perpetual snow in the higher reaches is the source of perennial rivers and rivulets, which criss-cross the terrain and ultimately finds their way into the Ganges and the Yamuna.

B. Pedology

48. The Himalayan tract of the Kumaon-Garhwal region exposes wide variety of rocks, ranging in age from Himalayan Pre-Cambrian to Quaternary. The Himalayan tract between the Bhagirathi and Alaknanda valleys in Garhwal is occupied by schists, schistose phyllites, granulites, migmatites, and the likes dipping north easterly with a scrap facing the gangetic plain and intruded by gneissose granite, pegmatite. These rocks rest upon metamorphosed shales, phyllites, limestones, quartzites, etc. from where these are separated by thrust.
49. The project region, pedagogically, is the least resistant to soil erosion and hence very prone to severe soil erosions. Soils of the Uttarakhand Himalayas in general are quite shallow, gravely impregnated with un-weathered fragments of parent rocks. The soils in various regions are as follows:
    i. Alpine Zone (above 3,000m): soils of glacial origin with naked rocks and meadows. These soils are mostly granitic sandy loam in nature.
    ii. Cool temperate and sub-tropical zone (1,800 to 3,000m): brown deciduous forest soils and grey coniferous forest soils predominate
    iii. Warm temperate and sub-tropical zone (900 to 1,800m): brown forest soils varying from loam to clayey loam and fairly widespread
    iv. Tropical zone (<900m): alluvial soils mixed with boulders, gravel and pebbles in the Shivalik valleys, Duns and the Bhabhar region.

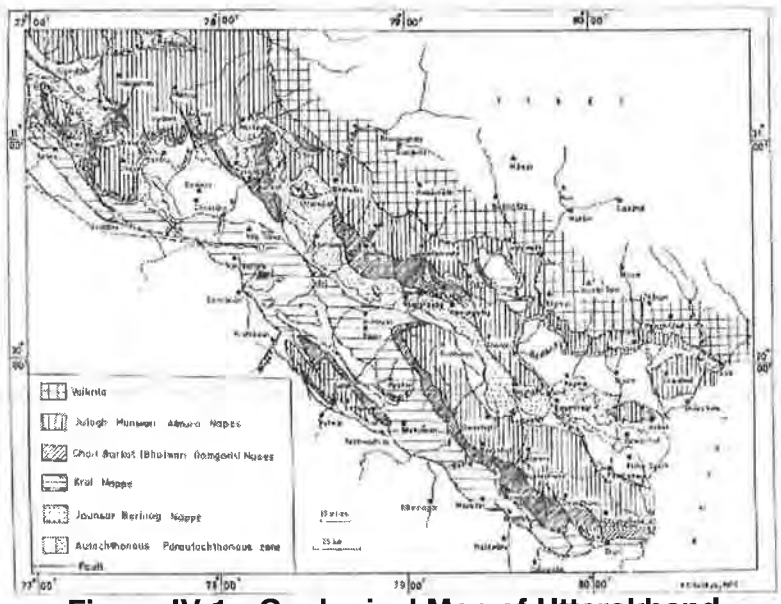


Figure IV-1:- Geological Map of Uttarakhand

50. The major soil groups found in the region are as follows:
    i. **Red loam soils:** The soils of this group occur in association with one another in the upper slopes where the soils are freely drained. Here, they create a unique moisture regime. Generally, the soils are characterized as deep, medium to fine-textured, slightly acidic, and low in fertility.
    ii. **Brown forest soils:** This group of soil is found in all districts and has developed from tertiary sedimentaries consisting of sandstone, shale, and micaceous grey sand stone. These are mostly found at altitude ranging from 600 to 1,700 m having an average rainfall of 800-2,000 mm. These soils are fairly deep and moderately permeable.
    iii. **Sub-mountain soils:** These soils are found in all the districts. These have developed under the unique environment of the natural forest vegetations of deodar, spruce, blue pine, and chir pine, in the midst of high altitudes and high rainfall. The surface layer is up to 15 cm characterized by dark brown to black colour, sandy with loose and un-decomposed organic matter, and rich humus at depths ranging from 15 to 50 cm.
    iv. **Mountain meadow soils:** This group of soils is generally found at high elevations characterized by dry and cold climate and scanty vegetation, mostly alpine pastures. The soils are shallow to deep and immature. These soils suffer from moisture deficiency resulting from prolonged wind erosion and snow action. Sandy soils of varying depth are found only in the valleys and low lying terraces. In some places, the soils are gravelly sandy loam type.
    v. **Skeletal soils:** The soils of this group are very shallow, representing the weathered mantle of the parent rocks. Owing to deficient precipitation, poor vegetation cover, and unfavourable conditions for intensive weathering, soil development is limited. Wherever there is any soil cover, it is badly affected by wind erosion. The parent rocks are exposed in most of the areas.
51. The most predominant soil associations in hill areas are red loams and brown forest soils. The other types are found only under variations of micro topography. Meadow soils occur only in depressionary pockets in valleys resulting from the accumulation of finer materials and the removal of soil humus caused by rains from the surrounding hill ranges.
52. Soils associated with higher elevations are highly depleted of fine fractions and contain 42 percent gravel. On the other hand, the soils associated with lower elevations (e.g. valleys) contain only 21 percent gravel. Soils associated with pastures and forests (e.g. open for grazing) seem to be highly depleted of fine soil formation. The soil depth is mostly shallow to very shallow.
53. The soil of the region has been formed either through pedogenetic processes or through transported means. The pedogenetic soils are the ones that have been formed by long exposure to atmospheric agencies like physical and chemical weathering and rock slides. Such types of soils are derived from granite Gneissic, Schistose and Phyllite rocks. These soils obtained high percentage of silica from their parent body, while the soils formed from the limestone are rich in calcium carbonate. The transported soils are carried and deposited by the streams. Their parent bodies and source rocks lay at far places. Some of these soils have mixed origin of glacial and fluvio-glacial origin. These soils of takus, fans and terraces are of silt to clayey loam and are very fertile. The brown

forest soils contain very high percentage of organic matter. The katil soils are stony and immature, and are considered as extremely poor soils. The Talaon soils are brown in colour with clay texture. The stony texture provides for the higher rate of erosion.

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

S. No.	Name of the Sub Project	No. of Samples	Sampling locations
1	Auli	1	Auli- GMVN Campus
2	Joshimath	1	Joshimath- GMVN Campus
3	Pandukeshwar	1	Pandukeshwar
4	Deval	1	Deval GMVN Campus
5	Lohajung	1	Lohajung GMVN Campus
6	Harsil	1	Harsil GMVN Campus
7	Barkot	1	Barkot GMVN Campus
8	Purola	1	Purola GMVN Campus
9	Phoolchatti	1	Phoolchatti GMVN Campus
10	Barsu	1	Barsu GMVN Campus
11	Raithal	1	Raithal GMVN Campus
12	Katik-Swami(Kanakchauri)	1	Kartik-Swami

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

C. Climate and Meterology

57. 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.
58. 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.
59. 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 Rudraprayag, Chamoli, Uttarkashi, and Pauri are humid and cold.
60. As for the project areas within the Kumaon region, such districts come under the Intermediate Zone, a zone with moderate temperature and moderate rainfall. The climate is cool, dry and delightfully healthy. The weather normally follows the seasonal rhythm during the year. The temperature ranges from 0°C to 10°C in winter and from 8°C to 33°C in summer season. The average rainfall ranges in between 55 to 212 cm. The winter season beginning from November to the end of February is cold and the

summer period from March to June is hot. The rainy season from July to September is warm and moist.

61. The Garhwal region has a sub-temperate to temperate climate with maximum temperature recorded in the month of June is 45°C at Kotdwar while in the higher reaches at Dudhatoli it only rises to 25°C. Temperature descends to a minimum of 1.3°C in January, and means monthly temperature for the region ranges from 25°C to 30°C.

1. Rainfall

62. The monsoon commences after the middle of June and continues up to the second week of September—by such time, about 4/5 of annual precipitation is generally received all over the region. However, rainfall occurs in the hills almost throughout the year, though lesser in some months than others.
63. The frontal ranges of the Shivalik and adjoining Lesser Himalaya receive the highest rainfall of about 2,420mm followed by locations close to Greater Himalaya – 2,160mm foothills – 1,880mm Terai locations – 1,440 mm and the rain shadow locations of Trans-Himalaya – 720mm. Generally, the hills are markedly wetter than the adjacent plains.
64. Data based on ten pairs of meteorological stations located within the Himalayas and adjacent plains indicate that the annual rainfall in a hill station located within the Shivaliks or the Lesser Himalayas is 1.6 to 5.3 times as much as in the adjacent stations in the plains. Interior parts receive comparatively less rainfall during the monsoon period than the frontal parts. During winter, the situation is reversed.

2. Temperature

65. The average temperature in summer varies between 12 and 16^{0}C. Winter nights everywhere, are extremely cold in Uttarakhand. Between April and June, temperature in plains crosses 40^{0}C and drops to 10^{0}C during monsoon. With increase in altitude, temperature in the hilly region falls sharply and there is permanent snow cover on the peaks.
66. The mean winter temperature at altitude 2,200m above MSL is 6.7^{0}C and summer mean temperature is 18.3^{0}C. In winter the daily maximum temperature in most of the hilly areas is around 7^{0}C and minimum 1^{0}C. The atmosphere is generally foggy during the morning and evening.

3. Humidity

67. Relative humidity is high during the monsoon season, generally exceeding 70 percent on the average. The driest part of the year is the pre-monsoon period when humidity may drop to 35% during the afternoon. During the winter months, humidity increases toward the afternoon at certain high stations.

D. Ambient Air Quality and Noise Level

68. 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.

69. 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) as per CPCB guideline are as follows.

S. No.	Name of the Sub Project	No. of Samples	Sampling locations
1	Auli	1	Auli- GMVN Campus
2	Joshimath	1	Joshimath- GMVN Campus
3	Pandukeshwar	1	Pandukeshwar
4	Deval	1	Deval GMVN Campus
5	Lohajung	1	Lohajung GMVN Campus
6	Harsil	1	Harsil GMVN Campus
7	Barkot	1	Barkot GMVN Campus
8	Purola	1	Purola GMVN Campus
9	Phoolchatti	1	Phoolchatti GMVN Campus
10	Barsu	1	Barsu GMVN Campus
11	Raithal	1	Raithal GMVN Campus
12	Katik-Swami (Kanakchauri)	1	Kanakchauri

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

Ambient Noise Level

71. 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.
72. 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 subproject. 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 noise quality will be generated by collection of representative samples by the contractor before commencement of construction works. The selection of sampling location will be representative of residential, commercial, institutional, industrial and sensitive locations.The proposed locations of noise quality monitoring at pre construction stage (Baseline data) are as follows as per CPCB guideline are as follows:

S. No.	Name of the Sub Project	No. of Samples	Sampling locations
1	Auli	1	Auli- GMVN Campus
2	Joshimath	1	Joshimath- GMVN Campus
3	Pandukeshwar	1	Pandukeshwar
4	Deval	1	Deval GMVN Campus
5	Lohajung	1	Lohajung GMVN Campus

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11	Raithal	1	Raithal GMVN Campus
12	Katik-Swami (Kanakchauri)	1	Kanakchauri

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

B. Hydrology

74. 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.
75. 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

76. 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.
77. 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 7,138m meet at Devprayag and flow as the Ganges thereafter. The Bhagirathi is the main stream while the Alaknanda, Saraswati, Dhauliganga, Birahi 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

78. 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.
79. 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 are as follows:

S. No.	Name of the Sub Project	No. of Samples	Sampling locations
1	Auli	1	Auli- GMVN Campus
2	Joshimath	1	Joshimath- GMVN Campus
3	Pandukeshwar	1	Pandukeshwar
4	Deval	1	Deval GMVN Campus
5	Lohajung	1	Lohajung GMVN Campus
6	Harsil	1	Harsil GMVN Campus
7	Barkot	1	Barkot GMVN Campus
8	Purola	1	Purola GMVN Campus
9	Phoolchatti	1	Phoolchatti GMVN Campus
10	Barsu	1	Barsu GMVN Campus
11	Raithal	1	Raithal GMVN Campus
12	Katik-Swami (Kanakchauri)	1	Kanakchauri

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

F. MINERAL RESOURCES

81. 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.

82. 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 IV-1. 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)

83. 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.

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

G. Seismology

85. 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.
86. 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.

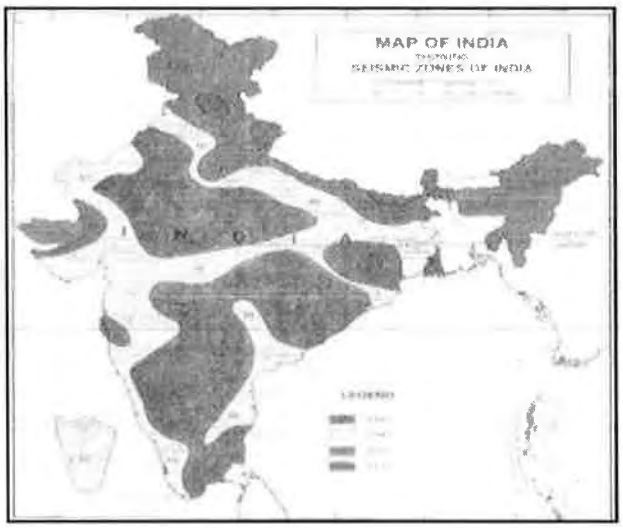


Figure IV-2 Seismic Zone of India

H. Ecology

1. Forestry

87. According to The India State of Forest report 2013, the recorded forest area of the Uttarakhand state is 34,651 km2 which constitutes 64.79% of its geographical area. Reserve forests constitute 24,643 sq km Protected Forests 9,885 sq km and Unclassed Forests constitute 123 sq km of the total forest area.

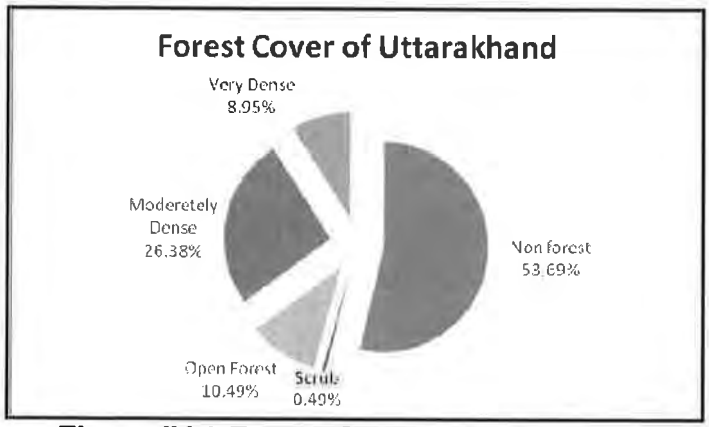


Figure IV-3 Forest Cover by State, 2013.

88. The distribution of forest cover by district is presented in the succeeding Figure and Table. The Garhwal region has more forest cover with 14,639 km2 compared to the Kumaon region with 9,869 km2. 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

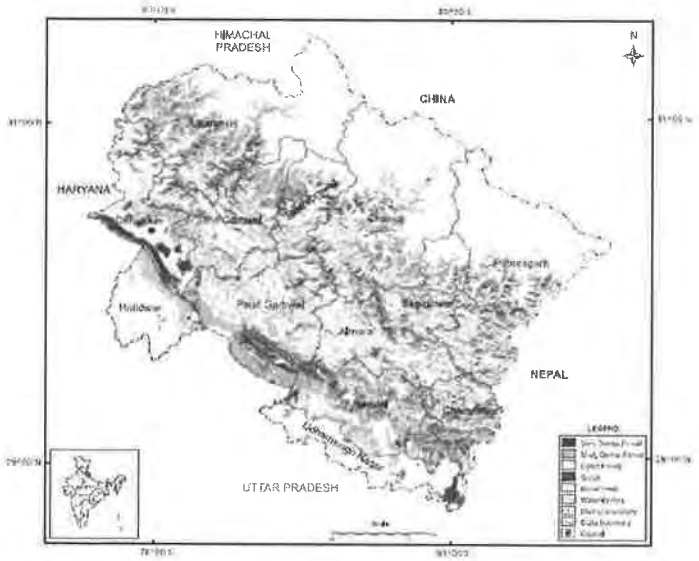


Figure IV-4Uttarakhand's Forest Cover Map

Table IV-2. District-wise Forest Cover, Uttarakhand

(Area in km^2)

Region	District	Geographic Area	Forest Cover 2013 Assessment			Total Forest	% ofGA
			Very Dense	Moderate Dense	Open Forest		
Garhwal	Uttarkashi	8,016	570	1957	618	3145	39.23
	Rudraprayag	1,984	241	592	297	1130	56.96
	Chamoli	8,030	441	1,573	686	2700	33.62
	Pauri Garhwal	5,329	520	2,095	676	3291	61.76
	Tehri Garhwal	3,642	298	1,232	618	2148	58.98
	Dehradun	3,088	583	695	332	1610	52.14
	Haridwar	2,360	25	333	257	615	26.06
Sub-Total		**32,449**	**2,678**	**8,477**	**3,484**	**14,639**	
Kumaon	Pithoragarh	7,090	571	1,113	416	2100	29.62
	Bageshwar	2,246	197	883	305	1,385	61.67
	Almora	3,139	222	927	428	1,577	50.24
	Nainital	4,251	605	1899	570	3,074	72.31
	Champawat	1,766	337	576	274	1,187	67.21
	Udham Singh Nagar	2,542	175	236	135	546	21.48
Sub-Total		**21,034**	**2,107**	**5,634**	**2,128**	**9,869**	
Grand Total		**53,483**	**4,785**	**14,111**	**5,612**	**24,508**	**45.82**
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%						

Source: India State of Forest Report 2013

89. 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.

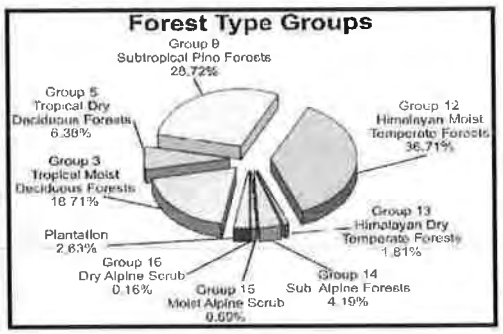


Figure IV-5. Forest type groups of Uttarakhand

90. 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*) asource of resin, which is used for producing resin and terpentine.

Table IV-3. 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

Source: Uttarakhand forest Department website

2. Biodiversity

91. 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 seven wildlife sanctuaries for the conservation of flora and fauna. Such areas include the Nanda Devi National Park, Valley of Flowers, Gangotri National Park, Govind Pashu Vihar National Park, Rajaji National Park, Jim Corbett National Park, Kedarnath Wildlife Sanctuary, Askot Musk Deer Sanctuary, Mussoorie Sanctuary, Binsar Wildlife Sanctuary, Sanadi Sanctuary, Nandhaur Wildlife Sanctuary and Govind Wildlife Sanctuary—all of which are being looked after by the Uttarakhand government. A positive remark on the State is that it maintains rich wildlife outside their protected areas.

Table IV-4. Wildlife in Uttarakhand

Sl. No.	Protected Areas	Year	Unit	Statistics
1.	**National Parks**			
	(i) Number	2013-14	No.	6
	(ii) Area	2013-14	km^2	1915.02
2.	**Wildlife Sanctuaries**			
	(i) Number	2013-14	No.	7
	(ii) Area	2013-14	km^2	2690.12
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

Source: Wildlife and Protected Areas, ENVIS, 2014

92. 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.

93. 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-5. National Parks in Uttarakhand

Sl. No.	National Park	Year of Establishment	Area (km^2)	District
1.	Corbett NP	1936	520.82	Nainital & Pauri Garhwal
2.	Nanda Devi NP	1982	624.60	Chamoli
3.	Valley of Flower NP	1982	87.50	Chamoli
4.	Rajaji NP	1983	820.00	Dehradun, Pauri Garhwal and Haridwar
5.	Gangotri NP	1989	2390.02	Uttarkashi
6.	Govind NP	1990	472.08	Uttarkashi

Source: Wildlife and Protected Areas, ENVIS, 2014

Table IV-6. Wildlife Sanctuaries in Uttarakhand

Sl.No.	Sanctuary	Year of Establishment	Area (km^2)	District
1.	Govind WLS	1955	485.89	Uttarkashi
2.	Kedarnath WLS	1972	975.20	Chamoli
3.	Askot WLS	1986	600.00	Pithoragarh

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

4.	Sonanadi WLS	1987	301.18	Garhwal
5.	Binsar WLS	1988	47.07	Almora
6.	Musoorie WLS	1993	10.82	Dehradun
7.	Nandhaur WLS	2012	269.96	Nainital and Champawat

Source: Wildlife and Protected Areas, ENVIS, 2014

94. 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-7. 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*

Sr No	Local Name	Scientific Name
2.	Karoz	*Carissa spinarium*
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 IV-8. 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		

Sl. No.	Wild Animals	
	Local Name	Scientific Name
1	Chir Fijent	Catreus wallichii
2	Kalij Fijent	*Lophura Leucomelana*
3	Koklaj Fijent	*Pucrassia macrolophus*
4	Kala Irgal	*Letinaetus makavensis*
5	Karorla	*Urocissa erythsorhyncha*
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*

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

3. Biosphere Reserves

95. 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.

96. 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).

97. 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*.

98. 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.

99. 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.

100. **Fishery**

101. 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, Mahaseer, 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.

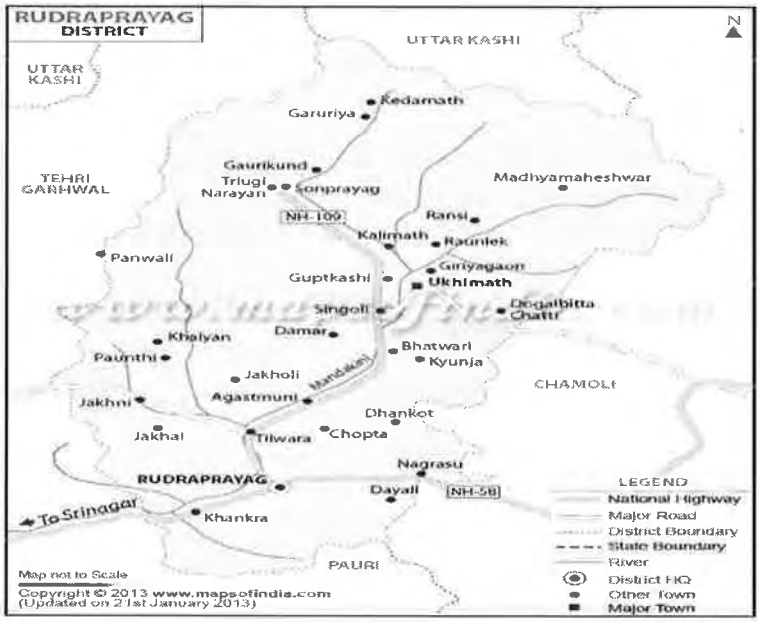
I. Socio-Economic

1. Social and Cultural Development

102. 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.

103. The State is divided into Garhwal and Kumaon divisions. Administratively, the State is divided into 13 districts, 79 tehsils and 97 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 16,853 villages in the State and 7,256 gram panchayats. Of the total number of villages, 5,868 are not connected to all weather roads.



2. Land Use and Land Use Pattern

104. 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.

105. 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 IV-9. Land Utilisation in Uttarakhand

Sl. No.	Land-use	Period /	Unit	Statistics
1	Total Reported Area	2010-11	Hectare	56,72,636
2	Forest Area	2010-11	Hectare	34,84,803
3	Culturable Waste Land	2010-11	Hectare	310,390
4	Fallow Land	2010-11	Hectare	1,27,793
	(i) Current Fallow	2010-11	Hectare	43,295
	(ii) Fallow Land other than Current Fallow	2010-11	Hectare	84,498
5	Barren & Unculturable Land	2010-11	Hectare	2,24,764
6	Land under Non-agricultural Uses	2010-11	Hectare	2,17,648
7	Permanent Pasture & Other Grazing Land	2010-11	Hectare	1,98,526
8	Land under Misc., Tree Crops and Groves not included in Net Area Sown	2010-11	Hectare	3,85,548
9	Net Area Sown	2010-11	Hectare	7,23,164

Source: Uttarakhand at a Glance 2012-13, Govt. of Directorate of Economics and Statistics

J. Health

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

Table IV-10. 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 2012, M/O Health & F.W., GOI

107. The health infrastructure of the State is described in succeeding Table. 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. The populations around the sub-project area rely on the poorly-constructed roads in going to major towns/districts to avail of services from secondary and tertiary

health facilities. With better road conditions, travel time to such health facilities will be reduced and hence, treatment will be received more immediately.

Table IV-11. 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

108. Literacy rate in Uttarakhand has seen upward trend and is 79.63 percent as per 2011 population census. Of that, male literacy stands at 87.40 percent while female literacy is at 67.06 percent. In 2001, literacy rate in Uttarakhand stood at 71.62 percent of which male and female were 81.02 percent and 63.36 percent literate respectively. In actual numbers, total literates in Uttarakhand stands at 6,880,953 of which males were 3,863,708 and females were 3,017,245.
109. Average literacy rate of Chamoli in 2011 were 82.65 compared to 75.43 of 2001. If things are looked out at gender wise, male and female literacy were 93.40 and 72.32 respectively. For 2001 census, same figures stood at 89.66 and 61.63 in Chamoli District. Total literate in Chamoli District were 280,556 of which male and female were 155,395 and 125,161 respectively. In 2001, Chamoli District had 237,354 in its district.
110. 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.
111. Average literacy rate of Uttarkashi in 2011 were 75.81 compared to 65.71 of 2001. If things are looked out at gender wise, male and female literacy were 88.79 and 62.35 respectively. For 2001 census, same figures stood at 83.60 and 46.69 in Uttarkashi District. Total literate in Uttarkashi District were 215,126 of which male and female were 128,237 and 86,889 respectively. In 2001, Uttarkashi District had 161,161 in its district.

L. Cultural and Archeological resources

112. 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.
113. 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.
114. 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.
115. 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.
116. 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.
117. 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.
118. 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.

119. There is no Archaeological Survey of India (ASI) listed heritage sites within the study area.

M. Economic Development

1. Transportation and Communication

120. 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.

121. As per statical diary of Uttarakhand 2011-2012, the overall road network in the State is 337486.92 km. The road network is administered predominantly by the PWD and comprises of 1375.76 km of national highways (NH) 3788.20 km of State Highways (SH), 3289.74 km of Major District Roads (MDR), 2,945.04 km of Other District Roads (ODR), 14543 km of Village Roads (VR) 858.85 light motor vehicle road (LVR). Other than PWD , Irrigation department (741 km), Cane development Department (885 km), Forest Department (3257 km) Border Road Task Force (BRTF) 1281.32 Km) and others like MANDI PARISHAD/Market council and PMGSY road (1685 km) a total 7849.32 km road is also managed by their respective department. The Border Roads Organization manages about 1,623 km of NHs, SHs, MDRs, and ODRs (class 9 equivalent and above roads having carriage way width 3.75 meter and above). In project district Nanital, the total length of Pucca road is 3763 km in which 2233 km road is under PWD.

122. 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. The total length of Puccka road in district is 1514 km in which 1276 km road is under PWD.

As per PWD records following table gives the scenario of roads of the UttarakhandState.

TableIV-12. 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

123. 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. The industrial development of the State as per Uttarakhand at a Glance (2012-13), Directorate of Economics and Statistics, Govt. of Uttarakhand is described in succeeding Table.

Table IV-13. Industrial development of Uttarakhand State.

Industry	Year	Unit	Statistics
Rural and Small Scale Industries			
Khadi Udhyog/Gramodhyog Units	2011-12	No.	859
Small Scale Industries (SSIs)	2011-12	No.	40049
Total Employees of Khadi Units	2011-12	No.	4011
Total employees of SSIs	2011-12	No.	177615
Factories (Regs. under Factories Act, 1948-Section 2M(I) and 2M(II)]			
No. of factories	2010-11	No.	2739
No. of workers	2010-11	No.	234332
Total person engaged	2010-11	Rs. Lakh	289957
Value of products & by Product	2010-11	Rs. Lakh	10546211
Net Value Added	2010-11	Rs. Lakh	2996017
Value of Output	2010-11	Rs. Lakh	10950453
Gross Fixed Capital Formation	2010-11	Rs. Lakh	390972
Profits	2010-11	Rs. Lakh	2370811

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

3. Agriculture, Forestry and Fishery

124. 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.

125. 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.

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

Sl. No.	Items	Year/ Period	Unit	Statistics
	(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

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

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*) andBarnyard 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*)

Sl. No.	Ecological Sub-Region	Altitudinal Gradient (m)	Major Agriculture Crops
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*)

126. 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

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

N. Fisheries

127. 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*.

O. Energy and Electric Power Potential

128. 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.
129. 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.

P. Aesthetic and Tourism

130. Tourism is one of the strong pillars of the State economy. The State has high growth potential for tourism, be in nature, wildlife, adventure or pilgrimage tourism. The State received 2,05,46, 323 domestic tourists in the year 2008, 2,19,34, 567 in the year 2009 and 3,02,06, 030 in the year 2010. As per Uttarkhand at a Glance 2012-13 a document issued by Directorate of Economic and Statistics GoUK state recived 5,69,250 tourists in the year 2011-2012 registering a considerable yearly growth. Expenditure on schemes for tourism development and promotion in the State has progressively increased over the years. Some of the major destinations with tourism potential include Haridwar (called 'The Gateway of God'), Rishikesh (the birth place of Yoga), Dehradun, Mussoorie, Almora, Kedarnath, Badrinath, Yamunotri, Gangotri, Jim Corbett National Park, Nainital, Ranikhet, and Pithoragarh.
131. The district is named after its headquarters town Uttarkashi, an ancient place with rich cultural heritage and as the name suggests is the Kashi of north (Uttara) held almost as high a veneration as Kashi of the plain (Varanasi). There is a famours Vishwanath tample also located in Uttarkashi town dedicated to Lord Shiva. The two important rivers of India Ganga and Yamuna have their orgin place namely Gangotri and Yamnotri respectively in district Uttarkashi. Gangnani, Harsil, Dodi Tal, Dayara Bugyal are the important tourist places in District Uttarkashi.
132. District Rudrapryag is of immense siginificance for the piligrims visiting to Bardinath and Kedarnath, famous piligrims of Hindu religion. Rudraprayag is named after 'Rudra' an aspect of Rudra is located in the confluence of Riven Alaknanda and Mandakini. In district Rudraprayag tourists 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.Deoria Tal is an enchanting lake to visit in Rudraprayag located 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. 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.

133. Other important tourist sites of district Rudraprayag are Guptkashi, Ukhimath, VasukiTal, and Tunganath. Tourists can also go to Kalimath, KartikswamiTemple,Indrasani Mansa Devi Temple,Chandrashila, Maa Hariyali DeviTemple, Koteshwar Temple, and Madmaheshwar.

134. 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.

135. Chamoli is the second largest district of Uttarkhand. Chamoli hosts a veriety if torusit destination of piligrims and trackers tourists interests. The famous shrine Badrinath and Kedartha of *Hindu*religion and Hemkund of *Shikh* religion are located in the Chamoli. The region is also called 'Adobe of God' by its pristine natural environment. Valley of Flower, Gurson-Bugyal, Vedni-Bugyal, Nanda Devi National Park-A world Heritage site, Roopkund, Auli, and Gvaaldam are the famous tourist destination of Chamoli.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

136. 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.

137. 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

142. 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

143. The sub-project area is covering 3 Districts of Garhwal region in Uttarakhand namely- Uttarkashi, Rudraprayag and Chamoli. A total of 12 locations are proposed for Construction of FRP Huts in 3 Disaster Affected Districts of Garhwal under UEAP.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.

144. Due to tough hilly terrain, flat land is the major crisis.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.

145. There is no resettlement issue envisaged in case of all 12locations 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.

146. The location selected for construction of the FRP/Hybrid 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

147. The proposed Hybrid/FRP Huts are inside the premise of the existing Tourist Rest Housesexcept for Kartiyaswami which is Gram Sanchayit Land and the process for securing NOC for the same is under process. There is no land acquisition as such involved. The connecting Roads to sites for FRP/Hybrid Huts proposed are not new constructions but are existing roads. As such, there is no land acquisition involved. 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

148. 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

149. 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

150. 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. Subproject involves construction of FRP / Hybrid huts which are made up of pre-engineered prefabricated steel and reinforced plastic panels erected on concrete base, as such very little construction material would be involved. Transportaion of construction and prefab material is expected to have negligible adverse impact on the access roads. However any damage to the raods due to transportation of construction material would be corrected by the construction contractor as per GCC of Contract at no additional cost.

4. Operation and Maintenance Impacts

151. Impacts during operation of FRP/Hybrid Huts 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, access roads to FRP hut sites 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 access roads and landscaping. Govt of Uttarakhand / GMVN shall make special provision for operation and maintenance of FRP/Hybrid Huts and all allied facilities.

C. Benefits

Construction of FRP/Hybrid Huts

152. FRP/Hybrid Huts 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

153. The cumulative impact assessment (CIA) examined the interaction between the subproject's residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing and reasonably foreseeable future projects or activities.
154. 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.
155. Implementation of the project will not have any bearing on ecology and environment of the locality. Since the sturucture 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

156. 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.

157. 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.

158. During Project preparation, consultations have been held with the EA, IA, Garhwal Mandal Vikas Nigam (GMVN), and District Administration 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/ Occupation
1	15.06.2014	Purola	Mr. Upendra Chauhan	Manager TRH
			Mr. Manmohan	TRH Staff
			Mr. Jayendra Singh	Resident
			Mr. Roshan Bijalwan	Govt. Service
			Mr. Brij Bhushan	businessman
			Mr. Prem Singh Rana	Farmer
			Mr. Pyarelal Himani	Farmer
			Mr. B.M.S. Sajwan	Govt. Service
			Mr. Srawan Singh	Businessman
			Mr. Rohit Kumar	Farmer
			Mr. Harwansh Singh	Farmer
2	15.06.2014	Barkot	Mr. Atul Chauhan	Manager TRH
			Mr. Arvind C. Ramola	Village Farmer
			Mr. Dharmveer Singh	Businessman
			Mr. Suresh C. Rana	Village Farmer
			Mr.Manmohan S. Chauhan	Businessman
			Mr.Jagdish Pd. Juydi	Businessman
			Mr. Kishan S. Rana	Resident
			Mr. Kamesh	Village Farmer

3	16.06.2014	Phoolchatti	Mr. B.S. Rawat	Manager TRH
			Mr. Pyarelal	TRH Staff
			Mr. Jag Mohan	Farmer
			Mr. Om Veer Singh	Farmer
			Mr. Pyar Das	Farmer
			Mr. Kundiya S. Tomar	Villagers
			Mr. Vinod S. Rawat	Farmer
			Mr. Abhishek Kumar	Villagers
			Mr. Harbansh Singh	Villagers
4	16.06.2014	Raithal	Mr. Prabodh Dabral	Manager TRH
			Mr. B.P Pokhriyal	Tourism Officer
			Mr. Lakshamn Singh	Villager Farmer
			Mr M.M.S. Rawat	Contractor
			Mr. Himmat Singh	Farmer
			Mr. Bishan Singh	Farmer
			Mr. Ramesh Rawat	Farmer
			Mr. Jagprakash	Farmer
			Mr. Ram Bhagat	Farmer
			Mr Satya Singh	Farmer
5	17.06.204	Harsil	Mr. Vikram Panwar	Manager TRH
			Mr. Vinod Rana	TRH Staff
			Mr. Umed Singh	Govt. Service
			Mr. Kishan Negi	Villager
			Mr. Shiv Charan	Farmer
			Mr. Praveen Singh	Farmer
			Mr. Vinod Rana	Resident
			Mr. Anuj Semwal	Resident
			Mr. Bishan Singh	Villager
			Mr. Bhupendra Singh	Villager
			Mr. Vijay Rawat	Villager
6	17.06.2014	Barsu	Mr. Vijay Semwal	Manager TRH
			Mr. B.S. Rawat	TRH Staff
			Mr. Jagmohan	Resident
			Mr. Manbeer Singh	Farmer
			Mr. Mr. M.S. Rawat	Govt. Service
			Mr. Virendra Kumar	Service
			Mr. Rajveer Singh	Farmer
			Mr. Manoj Rangar	Farmer
			Mr. Arvind Pd. Raturi	Farmer
			Mr. Ramesh Raturi	Farmer
			Mr. Dinesh Panwar	Farmer
7	19.06.2014.	Pandukeshwar	Mr. S.P Sati	Govt. Employee
			Mr. Jagjeet Mehta	Resident
			Mr. Ishwar S. Bhagat	businessman
			Mr. Kaushal Bhandari	Villagers
			Mr. Lakshman Nainwal	busineesman
			Mr. Atul Sharma	Villagers
			Mrs. Maheshwari Sharma	Villagers/ housewife

			Mrs. Guddi Devi	Villagers/ housewife
			Mrs. Geeta Kunwar	Villagers/Housewife
			Mr. Arvind Sharma	Resident
8	19.06.2014	Joshimath /Auli	Mr. Hiralal	Tourism Officer
			Mr. P.N. Semwal	Manager TRH
			Mr. Lalit Kohli	Manager TRH
			Mr. Madan Panwa2	Manager TRH
			Manoj Jain	Businessman
			Manoj Panwar	Contractor
			Jagdish Kumar	Resident, Service
			Prakash Negi	Social Worker
			Dhaneshwari Rana	Villagers
			Dhirendra Parmar	Businessman
			Indra Singh	Resident
			Papu Rana	Village Farmer
9	22.06.2014	Kartik-Swami-(Kanakchauri)	Mr. Rahul Langer	District Magistrate
			Mr. Chauhan	SDM
			Mrs. Seema Nautiyal	District Tourism Development Officer
			Mr. M. S. Negi	Businessman
			Mr. Jeet S. Negi	Businessman
			Mr. Guman S. Negi	Businessman
			Mr. Dinesh S. Negi	Farmer
			Mr. Mahaveer Singh	Farmer
			Mr. Jot Singh	Farmer
			Mr. Vikram Singh	Farmer
			Mr. Avtar Singh	Farmer
10	23.06.2014	Deval	Mr. Bhawan Singh	KMVN
			Mr. Kanchan Singh	Resident/ Photographer
			Mr. Kripal Singh	Farmer
			Mr. Bhajan Singh	Worker
			Mr. Hari Prasad	Farmer
			Mr. Naresh Singh	Businessman
			Mr. Kamal Kant	Businessman
			Mr. Devi Pd. Gairola	Businessman
11	23.06.2014	Lohajang	Mr. Ganga Singh	Contractor
			Mr. Dayal Singh	Service person
			Mr. Verendra Singh	Businessman
			Mr. Khilaf Singh	Businessman
			Mr. Mohar Singh	Farmer
			Mr. Kriti Rawat	Farmer
			Mr. Chandan Singh	Farmer
23	25.06.2014	Dehradun	Mr. Rajesh Kumar	Managing Director, PIU- GMVN
24	25.06.2014		Mr. Sanjay Gupta	Procurrement

				Officer, PIU- GMVN
25	25.06.2014		Mr. Gambhir Singh	Specialist- Engineering & Construction supervison, PIU- GMVN
26	25.06.2014		Mr. M.M. Dhasmana	J. Engineer, PIU- GMVN

Place: Purola and Barkot
District: Uttarkashi
Date:15/06/2014
Participants:GMVN officials and Villagers

1.	**IssuesDiscussed:** • 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'sResponse:** • 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. • Existing resources (market/ water supply/ fuel/fooder) available in the area should not be used in the proper way by the construction workers. • Out side labour should not be hired during construction and operation. • Effort should be taken to avoid any major health hazard during constuction.
3.	**Recommendations&Suggestions:** • Efforts should be taken for the generation of employment for local people in construction work • Measures should be taken to avoid extra pressure on the existing resources in the area.

Place: Phoolchatti
District: Uttarkashi
Date: 16/06/2014
Participants: GMVN officials and Villagers

1.	**IssuesDiscussed:** • 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'sResponse:** • 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. • Project is much needed due to unavailability 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 • In order to avoid extra pressure on natural resources propoer measure will be adopted during construing/ operation of FRP huts.

Place: Raithal
District: Uttarkashi
Date: 16/06/2014
Participants: GMVN officials and Villagers

1.	**IssuesDiscussed:** • Impact on the local facilities availanle in the area. • Sanctity and identity of the local area should not be harmed. • Pressure should not be on the local resources. • Local people may be engaged during the construction and operation

2.	**Stakeholder'sResponse:** • Villagers think that the area will get exposure due the torism development. • Project should not have any pressure on the local area. • Employment for local village people for construction. • Construction activity is not causing any major health hazard.
3.	**Recommendations&Suggestions:** • Local labor should be engaged during construction.

Place: Harsil and Barsu
District: Chamoli
Date: 17/06/2014
Participants:GMVN officials and Villagers

1.	**IssuesDiscussed:** • Local area will be developed due the tourism development. • People's expectation for employment generation during construction. • Local products may be incouraged. • Any loss of land/ property due to construction activity.
2.	**Stakeholder'sResponse:** • Theres should not be any major impact on the area due to the constryction. • Villagers must get an employement during the construction/ operation. • Local culture and product may be used during the operation. • Construction should not have any health impact on the local area. • Only Revenue/ Govt. Land may be used for the proposed work.
3.	**Recommendations&Suggestions:** • Local labor should be engaged during construction.

Place: Pandukeshwar
District: Chamoli
Date:19/06/2014
Participants:GMVN officials and Villagers

1.	**IssuesDiscussed:** • 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'sResponse:** • 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. • Effort should be taken to avoid any major health hazard during constuction. • Existing structure are not enough to accommodate tourist during peak season time.
3.	**Recommendations/Suggestions:** • Efforts should be taken to generate employment for local people in construction work.

Place: Joshimath and Auli
District: Chamoli
Date: 19/06/2014
Participants:GMVN officials and Villagers

1.	**IssuesDiscussed:** • Increase opportunity by the proposed work/ project. • Area will be developed or get exposure by the development of tourism. • Any loss of housing, agricultural land and other property or displacement of people fully or partially. • Local resources will be sustnaibly developed.
2.	**Stakeholder'sResponse:** • Due to the project area overall development of the area will be enhance. • Project should not have any pressure on their natural resources. • Local people/contractor may get opportunity during the constructionperiod. • Proper measures shall be taken to the management of the waste generated during construction/ operation of the project.
3.	**Recommendations&Suggestions:**

	• Local labor should be engaged during construction. • Existing resources of the area may not be harmed. • Provision should be made for propoer dumping of waste generated during operation of these FRPs.

Place: Kartikswami- (Kanakchauri/Ghimtoli)
District: Rudraprayag
Date:18/06/2014
Participants:GMVN officials and Villagers

1.	**IssuesDiscussed:** • 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'sResponse:** • No any major impact on environment, flora and fauna due to construction activity but due care should be taken to preserve flora. • During construction the road network should be developed/maintained the contractor. • Villagers want employment for local village people during construction. • Effort should be taken to avoid any major health hazard during constuction. • Existing infrastructure are not adequet to accomudate more tourist. • Exisiting water resources should not be disturbed during construction and operation.
3.	**Recommendations&Suggestions:** • Employement to local worker should be provided during construction and operation of the project. • Provision should be made for propoer dumping of waste generated during operation of these FRPs.

Place: Deval **District:** Chamoli **Date:** 23/06/2014 **Participants:** GMVN officials and Villagers	
1.	**IssuesDiscussed:** • Discussion among public for sharing of information related to project. • Scope of employement generation fro the local people during construction/operation phase of the project. • Construction activity whether causing any type of health hazard or not.? • Any impact on any historical, cultural or religious monument. • Will the proposed work will creat extra burden on the available market. • Available road structure should be repaired if damaged during the construction phase.
2.	**Stakeholder'sResponse:** • There will be no adverse impact on the environmental condtion of the area. • Villagers want employment for local village people during construction. • Effort should be taken to avoid any major health hazard during constuction. • During construction the road network should be developed/maintained the contractor. • Exisiting water resources should not be disturbed during construction and operation.
3.	**Recommendations&Suggestions:** • Employement to local worker should be provided during construction and operation of the project.

Place: Lohajung District:Chamoli Date:23/06/2014 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'sResponse: • No any major impact on environment due to construction activity. • Villagers think for better livelihood and overall development. • Project should not have any pressure on their natural resources. • 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. • Measures shall be taken to avaod any deteriomental impact on the existing natural resources.

B. Future Consultation and Information Disclosure

151. 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

152. 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.

76. 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.

77. 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

78. 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.

79. 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

80. 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.

81. 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. Copies of the IEE will be kept in the PMU/PIU office and will be distributed to any person willing to consult the IEE.

Public Consultation at Purola

Public Consultation at Phoolchatti

Public Consultation at Raithal

Public Consultation at Harsil

Public Consultation at Barsu

Contd....

Public Consultation at Pandukeshwar

Public Consultation at Joshimat

Public Consultation at Kankchauri (Ghimtoli)

Public Consultation at Deval

Public Consultation at Lohajung

Figure VI-1Photographs of Consultations

VII. ENVIRONMENTAL MANAGEMENT PLAN AND GRIEVANCE REDRESS MECHANSIM

A. Environmental Management and Monitoring Plan (EMMP)

82. 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.

83. 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.

84. 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.

85. 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

86. 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.

87. 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.
88. The Safeguard Staff of UEAP, SDMA (EA) in PMU, and IA will monitor the implementation of environmental covenants with assistance of Engineer (DSC).
89. 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, SDMA (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.

90. 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.

91. 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 Plan

92. 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.

93. 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

94. 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.
95. 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.
96. 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

97. 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

98. 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.
99. 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

100. 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.
101. The Contractor shall monitor the environmental parameters periodically as specified in the monitoring plan and report to the Engineer.
102. The Contractor shall reduce the dust emission due to construction activities by regular water sprinkling in the affected areas.
103. 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.
104. All the construction equipment and vehicles should remain all time in good conditions up to satisfaction of site engineers.
105. 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

106. 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.

107. 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

108. 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.
109. 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

110. 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.
111. 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.
112. 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 VII-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

Indicators	Parameters to be Monitored	Frequency	Responsibility
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 / 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/ construction camp 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 sensitive receptors/ construction camp during construction stage	Contractor, to be monitored through 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/ construction camp during construction	Contractor, to be monitored through approved Monitoring Agency

Indicators	Parameters to be Monitored	Frequency	Responsibility
		stage	
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

113. As part of good engineering practices in the project, there have been several measures as erosion prevention, rehabilitation of borrow areas, safety, signage, provision of temporary drains, etc., the costs for which will be included in the design costs (site development cost) of specific subprojects. Therefore, these items of costs have not been included in the IEE budget. Only those items not covered under budgets for construction are included in the IEE budget.
114. 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 Garhwal Mandal Vikas Nigamas 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.

115. 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).

116. 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-2below.

117. 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 VII-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	1,50,000	1,50,000	
C.	**Environmental Baseline Data Generation**						
1.	Ambient Air Quality monitoring	Pre-Construction	Per Sample	12	15000	1,80,000	Contractors cost
2.	Noise Quality monitoring			12	5,000	60,000	
3.	Water Quality monitoring			12	9,200	1,10,400	
4.	Soil			12	8000	96,000	
D.	**Environmental Monitoring**						
1	Air quality	Construction	Per sample	36	15,000	5,40,000	
2	Water quality		Per sample	36	9200	331200	
3	Noise Levels		Per location	36	5000	1,80,000	
4	Soil			36	8000	2,88,000	
5.	Dust Suppression at subproject sites	Construction and defect liability phases	lump sum		lump sum	1,00,000	
6	Ambient Air Quality	Operation/ Defect Liability Period	Per Sample	36	15000	5,40,000	Implementing Agencies cost/ Contractors cost
7	Water quality		Per year	36	9200	3,31,200	
8	Ambient Noise Quality		Per Sample	36	5000	1,80,000	
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		3	50,000	1,50,000	PMU/DSC
					Total INR	32,36,800	

The above costs have been arrived on lump sum basis and subject to change based on actual number of samples and locations to be assessed while preparing IEE. Any additional no of samples required to be performed for baseline data and construction stage monitoring would be paid the unit rate derived from the contractor's quotes.

F. Environmental Monitoring and Reporting

118. 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 assessmentof the implementation performance and its verification by the PMU safeguards specialist. PMU will also take corrective actions as required.
119. Monitoring reports will be posted in a location accessible to the public.
120. 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 VII-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	IA, Contractor
		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	
		A general regard for the social and	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
		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.			
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	Environment and Safety Officer of Contractor with the Engineer, EE & F-PIU	IA & PMU	IA, Contractor

[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
		can be dealt with quickly and by the appropriate person(s).			
		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 nature and duration of construction works and contact numbers for concerns/complaints.	Contractor with the Engineer, EE & F-PIU	IA & PMU	
		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	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	IA

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
	and the architectural/archaeological character of the surroundings				
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	IA
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	IA
2.3	Selection of materials and construction technologies, if not carefully chosen, will adversely impact the aesthetic appeal of the destinations	Selection of materials will be from approved sources and construction technologies proposed will strictly conform to the Uttarakhand architecture. Any new landscaping elements will only utilize native species. Material selection would be done keeping in view that no asbestos (except as allowed), and CFC is used.	Engineer, EE, and F-PIU	IA & PMU	IA
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	Engineer, EE, and F-PIU	Contractor, IA & PMU	IA

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

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		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.			
3.2	Drinking water availability	Sufficient supply of cold potable water to be provided and maintained. The water quality shall be as per standard norms for drinking water. If the drinking water is obtained from an intermittent public water supply then storage tanks will be provided. The cleanliness of the storage tanks will be ensured and all measures to be taken to avoid any water contamination.	Contractor	Engineer and EE	Contractor
3.3	Waste disposal	Pre-identified disposal location (identified by Contractor and approved by EE-DSC) shall be part of Comprehensive Waste Disposal Plan	Contractor with the Engineer	F-PIU, IA & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		Solid Waste Management Plan to be prepared by the Contractor in consultation and with approval of Environmental Specialist of DSC. The Environmental Specialist of DSC shall approve these disposal sites after conducting a joint inspection on the site with the Contractor. Wherever, possible Solid waste management shall be through local ULB system or other alternate measures. Contractor shall ensure that waste shall not be disposed off near the water course or agricultural land, Orchards and Natural Habitats like Grasslands.			
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	Contractor
3.5	Quarry operations	Contractor shall finalize the quarry for procurement of construction materials after assessment of the availability of sufficient quantity of materials, quality and other logistic 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	Contractor with the Engineer	F-PIU, IA & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		the material will be covered to prevent spillage.			
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 agercies 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 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.	Contractor with the Engineer	F-PIU, IA & PMU	Contractor
3.7	Soil/Land Erosion	Slope protection measures will be undertaken as per design to control soil erosion.	Contractor with the Engineer	FPIU, IA & PMU	Contractor
3.8	Water Pollution from Construction Wastes	The Contractor shall take all precautionary measures to prevent entering of wastewater into streams, water bodies or the irrigation system during construction Contractor shall not wash his vehicles in river/stream water and shall not enter riverbed nearby the water resource area for that purpose.	Contractor with the Engineer	Engineer, F-PIU & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
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	Contractor
3.10	Soil Pollution due to fuel and lubricants, construction waste	The fuel storage and vehicle cleaning area will be stationed such that spillage of fuels and lubricants does not contaminate the ground. All pollution parameters will be monitored as per monitoring plan. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be collected and separated through an oil interceptor before discharging it on land or into other treatment system.	Contractor	Engineer, F-PIU & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
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	Contractor
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	Contractor
3.13	Noise Pollution	The Contractor shall confirm that all Construction equipment used in construction shall strictly conform to the MoEF&CC/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	Contractor with the Engineer	EE, F-PIU & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		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 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	Contractor
3.15	Disposal of Construction Waste / Debris / Cut Material	The Contractor shall confirm that Safe disposal of the construction waste will be ensured in the pre-identified	Contractor	Engineer, F-PIU & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		disposal locations. In no case, any construction waste will be disposed around the project site indiscriminately.			
3.16	Safety Measures During Construction	PersonalProtectiveEquipmentfor workersonthe projectandadequatesafety measuresfor workers duringhandlingofmaterials atsitewill betakenup. TheContractorhastocomply with allregulations regardingsafe scaffolding,ladders,workingplatforms, gangway, stairwells, excavations,trenchesandsafe means ofentry andegress. The Contractor has to comply with all regulations for the safety of workers. Precaution will be taken to prevent danger of the workers from fire, etc. First aid treatment will be made available for all injuries likely to be sustained during the course of work. Contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camp. Contact information of Doctor, availability & 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	Contractor	Engineer, F-PIU & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		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	Contractor
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	IA, Contractor
3.20	Conflict with locals	Contractor shall ensure that mostly the local labourers are employed and migratory laborer shall be employed	Contractor	Engineer, F-PIU & PMU	Contractor

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		only in case of unavoidable 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	Contractor
4	**Operation and Maintenance impacts**				
4.1	Environmental Conditions	The periodic monitoring of the ambient air quality, noise level, water (both ground, surface water) quality and soil, in the subproject area as suggested in pollution monitoring plan through an approved monitoring agency.	Pollution Monitoring Agency appointed by IA	SDMA, PMU	GMVN /Dept. Of Tourism, GoUK
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.	IA, EA and Tourism Department	SDMA, PMU &GoUK	GMVN /Dept. Of Tourism, GoUK

S. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Fund Source
		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; (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	GMVN/ 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), GMVN= Gharwal Manadal Vikas Nigam

G. Performance Indicator

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

Table VII-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 Ambient 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

122. 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.
123. 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 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.
124. 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.
125. 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.
126. 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.
127. 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

128. 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.
129. 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.
130. 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.
131. 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.
132. In conclusion, the sub-project will have overall beneficial impacts after completion in terms of enhancement in emergency preparedness by construction of FRP/HYBRID, Huts 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 FRP/Hybrid 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.
133. 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.

134. Based on the findings of the IEE, the classification of the subproject as Category —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: **Construction of FRP Huts**/Tented Accommodation in 05 most in affected Districts of Uttarakhand namely **Chamoli, Rudraprayag, Uttarkashi (Garhwal Region)**, Pithoragarh & Bageshwar

Processing Stage : Sub-Project Appraisal Report (SAR) preparation

Modality :

[ ] Project Loan [ ] Program Loan [ ] Financial Intermediary [ ] General Corporate Finance
[ ] Sector Loan [X] 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 construction of shelters and huts is proposed to restore climatic resilient tourism and assist disaster affected population, also considering the future preparedness to provide emergency evacuation shelters to tourists & pilgrims. The proposed project of **Construction Of FRP Huts in Garhwal region of Uttarakhand** falls under the Environmental Category "B" as its potential environmental impacts are less adverse than those of category A projects. The	The Project Category as per ADB Safeguard Policy (SPS) 2009 is "B" and IEE is required.

impacts are site specific and can be mitigated readily through EMP.	

F. Approval

Proposed by: Field PIU Garhwal (Garhwal Mandal Vikas Nigam)	**Reviewed by**: Environment Safeguard Specialist, PIU Tourism - Environment & Social Management Cell (ESMC)
(Sign. of Deputy Team Leader, Field PIU Garhwal)	**(Sign. of Environment Safeguard Specialist, PIU Tourism)**
Date:	Date:
(Sign. of Team Leader, Field PIU- Garhwal-GMVN)	**Endorsed by: Additional Project Manager, PIU Tourism**
Date:	Date:
Endorsed by: Authorised Signatory, Field PIU Garhwal-GMVN Managing Director Garhwal Mandal Vikas Nigam Ltd Dehradun	**Approved by: Project Manager, PIU Tourism** **Chief Compliance Officer: The project is not coming under HCS.**
Date:	Date:

Rapid Environmental Assessment (REA) Checklist
Construction Of FRP Huts: District Chamoli

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 the 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.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:

India /Loan 3055-IND Uttarakhand Emergency Assistance Project (UEAP) :**Construction of FRP Huts**/Tented Accommodation in 05 most affected Districts of Uttarakhand namely **Chamoli**, Rudraprayag, Uttarkashi, Pithoragarh & Bageshwar

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		√	
C. Potential Environmental Impacts Will the Project cause.....			
▪ impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to physical cultural resources?		√	
▪ disturbance to precious ecology (e.g. sensitive or ▪ protected areas)?		√	
▪ alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	

Screening Questions	Yes	No	Remarks
▪ deterioration of surface water quality due to silt runoff 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 pre fabricated 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 pre fabricated 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 Peoples 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?		√	
▪ community safety risks due to both accidental and natural causes, especially where the structural elements		√	FRP structures are designed to ensure safety of the community

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?			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 pre fabricated 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)?		√	

Rapid Environmental Assessment (REA) Checklist
Construction Of FRP Huts: District Rudraprayag

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 the 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.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:

India /Loan 3055-IND Uttarakhand Emergency Assistance Project (UEAP) :**Construction of FRP Huts**/Tented Accommodation in 05 most affected Districts of Uttarakhand namely Chamoli, **Rudraprayag**, Uttarkashi, Pithoragarh & Bageshwar

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		√	
C. Potential Environmental Impacts Will the Project cause.....			
▪ impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to physical cultural resources?		√	
▪ disturbance to precious ecology (e.g. sensitive or ▪ protected areas)?		√	
▪ alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	

Screening Questions	Yes	No	Remarks
▪ deterioration of surface water quality due to silt runoff 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 pre fabricated 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 pre fabricated 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 Peoples 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?		√	
▪ community safety risks due to both accidental and natural causes, especially where the structural elements		√	FRP structures are designed to ensure safety of the community

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?			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 pre fabricated 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)?		√	

Rapid Environmental Assessment (REA) Checklist
Construction Of FRP Huts: District Uttarkashi

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 the 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.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:

India /Loan 3055-IND Uttarakhand Emergency Assistance Project (UEAP) :**Construction of FRP Huts**/Tented Accommodation in 05 most affected Districts of Uttarakhand namely Chamoli, Rudraprayag, **Uttarkashi**, Pithoragarh & Bageshwar

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		√	
C. Potential Environmental Impacts Will the Project cause.....			
▪ impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to physical cultural resources?		√	
▪ disturbance to precious ecology (e.g. sensitive or ▪ protected areas)?		√	
▪ alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	

Screening Questions	Yes	No	Remarks
▪ deterioration of surface water quality due to silt runoff 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 pre fabricated 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 pre fabricated 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 Peoples 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?		√	
▪ community safety risks due to both accidental and natural causes, especially where the structural elements		√	FRP structures are designed to ensure safety of the community

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?			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
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▪ generation of wastewater during construction or operation?	√		Construction activities involve installation of pre fabricated 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)?		√	

Public Consultation Record

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

Name of the Project ::

Project Package No. :: UK/UEAP-T(GMVN)/DDN/0 (ADB LOAN No. 3055 - IND)

Locations to be Improved :: Purola

Place of Public Consultation :: Purola

Tehsil :: Purola

District :: Uttarkashi

Date :: 15.06.2014

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

Sl.No.	Name and Address	Occupation	Signature
1	Roshan Bijalwan 9412320307	Banking Service	[illegible]
2	Brij Bhushan	Business	[illegible]
3	Vikram Singh Rawat	Govt. Service	[illegible]
4	NAVEEN SINGH RAWAT	Business [illegible] 9411188360	[illegible]
5	[illegible]	नगर पंचायत पुरोला 9410195402	[illegible]
6	श्री. प्यारेलाल [illegible]	[illegible] 9412320103	
7	[illegible]	[illegible] खण्ड पुरोला 9411547630	[illegible]
8	अरविन्द [illegible]	उपाध्यक्ष [illegible] पुरोला	9411395455 [illegible]
9	[illegible]	[illegible]	8979027746 [illegible]
10	[illegible]	पुरोला व्यवसायी	8958099297 [illegible]
11	[illegible]	पुरोला [illegible]	9012297327 [illegible]
12	Dinesh Gaur	Media Reporter	9411105481 [illegible]
13	K. C. Bharti	[illegible]	9456114836
14	Brij Mohan	Revenue Dept. Purola	9458125742 [illegible]
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Publi. Consultation Record

ne of Project	: Uttarakhand Emergency Assistance Project (UEAP)
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ject Package No.	: UK/UEAP-T(GMVN)/DDN/0 (ADB LOAN No 3055 IND)
cations to be Improved	
ce of Public Consultation	: Barkot
nsil	: Purola
strict	: Uttarkashi
te	: 15.06.2014

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

.No.	Name and Address	Occupation	Signature
1	[illegible]	हाँ YS	[illegible]
2	Bhushan Singh Bisht [illegible]	हाँ	[illegible]
3	[illegible]	[illegible]	[illegible]
4	[illegible]	yes	[illegible]
5	[illegible]	Yes	[illegible]
6	Suresh chandra Rana	Business	[illegible]
7	Manmohan Singh chauhan.	हाँ	[illegible]
8	हरि[illegible]सिंह राणा [illegible]	yes	[illegible]
9	जगदीश प्रसाद [illegible]	हाँ	[illegible]
10	[illegible]	Yes	[illegible]
11	[illegible] Krishan Singh Rana	Yes	[illegible]
12	Kamesh Singh Rawat	yes	[illegible]
13	[illegible]	हाँ	[illegible]
14	[illegible]	yes	[illegible]
15	[illegible] Singh Barkot[illegible]		
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Public Consultation Record

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

Project Package No. :: UK/UEAP-T(GMVN)/DDN/0 (ADB LOAN No. 3055 - IND)
Locations to be Improved :: Phoolchalli
Place of Public Consultation :: Phoolchalli village
Tehsil :: Rajgarhi
District :: Uttarkashi
Date :: 16.06.2014

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

Sl.No.	Name and Address	Occcupation	Signature
1	[illegible]	[illegible]	
2	[illegible]	[illegible]	
3	[illegible]	[illegible]	
4	[illegible]	[illegible]	
5	[illegible]	[illegible]	
6	[illegible]	[illegible]	
7	[illegible]	[illegible]	
8	[illegible]	[illegible]	
9	[illegible]	[illegible]	
10	[illegible]	[illegible]	Rohit Kumar
11	[illegible]	[illegible]	
12	[illegible]	[illegible]	
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Public Consultation Record

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

Project Package No. :: UK/UEAP-T(GMVN)/DDN/0 (ADB LOAN No. 3055 - IND)
Locations to be Improved :: Raithal
Place of Public Consultation :: Raithal village
Tehsil :: Bhatwari
District :: Uttarkashi
Date :: 16.06.2014

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

Sl.No.	Name and Address	Occcupation	Signature
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Public Consultation Record

Name of Project : Uttarakhand Emergency Assistance Project (UEAP)
Name of the Project :
Project Package No. : UK/UEAP-1(GMVN)/DDN/0 (ADB LOAN No. 3055 - IND)
Locations to be Improved : Harsil
Place of Public Consultation : Harsil
Tehsil : Bhatwari
District : Uttarkashi
Date : 17.06.2014

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

Sl.No.	Name and Address	Occupation	Signature
1	[illegible]	[illegible]	
2	[illegible]	[illegible]	
3	[illegible]	[illegible]	
4	[illegible]	[illegible]	
5	[illegible]	[illegible]	
6	[illegible]	[illegible]	
7	[illegible]	[illegible]	
8	[illegible]	[illegible]	
9	[illegible]	[illegible]	
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Public Consultation Record

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

Project Package No. :: UK/UEAP-T(GMVN)/DDN/0 (ADB LOAN No. 3055 - IND)
Locations to be Improved :: Barsu
Place of Public Consultation :: Barsu
Tehsil :: Bhatwari
District :: Uttarkashi
Date :: 17.06.2014

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

Sl.No.	Name and Address	Occupation	Signature
1	मनवीर सिंह रावत	दुकान, खेती	
2	Mahipal Singh Rawat	Service	
3	Virendra Kumar	M.C. Tolkar	
4	विनोद सिंह रावत	खेती	
5	[illegible]	खेती	
6	[illegible]	खेती	
7	[illegible]	खेती	
8	[illegible]	खेती	
9	[illegible]	खेती	
10	Dinesh Singh Panwar	Farmer	
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Public Consultation Record

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

Project Package No : UK/UEAP-I(GMVN)/DDN/0 (ADB LOAN No 3055 IND)
Locations to be improved : Pandukeshwar
Place of Public Consultation : Pandukeshwar village
Tehsil : Joshimath
District : Chamoli
Date : 19.06.2014

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

S.NO	Name	Phone	Signature
1	जगजीत मेहता	9411350387	[signature]
2	ईश्वर सिंह [illegible]		[signature]
3	कौशल भंडारी	94113591[illegible]	[signature]
4	S.D. [illegible]	9410708812	[signature]
5	[illegible]	9411350270	[signature]
6	लक्ष्मण नेगी	9412912228	
7	अरविन्द [illegible] (सभी [illegible])	94576416	[signature]
8	अतुल शर्मा	9579041225	[signature]
9	विमला मेहता		
10	हेमन्ती राणा	7579023861	हेमन्ती राणा
11	महेश्वरी शर्मा	9411768288	[signature]
12	गुड्डी देवी	9410116327	गुड्डी देवी
13	[illegible] भण्डारी	9456579583	[signature]
14	सत्य कुमार [illegible]	9410595725	[signature]
15	एस. एस. कोठियाल, प्रधानाचार्य रा.इ.का. पाण्डुकेश्वर	9411599462	[signature]
16	[illegible] भण्डारी	7579114906	[signature]
17	[illegible]	9458600684	[signature]
	सुनीता कुँवर	9458527429	[signature]
(16)	[illegible] मेहता [illegible]	9456579624	[signature]
(17)	कुँवरपाल [illegible]	9410528876	[signature]
(18)	सरोजनी देवी		
19	[illegible]	9456765725	[signature]

Public Consultation Record

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

Project Package No. :: UK/UEAP-T(GMVN)/DDN/0 (ADB LOAN No. 3055 IND)
Locations to be Improved ::
Place of Public Consultation :: Joshimath (Ravigram) | Auli
Tehsil :: Joshimath
District :: chamoli
Date :: 19.06.2014

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

Sl.No.	Name and Address	Occcupation	Signature
1	मनोज जैन मैन बाजार	जोशीमठ (व्यापारी)	8650555711
2	मनोज पंवार सिंहधार	जोशीमठ (ठेकेदार)	7895441542
3	विनोद पंवार सिंहधार	जोशीमठ (ठेकेदार)	9634246065
4	जगदीश कुमार होडा गाँव	जोशीमठ (कर्मचारी)	7830325358
5	प्रकाश नेगी गाँव	जोशीमठ (समाज सेवक)	8057755133
6	धनेश्वरी राणा जोशीमठ	जोशीमठ ( )	9557536825
7	धीरेन्द्र पवार मनोहरबाग	जोशीमठ (व्यापार)	7895784140
8	इन्द्र सिंह होडा गाँव	जोशीमठ (पत्रकार)	9412019012
9	उत्तम सिंह मैन बाजार	जोशीमठ (कर्मचारी)	9410191761
10	पप्पू राणा मैन बाजार	जोशीमठ (युवक)	01389-221966
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Public Consultation Record

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

Name of the Project ::

Project Package No. :: UK/UEAP-T(GMVN)/DDN/0 (ADB LOAN No. 3055 - IND)

Locations to be Improved :: Karakchdum

Place of Public Consultation ::

Tehsil :: Ukimath

District :: Rudraprayag

Date :: 22-06-2016

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

Sl.No.	Name and Address	Occupation	Signature
1	Manbar Singh Negi	Shopkeeper 969032[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]
3	[illegible] नेगी	[illegible] 8057987837	[illegible]
4	[illegible] नेगी	दुकानदार 94102[illegible]	[illegible]
5	[illegible] नेगी	कृषक 96905 75525	[illegible]
6	[illegible]	[illegible] पूर्व सैनिक	[illegible]
7	[illegible]	कृषक	[illegible]
8	महावीर सिंह [illegible]	कृषक 7536865357	Mahabir
9	[illegible]	कृषक 7500341774	[illegible]
10	[illegible] सिंह	विद्यार्थी 98370506[illegible]0	[illegible]
11	विक्रम सिंह	कृषक 750045[illegible]	[illegible]
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Public Consultation Record

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

Project Package No. :: UK/UEAP-T(GMVN)/DDN/0 (ADB LOAN No. 3055 - IND)
Locations to be Improved ::
Place of Public Consultation :: Deval
Tehsil :: Tharali
District :: Chamoli
Date :: 23.06.2014

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

Sl.No.	Name and Address	Occupation	Signature
1	अपन सिंह ग्राम देवल	आम-चोरी	9675278711
2	कंचन सिंह ग्राम देवल	प्रोग्रामर	8755618029
3	भूपाल सिंह ग्राम देवल	इंजीनियर	8171090213
4	भजन सिंह ग्राम देवाल	कृषक	9456134004
5	राम सिंह ग्राम देवाल	मिस्त्री	9897469531
6	हरि प्रसाद ग्राम देवाल	किसान	9897538883
7	नरेश सिंह ग्राम देवाल	दुकानदारी	8979630423
8	कमल कांत ग्राम देवाल	दुकानदारी	9412032492
9	पराग्राल नेगी ग्राम देवाल	किसान	8439145451
10	देवी प्रसाद गैरोला ग्राम देवाल	दुकानदारी	7895033016
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Public Consultation Record

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

Project Package No. :: UK/UEAP-T(GMVN)/DDN/0 (ADB LOAN No. 3055 - IND)
Locations to be Improved :: Lohjang
Place of Public Consultation :: Lohjang
Tehsil :: Thanali
District :: Chamoli
Date :: 28.06.2014

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

Sl.No.	Name and Address	Occcupation	Signature
1	जगा सिंह लोहजंग	ठेकेदार	9997635228
2	दयाल सिंह लोहजंग	कर्मचारी	9536249929
3	विरेंद्र सिंह नेगी लोहजंग	व्यापारी	9897676945
4	विलाश सिंह लोहजंग	दुकानदार	7409121069
5	हरेंद्र सिंह लोहजंग	दुकानदार	9720938227
6	मोहर सिंह लोहजंग	किसान	9411379847
7	कृति रावत लोहजंग	किसान	9639193045
8	चंदन सिंह लोहजंग	किसान	9458310459
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Appendix 3

Site Photographs

Plate 1: Proposed site for FRP/Hybrid Hut Phoolchatti

Plate 2: Proposed site for FRP/Hybrid Hut Auli

Plate 3: Proposed site for FRP/Hybrid Hut, Barkot

Plate 4: Proposed site for FRP/Hybrid Hut Purola

Plate 5: Proposed site for FRP/Hybrid Hut Barsu

Plate 6: Proposed site for FRP/Hybrid Hut Raithal

Plate 7: Proposed site for FRP/Hybrid Hut Harsil

Plate 8: Proposed site for FRP/Hybrid Hut Joshimath

Plate 9: Proposed site for FRP/Hybrid Hut, Pandukeshwar

Plate 10: Proposed site for FRP/Hybrid Hut Ghimtoli

Plate 11: Proposed site for FRP/Hybrid Hut Deval

Plate 12: Proposed site for FRP/Hybrid Hut Lohajung

Appendix 4

MoEF&CC 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 Work Department, Government of Uttrakhand Dehradun.
5. The Principal Chief Conservator of Forest, 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, RoFIQ 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