

**SJVN LIMITED**

(A Joint Venture of Govt. of India and Govt. of Himachal Pradesh)

**CATCHMENT AREA TREATMENT PLAN OF SUNNI DAM  
HYDRO ELECTRIC PROJECT (382 MW)**



PREPARED BY



**R. S. Envirolink Technologies Pvt. Ltd.**

402, BESTECH CHAMBER COMMERCIAL PLAZA,

B-BLOCK, SUSHANT LOK-I, GURGAON

PH. +91-124-4295383; [www.rstechnologies.co.in](http://www.rstechnologies.co.in)

एसजेवीएन लिमिटेड

**SJVN Limited**

(A joint venture of Govt. of India & Govt. of Himachal Pradesh)  
A 'Mini Ratna' & Schedule 'A' PSU  
CIN : CIN:L40101HP1988GOI008409

सुन्नी बांध हाईड्रो पावर प्रोजेक्ट

Sunni Dam Hydro Power Project

**HEAD OF PROJECT SECRETARIAT**

**UNDERTAKING**

It is hereby to undertake that CAT Plan of Sunni Dam Hydro Electric Project with an outlay Rs. 38.34 Crore has been framed on the total project cost as per Detailed Project Report (Rs.2555.71 Crore on June 2019 price level) submitted to Central Electricity Authority (CEA) for Techno-Economic Clearance (TEC). The TEC has been accorded by CEA on 11.02.2021 with an outlay of Rs. 2475.35 Crore (July 2020 price level) whereas the CAT Plan has been prepared for a cost of Rs. 38.34 Crore, which is 1.55% of the approved TEC cost dated 11.02.2021. If TEC cost is increased during the construction of Project, the same shall be intimated to the HP Forest Department and the CAT Plan outlay shall be revised accordingly.

Yours faithfully

  
(R. L. Negi)  
CGM/HOP

Sunni Dam HEP, SJVN, Bithal,  
Distt. Shimla (H.P.)

Place: Bithal

Dated: 17.03.2021

परियोजना कार्यालय: गांव बिथल, डो0 शमाथला,  
तहसील कुमरसैन जिला शिमला-172030  
दूरभाष 01782-221807, Fax No. 01782-222277 www.sjvn.nic.in  
कार्पोरेट मुख्यालय शक्ति सदान शानान  
शिमला-171006 (H.P.)

Project office : Village Bithal, P.O. Shamathala,  
Tehsil Kumarsain, Distt. Shimla-172030  
Tele :01782-221807, Fax No.:01782-222277 www.sjvn.nic.in  
Corporate H.Q. : Shakti Sadan Shanan,  
Shimla-171006(H.P.)

अपने तथा राष्ट्र के हित में ऊर्जा की बचत करें।

SAVE ENERGY FOR BENEFIT OF SELF AND NATION

## PREFACE

The objective of the Catchment Area Treatment plan is to prevent soil erosion in the catchment and ensure longevity of the reservoir. In the state of Himachal Pradesh all the developers of hydro power projects have to mandatorily provide resources for catchment area treatment in the catchments catering to their projects. Himachal Pradesh Forest Department, Government of Himachal Pradesh vide its Notification No. FFB-B-F-(5)-9/2017 dated 21.11.2019 has made it mandatory for the project developers to provide not less than 1.5% of the total project cost as CAT Plan cost.

The present report pertains to the Catchment Area Treatment plan for the free draining catchment area of the proposed Sunni Dam Hydro Electric Project, covering area between the dam site of the proposed Sunni Dam HEP near Khaira village up to dam site of the proposed Luhri HEP Stage-II near Nanj village. The plan is based on secondary data collected through various sources and primary data collected through extensive field surveys in the free draining catchment area, discussions with the Himachal Pradesh Forest Department officials and the project proponents (SJVN).

The report emphasizes on the need to rejuvenate various degraded ecosystems in order to ensure sustainable yield of resources like water, fuel wood and fodder for the needs of local human population living in the catchments as well as create suitable viable habitats for the wildlife in the area. An integrated catchment area management is proposed to ensure socially relevant, economically viable and ecologically sustainable development.

We are thankful to Dr. Savita, PCCF (HoFF), Sh. R. K. Gupta, APCCF (CAMPA), Ms. Urwashi Thakur, DFO (CAMPA), Sh. S. D. Sharma, CCF (CAMPA), Sh. B. L. Negi, CCF Rampur Circle, Sh. Chander Bhusan, DFO (HQ), Sh. Raj Kumar, DFO Kotgarh Forest Division, Sh. S. K. Musafir, CCF Mandi Circle, Sh. Vasu Deogar, DFO Karsog Forest Division, Sh. S. D. Sharma, CCF Shimla Circle, Sh. Sushil Rana, DFO Shimla Forest Division, Sh. Ajit Thakur, Director GHNP, Sh. Rakesh Kumar, DFO WL Kullu, Range Forest Officer Shikari Devi Wildlife Sanctuary and all the field staff of Karsog, Kotgarh, Shimla and Wildlife Kullu Forest Division for their guidance, valuable suggestions and support to prepare this plan.

We are also thankful to SJVN authorities especially Sh. Roshan Lal Negi, CGM/ HoP, Sh. Vikas Mahajan, AGM (Environment), and Sh. Ramanuj Verma, Manager (Environment) for their coordination.

We sincerely hope that this CAT Plan will achieve the objectives laid down for it.



March, 2021  
Gurgaon

Vimal Garg  
Director

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## LIST OF ABBREVIATIONS

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AGM	:	Additional General Manager
CAMPA	:	Compensatory Afforestation Fund Management & Planning Authority
CAT	:	Catchment Area Treatment
CCP	:	Comprehensive Catchment Area Treatment Plan
CCP SRB	:	Comprehensive Catchment Area Treatment Plan Satluj River Basin
CCF	:	Chief Conservator of Forests
CF	:	Conservator of Forests
CGM	:	Chief General Manager
cms	:	Centimetre
cum	:	Cubic Meter
DFO	:	Divisional Forest Officer
Dia	:	Diameter
DoE	:	Directorate of Energy
DPR	:	Detailed Project Report
DTEM	:	Digital Terrain Elevation Model
DWA	:	Digital Watershed Atlas
EIMU	:	Erosion Intensity Mapping Unit
EL	:	Elevation
Fin	:	Financial
FRL	:	Full Reservoir Level
FSI	:	Forest Survey of India
GeoTIFF	:	Georeferenced Tagged Image File Format
GHNP	:	Great Himalaya National Park
GIS	:	Geographic Information System
Govt	:	Government
Ha	:	Hectare
HEP	:	Hydro Electric Project
HFT	:	Himalayan Frontal Thrust
HH	:	Households
HoP	:	Head of Project
HP	:	Himachal Pradesh
HP ECOSOC	:	Himachal Pradesh Ecotourism Society
km	:	Kilometre
kWh	:	Kilo Watt Hour
m	:	Meter
MBF	:	Main Boundary Fault
MBT	:	Main Boundary Thrust
MCM	:	Million Cubic Meter
MCT	:	Main Central Thrust
MDDL	:	Minimum Drop Down Level
MM	:	Millimetre
MU	:	Million Unit
MW	:	Megawatt
NABET	:	National Accreditation Board for Education and Training
NBSS&LUP	:	National Bureau of Soil Survey & Land Use Planning
Phy	:	Physical

PMC	:	Palampur Municipal Council
PMF	:	Probable Maximum Flood
QCI	:	Quality Council of India
Rmt	:	Running Meter
RSET	:	R S Envirolink Technologies Pvt. Ltd.
RUSLE	:	Revised Universal Soil Loss Equation
SC	:	Scheduled Caste
SHEP	:	Small Hydro Electric Project
SLUSI	:	Soil and Land Use Survey of India
Sq km	:	Square Kilometre
SRTM	:	Shuttle Radar Topography Mission
SSW	:	South South-West
SPV	:	Special Purpose Vehicle
ST	:	Scheduled Tribes
SYI	:	Silt Yield Index
TEC	:	Techno-Economic Clearance
VFD	:	Village Forest Development Society
WII	:	Wildlife Institute of India
WL	:	Wildlife

# CHAPTER 1 INTRODUCTION

## 1.1 INTRODUCTION

Himachal Pradesh, with five major rivers flowing through the state, has about a quarter of India's total hydropower potential. These five major rivers are Beas, Ravi, Satluj, Yamuna and Chenab. Directorate of Energy, Government of Himachal Pradesh has assessed the total harnessable hydro power potential in Himachal Pradesh as 23579.8 MW (**Annexure I**). Himachal Pradesh has been consistently progressing in harnessing the hydropower potential and has over 10,645.57 MW of operational projects spread across the river basins. To tap such potential, efficiently and in an environmentally sustainable manner, is the top priority of state. Many hydro power projects in the state are at various stages of development. All these project developers have to mandatorily provide resources for catchment area treatment in the catchments catering to their projects. Implementation of Catchment Area Treatment (CAT) Plan is mandated to state forest department. Himachal Pradesh Forest Department, Government of Himachal Pradesh vide its Notification No. FFB-B-F-(5)-9/2017 dated 21.11.2019 (**Annexure-II**) has made it mandatory for the project developers to provide not less than 1.5% of the total project cost as CAT Plan cost.

As a part of this development, SJVN Ltd. engaged R S Envirolink Technologies Pvt. Ltd. (RSET), Gurugram, as consultant for preparation of CAT Plan of free draining catchment area of Sunni Dam Hydro Electric Project (HEP) on river Satluj in Shimla and Mandi Districts in the state of Himachal Pradesh. RSET is a QCI-NABET accredited company to undertake River Valley, Hydroelectric, Drainage and Irrigation Projects.

The total project cost of the Sunni Dam HEP as approved by Central Electricity Authority, Ministry of Power, Government of India is Rs. 2475.36 Crore (**Annexure-III**). The present CAT Plan has been prepared for a cost of Rs. 38.34 Crore (1.55% of Rs. 2475.36 Crore).

## 1.2 CAT PLANS STATUS IN SATLUJ BASIN

At present 17 CAT Plans of various HEPs in the Satluj Basin are under implementation. The CAT Plans of HEPs already formulated and under implementation are presented in **Table 1.1**.

**Table 1.1: CAT Plans Under Implementation**

S. No.	Name of Project	Stream/ River	Financial Outlay (Rs. in Crore)
1	Shongtong Karcham	Satluj River	60.43
2	Karcham Wangtoo	Satluj River	31.94
3	Nathpa Jhakri	Satluj River	29.57
4	Rampur	Satluj River	23.38
5	Kol Dam	Satluj River	65.23
6	Tidong	Tidong Khad	5.89
7	Kashang Stage-I	Kashang Khad	3.03
8	Baspa-II	Baspa River	28.83
9	Roura-II	Roura Khad	4.02
10	Wanger Homte	Bhaba Khad	2.02
11	Selti-Masrang	Bhaba Khad	3.86
12	Sorang	Sorang Khad	6.47
13	Kut	Kut Khad	Data Not Available
14	Upper Nanti	Nanti Khad	2.11
15	Lower Nanti	Nanti Khad	1.69
16	Sumez	Sechi Khad	2.30
17	Jongini	Nogli Khad	2.15

(Source: [http://aqisac.gov.in/hpcampa/Individual\\_CAT\\_Docs2.aspx](http://aqisac.gov.in/hpcampa/Individual_CAT_Docs2.aspx))

Apart from above mentioned project specific CAT plans, Comprehensive CAT Plan for the entire Satluj River Basin (hereinafter referred to as “CCP SRB”) within Himachal Pradesh i.e. from Shipki La upto the dam site of Kol Dam HEP was also prepared by Himachal Pradesh Forest Department. Catchment areas of all the above-mentioned CAT Plans fall within the catchment area of Comprehensive CAT Plan for the entire Satluj River Basin.

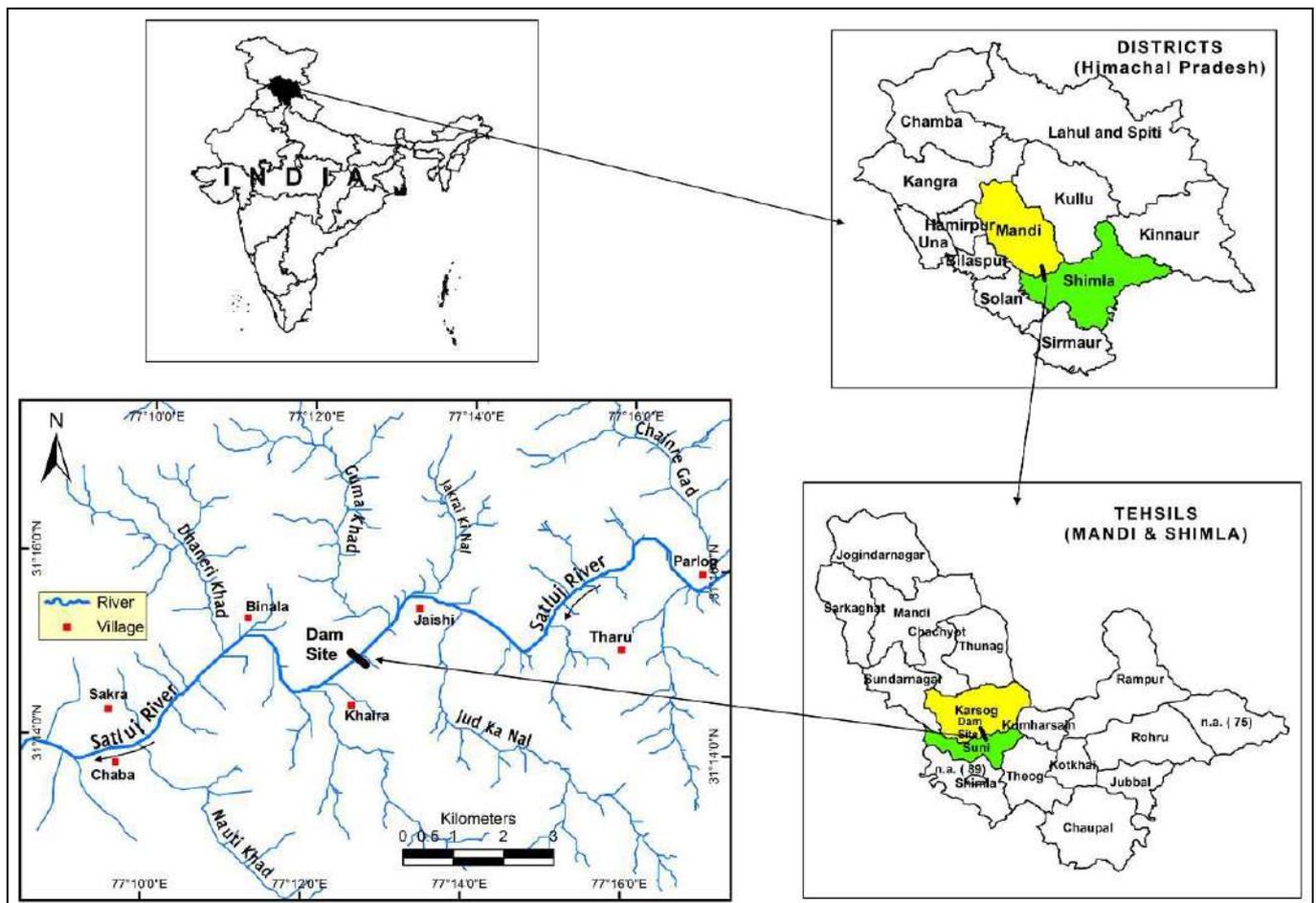
### 1.3 OBJECTIVE OF STUDY

Objective of the present study is to prepare CAT Plan for the free draining catchment. Immediately upstream project is proposed Luhri HEP Stage-II (172 MW), therefore, free draining catchment area to be considered for the present study has been delineated from the diversion site of proposed Sunni Dam HEP to the diversion site of proposed Luhri HEP Stage-II. The broad objectives for preparation of Catchment Area Treatment plan are outlined as under:

- i) Checking soil erosion and land degradation by taking up adequate and effective soil conservation measures, both engineering as well as biological, in erosion prone areas (mainly under very severe and severe erosion intensity categories).
- ii) Rehabilitation of degraded forest areas through afforestation and facilitating natural regeneration.
- iii) Rehabilitation of degraded slopes and landslide prone areas.

### 1.4 PROJECT DESCRIPTION

The proposed Sunni Dam (HEP) project is a run of the river scheme, with dam and underground toe powerhouse near village Khaira on MDR-22, located on the Satluj river about 50 km from Shimla, the State capital. The proposed 172 MW Luhri HEP Stage-II is immediately upstream of the project site and commissioned 800 MW Kol dam HEP is immediately downstream of the project site. Dam & underground toe powerhouse area lies in the districts of Shimla and Mandi of Himachal Pradesh. The project location map is given at **Figure 1.1**.



**Figure 1.1: Location Map of Sunni Dam HEP**

#### 1.4.1 Salient Features

The project envisages construction of a concrete gravity dam 71 m high from river bed level across river Satluj near Khaira village (31°45’ 53”N; 77°12’ 39”E), and toe power house (382 MW) on the right bank. The salient features of the project are given at **Table 1.2**. A general layout plan of the project is given at **Figure 1.2**.

**Table 1.2: Salient Features – Sunni Dam HEP**

I) Location	
State	Himachal Pradesh
District	Shimla & Mandi

River	Satluj
Nearest Village (Dam Site)	Khaira
Rail Head	Kalka (Haryana) 155km
Latitude of Dam Site	31°45' 53" N
Longitude of Dam Site	77°12' 39" E
<b>II) Hydrology</b>	
Catchment area at Dam site	52,955 Sq.km
90% dependable year	2001-2002
Flood discharge for river diversion	773 m <sup>3</sup> /sec
Probable Maximum Flood (PMF)	15473 m <sup>3</sup> /sec
<b>III) Reservoir</b>	
Full Reservoir Level (FRL)	EL 712.00 m
Minimum Drop Down Level (MDDL)	EL 709.50 m
Gross Storage at FRL	82.5 x 10 <sup>6</sup> m <sup>3</sup>
Live Storage at FRL	7.9 x 10 <sup>6</sup> m <sup>3</sup>
Length of Reservoir	20.70 km
Desilting Basin	Reservoir will act as Desilting basin
<b>IV) Dam</b>	
Type	Concrete Gravity
Top of dam	EL 715.0 m
Average River Bed Level at Dam Site	El. 644.0 m
Dam Height above River bed	71.0 m
Dam Height above deepest foundation level	83.0 m
Length of Dam at Top	178.0 m
Top Width of Dam	8.0 m
<b>V) Spillway</b>	
Design Flood (PMF)	15473.0 m <sup>3</sup> /sec
Type of Spillway	Combination of Upper level Spillway (ULS) and Low Level Spillway (LLS) (sluice spillway)
Energy Dissipation System	Stilling Basin type
<b>Low Level Spillway (LLS) (Under sluice Spillway)</b>	
Type	Sluice type
No. of Bays	Six (06) (Block No. 3 to 8)
Size of Opening	8.5 m (W) X 16.0 m (H)
Type & No. of gate	Radial, Six (06)
Width of each block	14.5 m
Total width of LLS Blocks	87.0 m
Crest Level	El. 660.0 m
<b>Upper Level Spillway (ULS) (Overflow Spillway)</b>	
Type	Ogee with open crest overflow
No. of Bays	One (01) (Block No. 9)
Size	5.0 m (W) X 4.5 m (H)
Type & No. of gate	Flap Gate, One (01)
Crest level	707.50 m
<b>VI) River Diversion</b>	
River Diversion Discharge (1 in 25 years)	773.0 m <sup>3</sup> /sec
Diversion Scheme	Through Diversion Tunnel (DT) and Cofferdams
Location of Diversion Tunnel	Left Bank
No. of Tunnel	One (01)
Diameter and Shape of DT	10.0 m, Horse Shoe Shape
Length of Tunnel	642.208 m

<b>VII) Power Intake</b>	
Number of Intake	Three (03)
Invert Level	El. 685.0 m
Discharge Capacity of Intake 1 and 2 (for Main Units)	277.84 m <sup>3</sup> /sec
Discharge Capacity of Intake 3 (for Environment Unit)	171.27 m <sup>3</sup> /sec
<b>VIII) Pressure Shaft</b>	
Number of pressure Shaft	Three (03) further bifurcated into six (06)
Discharge Capacity of Pressure Shaft 1 and 2 (for Main Units)	277.84 m <sup>3</sup> /sec
Discharge Capacity of Pressure Shaft 3 (for Environment Unit)	171.27 m <sup>3</sup> /sec
<b>IX) Power House</b>	
Type	Underground
Location	Right Bank
Normal Tail Water Level	El. 651.20 m
Minimum Tail Water Level	El. 647.50 m
Gross Head	59.97 m
Rated Head	57.85 m
Size of Power House Cavern	171 m (L) x 22.5 m (W) x 51.5 m (H)
Size of Transformer Hall Cavern	175 m (L) x 18.7 m (W) x 27 m (H)
Turbine Type	Francis
No. of Unit	Six (06)
Design Discharge for Main Plant	555.68 m <sup>3</sup> /sec
Design Discharge for Auxiliary Plant	171.27 m <sup>3</sup> /sec
Installed Capacity (Main Units)	4 X 73 MW
Installed Capacity for Environment Units	1 X 73 MW + 1 X 17 MW
Total Installed Capacity	382 MW
<b>X) Tail Race Tunnel</b>	
Number	Two (02)
Size of Tunnel	10.5 m and 9.0 m dia, Horse Shoe Shaped
Length of Tunnel	288 m and 208 m
<b>XI) Power Generation</b>	
Design Energy	1381.77 GWh (987.84 GWh: Main Plant + 393.33 GWh; Auxiliary Plant)
<b>XII) Approved Cost at July 2020 Price Level</b>	
Cost of civil works i/c HM works	Rs. 1525.13 Crore
Cost of Electro Mechanical works	Rs. 542.96 Crore
ATS Works	Rs. 51.72 Crore
Interest During Construction	Rs. 346.88 Crore
Financial Charges	Rs. 8.66 Crore
Total Project Cost	Rs. 2475.36 Crore
<b>XIII) Financial Aspects</b>	
1 <sup>st</sup> Year Tariff	Rs. 4.07/kWh
Levelized tariff	Rs. 3.70/kWh
<b>XIV) Construction Period</b>	
Total construction period	63 months

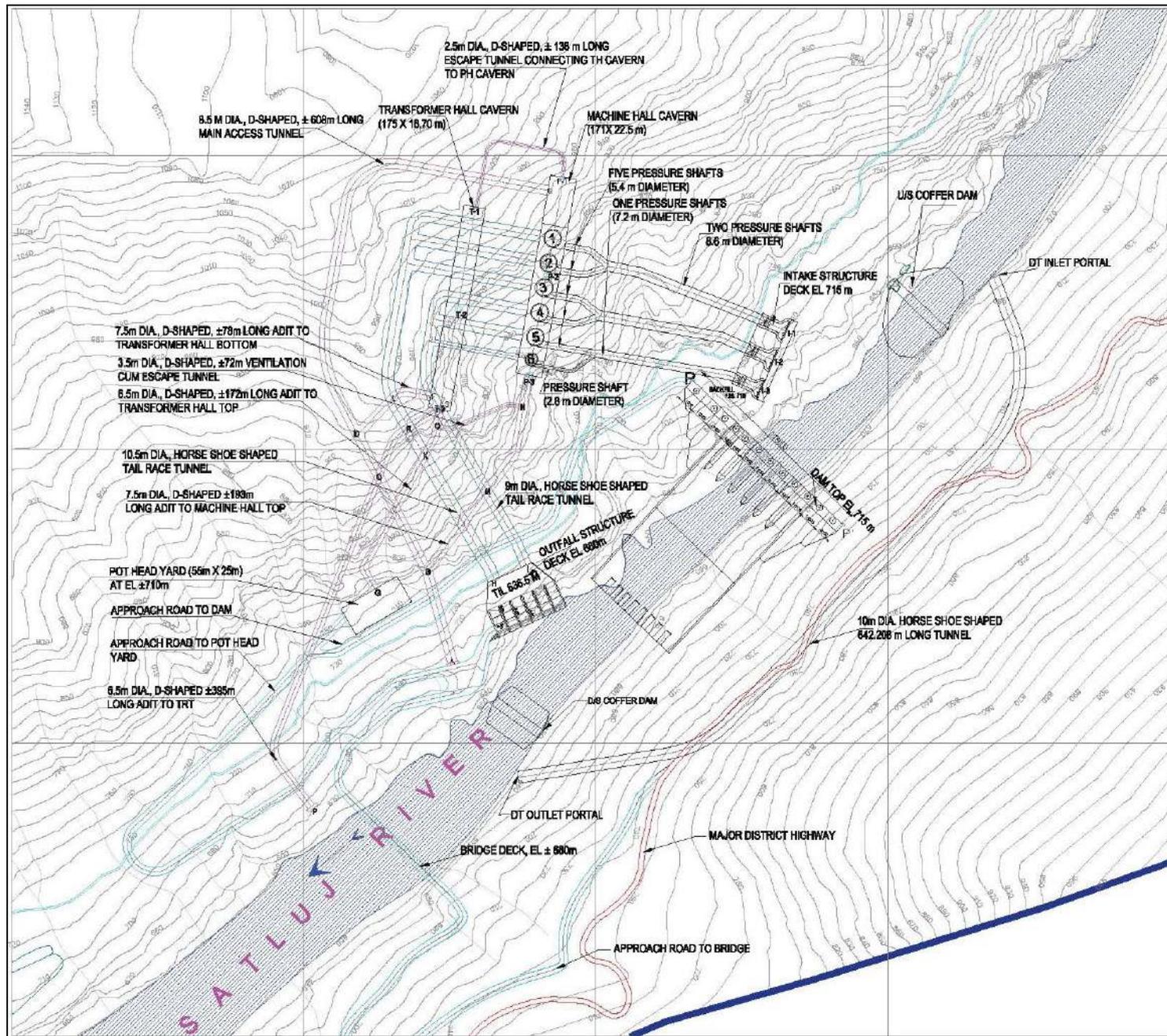


Figure1.2: General Layout of Sunni Dam HEP

## 1.5 NEED FOR CATCHMENT AREA TREATMENT PLAN

The common environmental problems encountered during execution and operational phases of major hydroelectric projects include land degradation in the catchment area due to various human activities, deforestation, mining etc. The siltation increases due to the degradation of the catchment leading to reduction in the capacity of the reservoir (life of the project), damage to the turbines etc. Excessive erosion and sedimentation thus cause both environmental and economic impacts. Economic impacts may be more prominent and easier to assess, whereas environmental impacts build slowly over the years, are difficult to assess and often irreversible.

The process of sedimentation embodies the sequential processes of erosion, entrainment, transportation, deposition and compaction of sediment. The study of erosion and sediment yield from catchments is of utmost importance as the deposition of sediment in reservoir reduces its capacity and thus affecting the water availability for the designated use. The eroded sediment from catchment when deposited on streambeds and banks causes braiding of river reach. The removal of top fertile soil from catchment adversely affects the agricultural production. Thus, a well designed catchment area treatment plan is essential to ameliorate the above mentioned adverse processes of soil erosion.

Soil erosion may be defined as the detachment and transportation of soil. Water is the major agent responsible for this erosion. In many locations, wind, glaciers, etc. also cause soil erosion. In hilly area, as in the present case, erosion due to water is a common phenomenon and the same has been studied as a part of the Catchment Area treatment (CAT) plan. Soil erosion leads to:

- loss in the production potential
- reduction in infiltration rates
- reduction in water holding capacity
- loss of nutrients
- increase in tillage operation costs
- reduction in water supply

The Catchment Area Treatment (CAT) plan highlights the management techniques to control erosion in the catchment area of a water resource project. The life span of a reservoir is greatly reduced due to erosion in the catchment area. Adequate preventive measures are thus needed for the treatment of catchment for its stabilization against future erosion. The catchment area treatment involves:

- Understanding of the erosion characteristics of the terrain and,
- Suggesting remedial measures to reduce the erosion rate.

### 1.5.1 Salient Features – Catchment Area Treatment Plan

Free draining catchment area to be considered for the present study is the catchment of Satluj river from the diversion site of proposed Sunni Dam HEP to the diversion site of proposed Luhri HEP Stage-II. The free draining catchment area falls under 4 forest divisions viz. Karsog, Shimla, Kotgarh and Wildlife Kullu. The total free draining catchment area is 394.36 sq km. As per the notification for the preparation of CAT Plan, minimum area to be treated under the CAT Plan would be approximately 15% of the total effective catchment. For the purpose of calculation of effective catchment, area above 3000 m of elevation, area having slope more than 45° and area under agricultural land, settlement and waterbody have been carved out of free draining catchment area. The effective catchment area thus calculated is 274.99 sq km. The total treatable area in the free draining catchment area is 8959.60 ha (process of calculation of treatable area has been given in Chapter 5). Finally, out of this 8959.60 ha, treatable area under effective catchment area was extracted, which comes out to be 6291.51 ha. Thus, total 22.88% of the effective catchment area will be treated under this CAT Plan. The salient features of the free draining catchment area are given in **Table 1.3**.

**Table 1.3: Salient Features - Catchment Area Treatment Plan**

FREE DRAINING CATCHMENT AREA AT A GLANCE					
State	Himachal Pradesh				
District	Shimla & Mandi				
River	Satluj				
Latitude	31°11'15.63" to 31°28'37.66"				
Longitude	77°8'58.21" to 77°25'5.37"				
Elevation Range (m)	644 to 3128				
Length of River (km)	23 approx. (from dam site of upstream Luhri HEP Stage II to dam site of Sunni Dam HEP)				
Forest Divisions Covered	04 (Karsog, Kotgarh, Shimla and WL Kullu)				
Free Draining Catchment Area (sq km)	Karsog Division	Kotgarh Division	Shimla Division	WL Kullu Division	<b>Total</b>
	239.09	69.40	79.90	5.97	<b>394.36</b>
Total Effective Catchment Area (sq km)	Karsog Division	Kotgarh Division	Shimla Division	WL Kullu Division	<b>Total</b>
	164.95	49.62	55.34	5.08	<b>274.99</b>
Total Treatable Area, out of total effective catchment area (ha)	Karsog Division	Kotgarh Division	Shimla Division	WL Kullu Division	<b>Total</b>
	4199.72 (approx. 25.46% of division area)	1180.18 (approx. 23.78% of division area)	857.77 (approx. 15.50% of division area)	53.84 (approx. 10.60% of division area)	<b>6291.51 (approx. 22.88% of the effective free draining catchment area)</b>
Total Area to be treated by Biological Measures (ha)	Karsog Division	Kotgarh Division	Shimla Division	WL Kullu Division	<b>Total</b>

	366	40	164	12	<b>582</b>
Total Area to be treated by Engineering Measures (ha)	Karsog Division	Kotgarh Division	Shimla Division	WL Kullu Division	<b>Total</b>
	3834	1140	694	42	<b>5710 (approx.)</b>
Total Fund Allocated for Biological Measures (Rs. in Crore)	Karsog Division	Kotgarh Division	Shimla Division	WL Kullu Division	<b>Total</b>
	4.81	1.12	1.75	0.11	<b>7.79</b>
Total Fund Allocated for Engineering Measures (Rs. in Crore)	Karsog Division	Kotgarh Division	Shimla Division	WL Kullu Division	<b>Total</b>
	2.75	1.33	1.06	0.06	<b>5.20</b>
Total Fund Allocated for Other Component of CAT Plan (Rs. in Crore)	Karsog Division	Kotgarh Division	Shimla Division	WL Kullu Division	<b>Total</b>
	13.47	3.71	4.53	0.69	<b>25.35</b>
Total CAT Plan Cost (Rs. in Crore)	Karsog Division	Kotgarh Division	Shimla Division	WL Kullu Division	<b>Total</b>
	21.03	6.16	7.34	0.86	<b>38.34</b>

For the delineation of free draining catchment area into various hydrologic units such as watersheds, sub watersheds, micro watersheds etc., methodology as defined by Soil and Land Use Survey of India (SLUSI), Government of India has been used. The methodology adopted has been elaborated **Section 5.1.1** of **Chapter 5**. Micro watersheds delineated in CCP SRB are larger in size in comparison to micro watersheds delineated in present study as per SLUSI, hence same adopted in present study are more fine-tuned and micro level. For easier interpretability, understanding and aligning the present CAT plan in sync with the CCP SRB, the number of micro watersheds delineated into both the studies have been overlaid and are presented in detail in **Section 5.1.1** of **Chapter 5**

The details of hydrological units covered in this study and in CCP SRB for the same area is tabulated below.

<b>Hydrologic Unit</b>	<b>As per Present Study</b>	<b>As per CCP SRB</b>
Watersheds (Nos.)	2 (partially)	4 (1 whole & 3 partially)
Sub Watersheds (Nos.)	8 (4 whole & 4 partially)	Nil
Micro Watersheds (Nos.)	49 (45 whole & 4 partially)	21 (20 whole & 1 partially)

As per the administrative boundaries of Himachal Pradesh Forest Department, total 30 forest beats falling in 9 forest blocks, 6 forest ranges and 4 forest divisions are covered in the free draining catchment area. Out of these 30 forest beats, 24 forest beats fall completely within the free draining catchment area while the rest 6 forest beats fall partially. The details of forest administrative units covered in the free draining catchment area are tabulated below:

S. No.	Name of Division	Name of Range	Name of Block	Name of Beat
1	Karsog	Pangna	Tatapani	Telehan (partially)
2		Karsog	Bagsad	Bagsad
3				Dharmour
4				Mahunag
5				Sapnaut
6				Parlog
7				Karsog
8			Kakahani	
9			Kamand	
10			Khanukhli	
11			Sanarli	
12		Shakar Dehra		
13		Mamail	Banera	
14			Galiach	
15			Kashol	
16			Mamail	
17		Mehandi		
18		Seri	Seri	Dhamun (partially)
19				Nanj (partially)
20				Niharinal
21	Shimla	Bhajji	Himri	Himri
22				Karyali (partially)
23				Pandoa
24				Sandoa
25	Kotgarh	Kumarsain	Baragaon	Ahar
26				Shiwan (partially)
27			Kangal	Dhar
28				Kangal
29				Khudlu
30	Wild Life Kullu	Wild Life Karsog	Shikari Devi	Bharmeri (partially)

The free draining catchment area falls within Shimla and Mandi districts of the state. Total 302 villages comprising of 11,762 households with a population of 56,355 fall within the free draining catchment area. The demographic profile of the free draining catchment area is presented below:

District	Shimla				Mandi			Grand Total
Tehsil	Kumharsain	Seoni	Theog	Total	Karsog	Thunag	Total	
Villages (Nos.)	30	43	8	81	202	19	221	302
Households (Nos.)	1109	1529	355	2993	8503	266	8769	11762
Population (Nos.)	4994	7110	1626	13730	41416	1209	42625	56355
Male (Nos.)	2483	3451	793	6727	20853	607	21460	28187
Female (Nos.)	2511	3659	833	7003	20563	602	21165	28168

## CHAPTER 2

# DESCRIPTION OF PHYSICAL ENVIRONMENT

### 2.1 DRAINAGE

Satluj is the sub-basin of Indus River System. Satluj (Sanskrit is Shatardu and Satadru or Sutudri in Rigveda) is one of the largest rivers in Himachal Pradesh. The Satluj river rises in the Kailash-Mansarovar region in Tibet with its origin in the Rakshas Tal as Longchhen Khabab (Xianquan). Some of the important glaciers feeding river Satluj in its initial stretches are Ganglung Gaungi glaciers and the glaciers of Riwa Phargul.

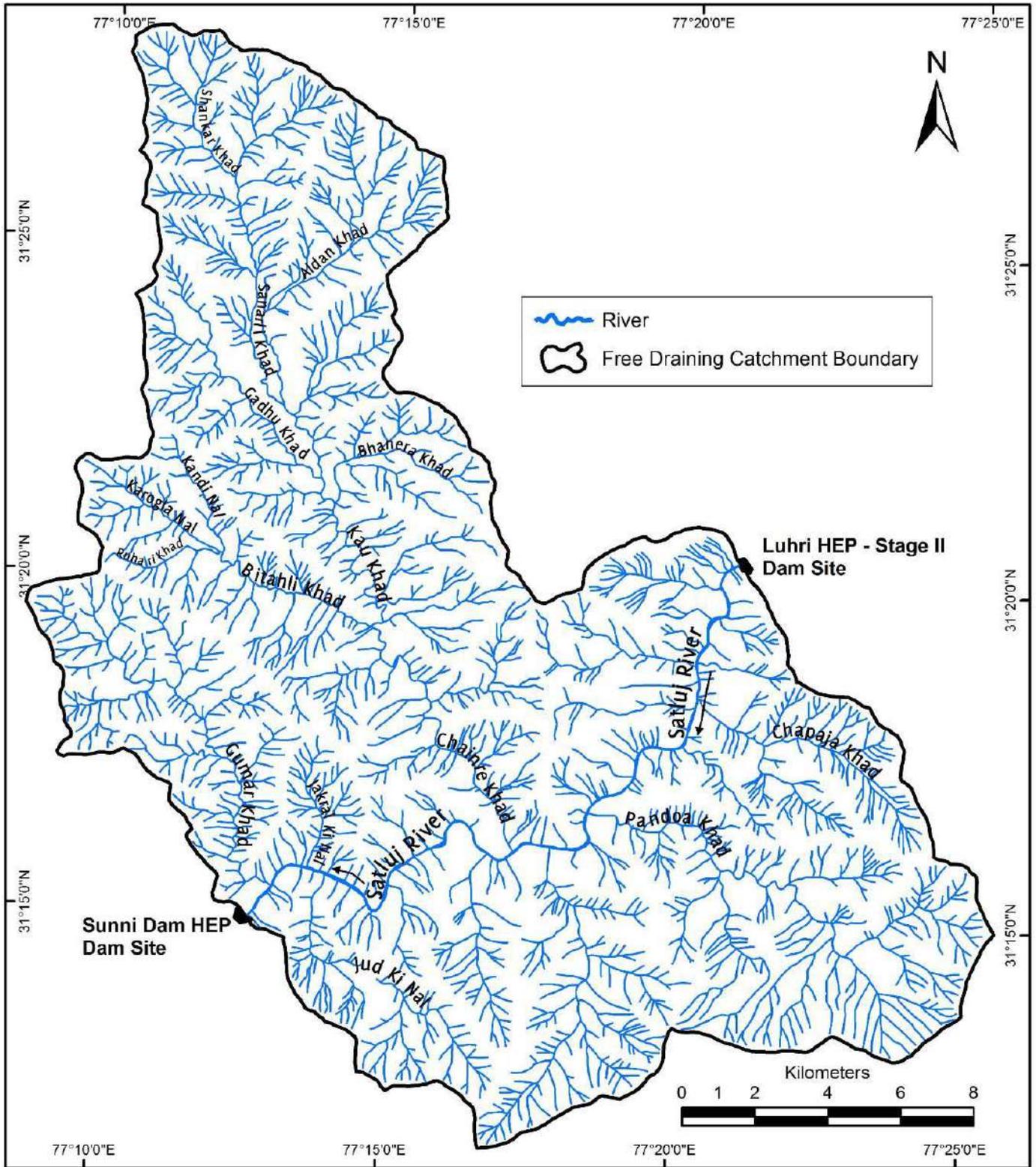
The Satluj river enters India near Shipkila (2880 m) in Himachal Pradesh and leaves the State at Bhakra. From its origin and up to Bhakra the river covers a distance of about 640 km and within Himachal Pradesh it travels a distance of 320 km. In Punjab it is joined by Beas and in Pakistan Chenab meets it at Uch (Bahawalpur). The river Satluj finally merges with Sindhu at Mithankot in Pakistan after covering a distance of about 1500 km from its origin. The first major tributary of Satluj within Indian territory is Spiti river which joins it at Khab. Chaso Khad, Kirang Khad, Kashang Khad, Pangi Khad, Choling Khad, Sorang Gad, Kut Gad, Kurpan Gad, Behna Khad, Kotlu Khad and Karsog Khad are the other major right bank tributaries. The major left bank tributaries of Satluj are Titang Khad, Nesang Khad, Tidong Khad, Baspa River, Duling Khad, Panvi Khad, Manglad Khad, Nogli Gad, Machhad Gad and Sainj Khad. The major settlements along the Satluj river within Himachal Pradesh are Namgia, Kalpa, Rampur, Tattapani, Sunni and Bilaspur. The total catchment area of Satluj river up to Bhakra is 56875 sq km (36900 sq km in Tibet and 19975 sq km in Himachal Pradesh). The river Satluj passes through Tibetan plateau into the Himalayan ranges and the Siwalik ranges and finally flows along the plains of Punjab. It crosses Dhauladhar ranges at Rampur and Naina Devi range at Bhakra gorge.

The catchment area of Satluj river upto the dam site of proposed Sunni Dam HEP is 52,955 sq km, out of which 16,055 sq km is in Himachal Pradesh.

### 2.2 FREE DRAINING CATCHMENT

The free draining catchment has been demarcated as the intercepting catchment area between the diversion site of upstream Luhri HEP Stage-II and the diversion site of proposed Sunni Dam HEP. The free draining catchment thus demarcated comes out to be 394 sq km.

The total length of the Satluj river in the free draining catchment area is about 23 km. The major right bank tributaries of Satluj river in the free draining catchment are Chainre Khad, Jakrai Ki Nal and Gumar Khad, whereas, the major left bank tributaries are Chapaja Khad, Pandoa Khad and Jud Ki Nal. The free draining catchment area map showing drainage network is given at **Figure 2.1**.



**Figure 2.1: Map of Free Draining Catchment Area of Sunni Dam HEP**

## 2.3 METEOROLOGY (PRECIPITATION AND TEMPERATURE)

### 2.3.1 Precipitation

The climatic conditions of the Satluj River basin are strongly influenced by orthographic effects. The boundary between areas receiving mostly precipitation in the form of rain and those receiving mostly snow is at an elevation of (approximately) 1,525m. The catchment covers approximately 51,600 km<sup>2</sup> and 70% of this is largely snow bound.

The catchment receives precipitation due to the South-West monsoon as well as the western disturbances that pass over the north-west part of the country during winter. The South-West monsoon generally lasts from June to September, but may occasionally extend up to early October. During this period rainfall is generally not heavy but at times snowmelt contributes significantly to flood runoff, with maximum flows occurring between June and August. The winter precipitation falls either as rain or snow depending upon altitude and other meteorological conditions and may be very heavy on occasions but does not usually contribute directly to river discharge significantly and mostly goes to feed the snow glacier bound areas of the catchment.

### 2.3.2 Precipitation Data Network

There are at present twenty rain gauge stations in the catchment of Satluj River upstream of Bhakra, at which long term records are available. The relevant details of these stations are given in **Table 2.1**.

**Table 2.1: Data Availability Status of Raingauge Stations in Satluj Basin**

S. No.	Name of Station	Year of Commencement	Altitude (m)	Average Rainfall (mm)
1	Bilaspur (Sadar)	1954	580	1104
2	Bilaspur (Obs)	1957	587	1226
3	Ghumarwin	1958	637	1215
4	Arki	1951	1219	1228
5	Suni	1956	510	978
6	Shimla	1956	2065	320
7	Karsog	1951	1890	978
8	Theog	1958	2286	1040
9	Shillaru	1952	2590	1280
10	Kotgarh	1955	1828	963
11	Kumarsain	1951	1388	813
12	Khadrala	1951	2957	1974
13	Rampur	1951	1067	924
14	Fancha	1951	2071	2291
15	Nichar	1951	2195	997
16	Kilba	1951	1707	823
17	Baspa	1974	2550	760
18	Sangla	1951	1986	820

S. No.	Name of Station	Year of Commencement	Altitude (m)	Average Rainfall (mm)
19	Kalpa	1951	2771	673
20	Purbani	1951	2195	580

(Source: Inception report of Luhri HEP Stage-I)

48% of the annual precipitation occurs during the Indian summer monsoon from June to September. During this period the rainfall is some 40% more between Rampur and Bhakra than above Rampur. For the remainder of the year there is more precipitation above Rampur. This annual distribution of the rainfall is illustrated in **Table 2.2**.

**Table 2.2: Average Rainfall (mm) in Different Seasons in Satluj Basin**

Catchment	Average Rainfall (mm)				
	June-Sep	Oct-Nov	Dec-Feb	Mar-May	Total
Bhakra to Rampur	670	52	190	149	1061
Rampur to Shipkilla	470	60	220	220	970

(Source: Inception report of Luhri HEP Stage-I)

### 2.3.3 Temperature

Maximum and minimum daily temperatures are being recorded by a number of agencies in the Satluj Catchment as shown in **Table 2.3**. Temperature observations have also been started at Kalpa and Jeori from 1984. The maximum and minimum temperatures recorded at four of those stations are given in **Table 2.4**.

**Table 2.3: Temperature Observing Stations**

Station	Altitude	Year of Commencement
Bhakra	400 m	1946
Bilaspur	580 m	1956
Rampur	930 m	1967
Wangtu	1525 m	1971
Powari	1990 m	1971
Sumdo	3245 m	1973

(Source: Inception report of Luhri HEP Stage-I)

**Table 2.4: Maximum and Minimum Temperatures**

Station	Maximum Temperature °C	Minimum Temperature °C	Years
Shimla	30	-7.2	1956-70
Bilaspur	45	-2	1956-70
Kalpa	27	-9.5	1984-85
Jeori	40	-3	1984-85

(Source: Inception report of Luhri HEP Stage-I)

## 2.4 PHYSIOGRAPHY & GEOMORPHOLOGY

The project lies in the Inner Lesser Himalaya between the Dhauladhar Range in the south and the Higher Himalayan Range in the north. The Satluj River is the main drainage in the catchment area with headwaters located in the highlands of Tibet. Geomorphologically the area is located in a young mountain chain which is characterized by rapid down cutting valley. Hence, most of the valley slopes are steep and the Satluj River is confined within narrow V-shaped valleys on the higher reaches. In the reaches u/s of the project flat land/terraces can be seen on the both on right & left river banks. The hill ranges in the right bank of Satluj river trend NW-SE and on the left bank NE-SW. The area forms part of the drainage basin of Satluj, which flows in nearly southwest direction. Behna khad, Kotlu khad, Gumma khad and Bahairari khad are important tributaries of the river Satluj. The drainage in the area exhibits sub-dendritic to trellis pattern controlled both by structure and lithology.

## 2.5 REGIONAL GEOLOGY

The project area lies in Inner Lesser Himalayas SSW of main central thrust. The stratigraphy established in the Satluj Valley (after Sharma, 1977) is enumerated below in **Table 2.5**.

**Table 2.5: Stratigraphy for Lesser Himalaya in Satluj Valley along Satluj River**

Geological age	Group	Formation	Lithology
Holocene		Newer Alluvium	Boulder, pebbles, coarse sands-younger terraces (T1) and river channels.
Middle to Upper Pleistocene		Older Alluvium	Boulder, pebbles, coarse sands-older terraces (T2)
Palaeoceneto Early Eocene	Sirmour	Subathu (Kakra)	Bansal pisolitic laterite, quartz arenite, variegated shales & massive to thin bedded limestone
Mesoproterozoic to Neoproterozoic	Kullu	Khokhan	Quartzite, quartz chlorite and quartz biotite schist; slate, phyllite and schist, garnetiferous schist; locally associated with amphibolites.
		Gahr	Streaky mylonite gneiss, banded and augen gneisses
		Khamrada	Carbonaceous to graphitic schist and phyllite locally garnetiferous; lenticular grayish blue and cream coloured platy limestone and calcschist.
	Shimla		Quartzite-shale-limestone at the base, shale siltstone alternations with limestone inter beds shale & siltstone alternations with orthoquartzite & greywacke; conglomerate, arkosic sandstone, protoquartzite, grey & purple shale at top

Geological age	Group	Formation	Lithology
Paleoproterozoic	Rampur		Quartzite with penecontemporaneous mafic meta-volcanics intruded by Bandal Granitoid Gneiss
	Shali/ Larji	Bandla	Green and purple shale/ slate, siltstone sporadic limestone, thinly bedded orthoquartzite, interbeds green brecciated rock and a fairly persistent band of white quartzite at the base.
		Parnali	Cherty dolomite, grey limestone and white quartz-arenite
		Makri	Grey, green, black and purple shale and slate, thin bedded limestone, thin bedded quartzarenite with or without dolomite.
		Tattapani	Cherty dolomite, grey and pink colour with grey phyllitised shale.
		Sorghwari	Pink and grey cream textured limestone with shale parting
		Khatpul	Massive dolomite with sporadic quartz arenite and a thin red shale band at the base
		Khaira	Mainly pink and purple, white quartz arena
		Ropri	Brick red shale and siltstone with grey dolomite in the lower horizon; local development of salt, salt grit and the marly litho complex “Lokhan”
Sunder Nagar		Quartzite with penecontemporaneous mafic volcanics (Mandi – Darla Volcanic), grey slate, phyllite, shale, limestone	
Archaean	Jeori-Wangtu Granitoid		Augen gneisses, mylonitic gneiss, porphyroblastic biotite gneiss with intercalated biotite, garnet, kyanite, sillimanite bearing schist bands intruded by propyritic and tourmaline granite, pegmatite and aplite.

The project area lies in Khaira Formation and Khatpul Formation of Shali/Larji Group of rocks.

## 2.6 TECTONICS

Four distinct patterns of folding are identifiable in the vicinity of the project area. Chamba Syncline and Rampur Anticline are main structure features whereas Main Central Thrust and Jutogh Thrust are major thrusts in the far upstream. The nearest structural feature being Kotlu thrust is  $\pm 20$  km u/s of the project. Magan anticline which is also known as Shali anticline is in the vicinity of the project area.

## 2.7 SEISMICITY

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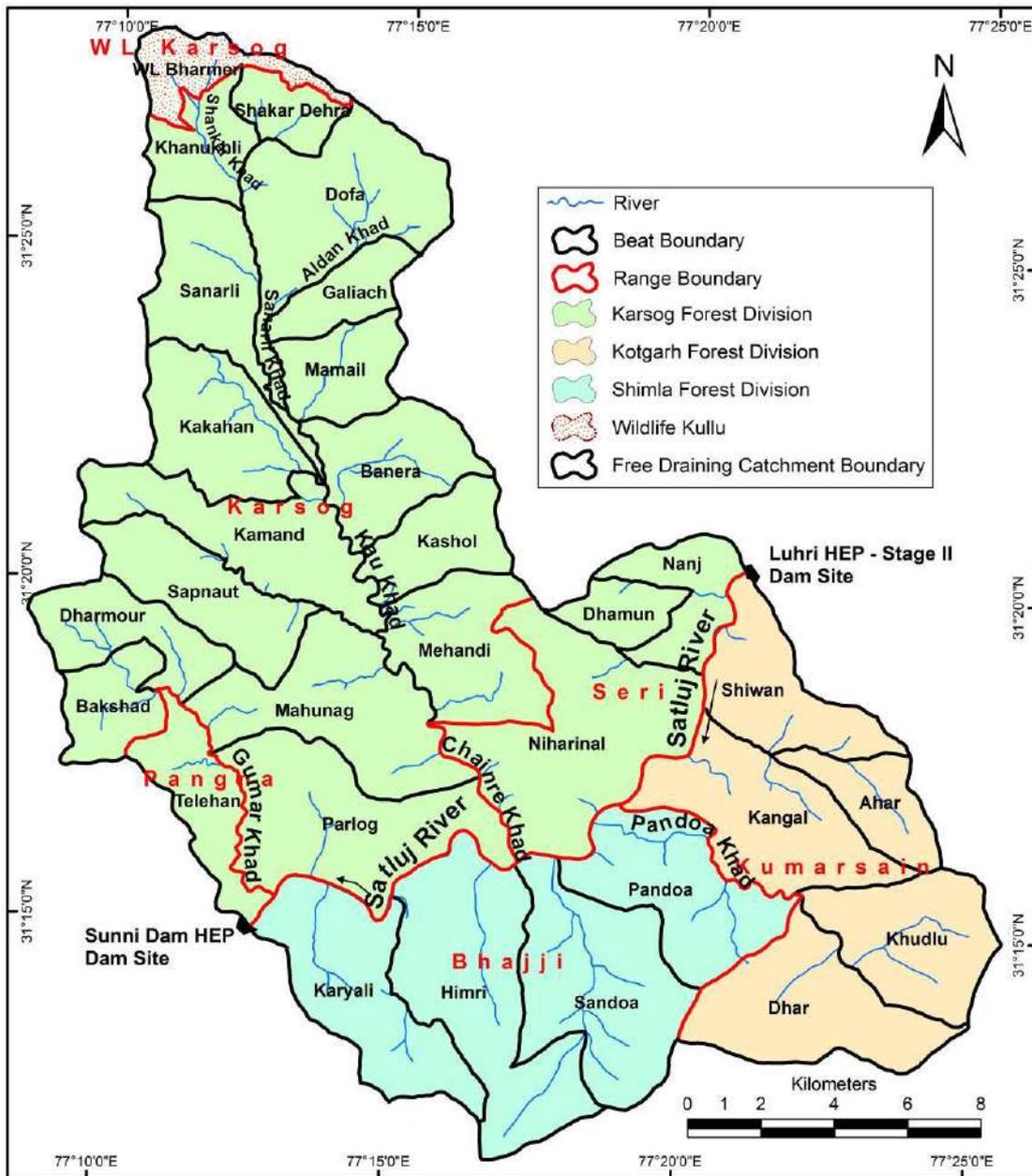
Himachal Pradesh falls in the Himalayan region, which is one of the more seismically active regions in the world. The Project area lies in the Shimla Block of the Main Himalayan Seismic Zone domain of NW Himalayan seismic belt (Narula et al. (2000) the project falls in Earthquake Zone V in accordance with the Seismic Map of India (IS:1893:1984). It is demarcated by the Main Central Thrust in the north and the Main Boundary Fault/Thrust (MBF/MBT) in the south, and limited in east and west by interpretative fundamental transverse faults. The Kangra Block lies to its west and the Garhwal Block in the east.

# CHAPTER 3

## ECOLOGICAL ASPECTS

### 3.1 FOREST TYPES

The forests in the free draining catchment area are under the administrative control of Kotgarh forest division of Rampur circle, Shimla forest division of Shimla circle and Karsog forest division of Mandi circle. Some part of the free draining catchment falls in Shikari Devi Wildlife Sanctuary also. Free draining catchment area of Sunni Dam HEP at the right bank of Satluj river comes under Karsog forest division and Shikari Devi Wildlife Sanctuary, while free draining catchment at left bank of Satluj river falls under Kotgarh and Shimla forest divisions (**Figure 3.1**).



**Figure 3.1: Forest Administrative Units Under Free Draining Catchment Areas of Sunni Dam HEP**

In the free draining catchment area of Sunni Dam HEP, major forest types as per the revised classification of Champion and Seth (1968) have been given in **Table 3.1** and described in the following paragraphs.

**Table 3.1: Forest Type in the Study Area**

Major Group	Type Group	Forest Type	Forest Division	Forest Range
Dry Tropical	5-Tropical Dry Deciduous Forest	5B/C2: Northern Mixed Deciduous Forest	Karsog	Pangana, Karsog, Seri
			Shimla	Bhajji
			Kotgarh	Kumarsain
		5/B DS1: Dry Deciduous Scrub Forest	Karsog	Pangana, Karsog, Seri
			Shimla	Bhajji
			Kotgarh	Kumarsain
		5/IS2: Khair, Sissu Forest	Karsog	Pangana, Karsog, Seri
			Shimla	Bhajji
			Kotgarh	Kumarsain
Montane Sub-Tropical	9-Sub Tropical Pine Forest	9/C1b: Upper or Himalayan Chir Pine Forest	Karsog	Pangana, Karsog, Seri
			Shimla	Bhajji
			Kotgarh	Kumarsain
		9/C1/DS1: Himalayan Sub-tropical Scrub	Karsog	Karsog, Seri
			Shimla	Bhajji
			Kotgarh	Kumarsain
Montane Temperate Forests	12-Himalayan Moist Temperate Forest	12/C1a: Ban Oak Forests ( <i>Quercus incana</i> )	Karsog	Pangana, Karsog, Seri
			Shimla	Bhajji
			Kotgarh	Kumarsain
		12/C1b: Moru Oak Forest ( <i>Q. dilatata</i> )	Karsog	Pangana, Karsog, Seri
			Shimla	Bhajji
			Kotgarh	Kumarsain
		12/C1c: Moist Deodar Forests	Karsog	Pangana, Karsog, Seri
			Shimla	Bhajji
			Kotgarh	Kumarsain
		12/C1d: Western Mix Coniferous Forest	Karsog	Karsog, Seri
			Shimla	Bhajji
			Kotgarh	Kumarsain
12/C1e: Moist Temperate Deciduous	Karsog	Karsog, Seri		

Major Group	Type Group	Forest Type	Forest Division	Forest Range
		Forests	Shimla	Bhajji
			Kotgarh	Kumarsain
		<b>12/C1f:</b> Low-Level Blue Pine Forest ( <i>Pinus wallichiana</i> )	Karsog	Karsog
			Shimla	Bhajji
			Kotgarh	Kumarsain
		<b>12/C1/DS1:</b> Oak Scrub	Karsog	Karsog
			Shimla	Bhajji
			Kotgarh	Kumarsain
		<b>12/C2a:</b> Kharsu Oak Forest ( <i>Quercus semecarpifolia</i> )	Karsog	Karsog
			Shimla	Bhajji
			Kotgarh	Kumarsain
		<b>12/C2b:</b> West Himalayan Upper Oak-Fir Forest	Karsog	Karsog
			Shimla	Bhajji
			Kotgarh	Kumarsain
		<b>12/Ds1:</b> Montane Bamboo Brakes	Karsog	Karsog
			Shimla	Bhajji
			Kotgarh	Kumarsain
			WL Kullu	WL Karsog
		<b>12/Ds2:</b> Himalayan Temperate Park Lands	Karsog	Karsog
			Kotgarh	Kumarsain
			WL Kullu	WL Karsog
		<b>12/Ds3:</b> Himalayan Temperate Pastures	Karsog	Karsog
			WL Kullu	WL Karsog
		<b>12/1S1:</b> Alder Forest	Karsog	Karsog
			WL Kullu	WL Karsog

### 3.1.1 5B/C2 Northern Dry Mixed Deciduous Forests

These forests are generally confined between 600m to 1300m and are characterized by scrub forests mainly found along the Satluj river in the southern and south western parts of the free draining catchment area. The characteristic species in the area are *Anogeissus latifolia*, *Phyllanthus emblica*, *Corymbia citriodora*, *Acacia catechu*, *Syzygium cumini*, *Ficus species*, *Melia azedarach*. Other associates are *Lannea coromandelica*, *Feronia limonia*, *Casearia tomentosa*, *Flacourtia indica*, *Mallotus philippinensis* and *Nyctanthes arbor-tristis*. The undergrowth consists mainly of *Carissa spinarum*, *Dodonaea viscosa*, *Woodfordia fruticosa*, *Justicia adhatoda*, *Murraya koenigii*, *Ziziphus nummularia*, etc. *Euphorbia royleana* occurs on rocky outcrops and over grazed sites. The herbaceous ground cover is generally very thin and consists mainly of grasses with scattered plants of *Inula cuspidata*, *Cassia tora*, *Flemingia* spp. and *Ageratum conyzoides*. *Bauhinia vahlii*, *Pueraria tuberosa*, *Acacia pinnata*, *Caesalpinia decapetala* and *Rubus paniculatus* are the common climbers.

### 3.1.2 5B/DSI Northern Dry Deciduous Scrub Forests

It is a degraded stage of Northern dry deciduous forests which is subject to lopping. It is characterized by shrubs species like *Carissa opaca*, *Woodfordia fruticosa*, *Randia sp.*, *Dodonaea viscosa*, etc.

### 3.1.3 5/IS2 Khair-Sissu Forests

This type is represented along river Satluj in Ghanghar area as a river in fringe vegetation on alluvial deposits which get submerged during monsoon and usually retain moisture throughout the year. The characteristic species are *Dalbergia sissoo* and *Acacia catechu*. The associates are *Moringa oleifera*, *Phoenix sylvestris* and undergrowth consists of *Ziziphus nummularia*, *Justicia adhatoda*, *Murraya koenigii* etc. Among grasses *Saccharum spontaneum* and *Erianthus munja* are common in this forest type.

### 3.1.4 9/C 1b Himalayan Chir pine forests

This type occurs between 1000 m to 2000 m elevation. *Pinus roxburghii* (Chir) is the characteristic species of this type is forest and is found localized in extent. The crop is generally irregular and widely scattered on the southern aspects. In the northern aspect there are few good patches, mature trees are few and scattered except in recently raised Chir plantation. The crop is mostly young to middle aged. In the northern aspect there are few good patches. The undergrowth varies in types and density according to the aspects and the overhead shade. Under open stands of Chir, *Pistacia integerrima* is common as a low squat tree amongst a fairly dense bushy growth of *Woodfordia fruticosa*, *Cotinus coggygia*, *Desmodium multiflorum* and *Rubus ellipticus*. Other common

lower plants in this forest type are *Berberis sp.*, *Myrsine africana*, *Indigofera cassioides* and *Pseudocaryopteris bicolor*, *Plectranthus sp.*, *Fragaria vesca* etc.

### **3.1.5 9/C1/DS1: Himalayan Sub-tropical Scrub**

This forest type was spread over in Chir Pine forest. These areas can be regenerated naturally or artificially by restricting the biotic interference. The area is used as grazing grounds by the villagers. The common plant species found in this type of forest are *Dodonaea viscosa*, *Rhus parviflora*, *Woodfordia floribunda*, *Berberis sp.*, *Cotoneaster sp.*, *Prinsepia utilis*, *Indigofera pulchella*, *Adiantum species*, etc.

## **Group 12-Himalayan Moist Temperate Forest**

The most important coniferous forests of the catchment fall under this group. The altitudinal range of this type of forest is between 1500 m to 3300 m elevation. Dominant species are very few in number and pure crops are more frequent than the mixed ones. Distribution of species depends on altitude and aspect. There is a sporadic distribution of broad leaf in between coniferous forest.

### **3.1.6 12/C 1a-Ban Oak forest**

This sub type only found along the transitional belt between Deodar, Kail, *Quercus ilex* and Chir in between 1500 to 2100 meters. This type represents climatic sub-climax. Being close to the habitation, Oak is heavily lopped for fodder and also cut for firewood.

Associated species in the forest type area: *Quercus incana*, *Rhododendron arboreum*, *Lyonia ovalifolia*, *Litsea umbrosa*, *Machilus odoratissima*, *Ilex dipyrena*, *Cotinus coggygria*, *Quercus dilatata*, *Quercus ilex*, *Pyrus pashia*, *Celtis spp.* *Indigofera spp.* *Berberis spp.*, *Daphne oleoides*, *Myrsine africana*, *Rosa moschata* and *Hedera helix* are the common.

### **3.1.7 12/C 1b- Moru Oak Forests**

*Quercus dilatata* (Moru) is the index species although it does not occur gregariously, it is found as widely distributed crop, usually as an understorey with *Pinus wallichiana* (Kail) and *Cedrus deodara* (Deodar). It extends between 2000 to 2500 meters. This type is in climatic and heavily lopped and cut for fodder. Its common associates are *Cedrus deodara*, *Pinus wallichiana*, *Quercus incana*, *Aesculus indica*, *Prunus cornuta*, *Toona ciliata* and *Alnus nepalensis*, *Rhus chinensis*. The under growth is generally consist of *Rosa macrophylla*, *Berberis species*, *Prinsepia utilis*, *Indigofera species*, *Deutzia species*, *Daphne sericea*, *Hedera helix*, *Clematis sp.*, etc.

### **3.1.8 12/C 1c- Moist Deodara Forests (*Cedrus deodara*)**

*Cedrus deodara* is the characteristics species of this type and it often occurs as pure but at time mixed with blue pine, fir and spruce. This type doesn't form climax as it is directly or indirectly influenced by human activities. It occurs in the altitudinal zone of 1800m to 2400m generally but descends to lower levels on cooler northern aspects and is replaced here by blue pine. It occurs on all geological formations on well drained soils and avoids ill drained and damp soils. The common associates are *Pinus wallichiana*, *Abies pindrow*, *Picea smithiana*, *Quercus dilatata*, *Q. incana*, *Rhus succedanea*, *Prunus padus*, *Aesculus indica*, *Rhododendron arboreum*, *Populus ciliata* and *Alnus nitida*.

Under dense canopy of Deodar, the understorey of broadleaved species is often missing and under growth very sparse, but in open crop, dense understorey of broadleaved species like *Rhus*, *Cedrela odorata*, *Corylus colurna*, *Prunus*, etc. is found. On clear felled patches or fire burnt sites, *Populus* appear on northern aspect and *Kail* on southern aspect. The under growth is dominated by *Parrotiopsis jacquemontiana* particularly on North-Western and Western aspects and when it is dense, it inhibits the regeneration of Deodar.

A pure patch of Deodar is commonly observed in the catchment, it also occurs with *Kail*, *Fir* and *Spruce*. *Quercus semecarpifolia* forms an external belt throughout the area.

### **3.1.9 12 C1d Western Mix Coniferous Forest**

This type is commonly known as mixed coniferous forest. The crop are heterogeneous mixture of all ages with the middle aged tree predominating occur between 2400m - 3000 m elevation. Deodar is the principal top canopy species with *Kail*, *Fir* and *Spruce*. Natural regeneration is disturbed due to heavy grazing. The principal deciduous tree species are *Corylus colurna*, *Aesculus indica*, *Juglans regia* and *Fraxinus xanthoxyloides*. The under growth mainly consist of *Viburnum* spp., *Indigofera* spp., *Desmodium* spp., *Rubus* spp., *Lonicera quinquelocularis*, *Rosa moschata*, etc. the ground flora consists mainly of *Fragaria vesca* and *Sinopodophyllum hexandrum*.

### **3.1.10 12 C1e Moist Temperate Deciduous Forests**

This type is commonly found from 1800 m to 2750 m elevation in moist hollow and depressions often as strips along the hill streams and also on gentle slopes. *Quercus* species are very few or absent. Shrubby vegetation was found along with mixed broad leaved species. The common tree species are *Acer caesium*, *Acer pictum*, *Aesculus indica*, *Betula alnoides*, *Carpinus* sp., *Celtis australis*, *Fraxinus* sp., *Juglans*

*regia*, *Aria lanata*, *Alnus sp.*, *Lyonia ovalifolia*, *Prunus cornuta* *Populus ciliata*, with scattered Spruce and Deodar.

The shrubby vegetation is a mixture of dwarf bamboo *Arundinaria sp.*, *Berberis sp.*, *Cotoneaster bacillaris*, *Skimmia laureola*, *Deutzia corymbosa*, *Viburnum sp.*, *Jasminum humile*, *Lonicera quinquelocularis*, *Litsea sp.*, *Strobilanthes atropurpureus*, etc. Herb growth is poorly developed with *Aconitum sp.*, *Impatiens sp.*, *Polygonatum sp.*, *Filipendula vestita*, *Aruncus dioicus*, *Aspidium sp.*, *Chaerophyllum reflexum*, *Viola sp.*, fern species e.g. *Adiantum sp.*

### **3.1.11 12 C1f Low-Level Blue Pine Forest (*Pinus wallichiana*)**

This type of forest frequently associated with *Cedrus deodara*. It ranges between 1500 to 2400m, dominated by *Pinus wallichiana*. The under growth comprises species of *Viburnum*, *Desmodium*, *Indigofera*, *Rosa*, *Berberis*, *Rubus*, *Strobilanthes*, *Geranium*, *Valeriana*, *Viola*, *Ainsliaea*, *Clematis* spp., etc. Fern species associated with this type of forest are *Adiantum capillus-veneris*, *Asplenium indicum*, *Aleuritopteris anceps*, *Aleuritopteris dubia*, *Aleuritopteris formosana*, *Dryopteris chrysocoma*, *Dryopteris cochleata*, *Hypodematium crenatum*, *Coniogramme serrulate*, *Polystichum discretum*, *Polystichum piceopaleaceum*, *Pseudocyclosorus canus*, *Thelypteris xyloides*, *Pyrrrosia mannii*, *Pyrrrosia porosa* etc.

### **3.1.12 12 C1/DS1 Oak Scrub**

This type of forest occurs near habitation between 1500 m to 2200 m elevation. Heavy lopping and browsing as well as unregulated felling for fuel and agricultural implements have reduced Oak at low bushy tree. *Rhododendron arboreum* and *Lyonia ovalifolia* are common associates, while under growth consists of thorny species or *Berberis lycium*, *Prinsepia utilis*, *Rosa macrophylla*, *Rosa moschata*, *Rubus niveus*, *Sorbaria tomentosa*, *Sarcococca pruniformis*, *Wikstroemia canescens*, *Salvia glutinosa*, etc. Regeneration of Oak is absent due to continuous grazing, browsing, lopping and unrestricted felling for fuel.

### **3.1.13 12/C2a: Kharsu Oak Forest (*Quercus semecarpifolia*)**

*Quercus semecarpifolia* occurs extensively over large area of high altitudes between the elevation of 2500 to 3000 m. *Q. dilatata* and *Abies pindrow* are the two main species associated with *Q. semecarpifolia* forests. At the upper limit of *Q. semecarpifolia* forests are intermingled with *Abies pindrow*, and sometimes it terminates into meadows lands. The top canopy of the forest formed either purely by *Q. semecarpifolia* or *Abies pindrow* to form dense coverage. The second storey of tree species is represented by *Rhododendron arboreum*, *Ilex dipyrena*, *Acer caesium*, *Acer acuminatum*, *Acer cappadocicum*, *Syringa emodi*, *Sorbus cuspidata*, *Prunus venosa*, *Lindera pulcherrima*, *Litsea spp.*, *Machilus duthiei* and occasionally *Taxus*

*baccata*. The common shrubs are *Berberis lycium*, *Berberis chitria*, *Cotoneaster acuminatus*, *Cotoneaster affinis*, *Cotoneaster microphyllus*, *Lonicera webbiana*, *Leptodermis kumaonensis*, *Mahonia borealis*, *Rosa macrophylla*, *Rosa sericea*, *Salix denticulata*, *Sarcococca pruniformis*, *Skimmia arborescens*, *Viburnum cotinifolium*, *V. erubescens*, etc. *Thamnocalamus falconeri* and *T. spathiflorus* form dense undergrowth on shaded places especially along ravines ecosystem. Fern species associated with this type of forest are *Adiantum sp.*, *Aleuritopteris sp.*, *Araiostegia pulchra*, *Araiostegia pseudocystopteris*, *Asplenium sp.*, *Athyrium sp.*, *Christella arida*, *Coniogramme serrulata*, *Cyclogramma auriculata*, *Cyrtomium caryotideum*, *Cystopteris fragilis* etc.

### **3.1.14 12/C2b: West Himalayan Upper Oak-Fir Forest**

These forests are extensively found between 2600 and 3000 m in shaded valleys as a continuous forest or more or less widely scattered patches. The canopy height reaches 20- 50m *Abies pindrow* is usually mixed up with *Q. dilatata* and *Q. semecarpifolia* on south aspects while on north aspects Oaks species (*Quercus* spp.) are replaced by broad-leaved deciduous tree species such as *Aesculus indica*, *Acer caesium*, *A. acuminatum*, *Betula alnoides*, *Corylus jacquemontii* *Ulmus wallichiana* and *Rhododendron arboreum*, etc. Common undergrowth of shrubs includes *Berberis chitria*, *Deutzia staminea*, *Leptodermis kumaonensis*, *Rosa macrophylla*, *R. sericea*, *Salix denticulata*, *Sarcococca saligna*, *Viburnum mullaha*, *Viburnum cotinifolium*, etc. as well as *Chimonobambusa jaunsarensis* and *Thamnocalamus falconeri* in the shaded localities. Fern species associated with this type of forest are *Adiantum venustum*, *Araiostegia sp.*, *Asplenium trichomanes*, *Athyrium sp.*, *Coniogramme pubescens*, *Cyclogramma auriculata*, *Dryopteris wallichiana*, *Lepisorus clathratus*, *Onychium japonicum*, *Pichisermollia ebenipes*, *Polystichum mehrae*, *Polystichum nepalense*, *Polystichum sp.*, *Selliguea oxyloba*, *Stegnogramma mollissima* etc.

### **3.1.15 12/Ds1: Montane Bamboo Brakes**

*Arundinaria falcata* and *Arundinaria saphiflora* are two bamboo species occur in the mixed coniferous forest. *Arundinaria falcata* is associated with *Quercus* species and *Arundinaria saphiflora* occurs in spruce and fir forest. They generally occupy moist northern slopes and form thicket excluding all shrubs. These hill bamboos are used for basket making by the local inhabitants. Their presence inhibits natural regeneration of main species.

### **3.1.16 12/Ds2: Himalayan Temperate Park Lands**

Open park like land with scattered large, uneven land surface with patches of coniferous and broad leaved tree species along with grassy turf (full of flowers in springs) with browsed shrub species like *Berberis*, *Lonicera*, *Arundinaria*,

*Cotonester* and *Viburnum* species. Occurred mostly between 2400 m-3600 m elevation. The ground is covered by *Fragaria vesca*, *Anomone sp.*, *Potentilla*, *Delphinium*, *Polygonum* and *Ranunculus* species. These grass land are heavily grazed by enormous flocks of sheep and goats. Due to thick humus deposited and luxuriant weed growth, the regeneration of fir and other broad leaved tree species is not coming up and the ground is being replaced by grassy turf.

### **3.1.17 12/Ds3: Himalayan Temperate Pastures**

This type characterized by the absence of tree species. These are found all over the tract in Deodar, fir and Kharsu forest. The ground flora is similar as under Himalayan Temperate Park Land type of forest.

### **3.1.18 12/1S1: Alder Forest**

This type is commonly found mainly along the banks of river, streams and nallahs, on landslides with alluvial soil. Occurrence of this type of forest was observed from 1000m to 3000 m elevation. The top story consists of *Alnus nepalensis*, *Populus ciliata*, *Celtis australis*, *Toona ciliata*, *Ficus* species, etc. Other associated species in this type of forest are *Crategus spiraea*, *Gerardiana hetrophylla*, *Rumex nepalensis*, *Polygonum*, *Polygonatum*, etc.

## **3.2 ECOLOGICAL COMMUNITIES**

Field surveys were conducted in different micro-watersheds to assess the community structure in different eco-zones. The survey was conducted in some of the selected sites and habitats in entire study area lying between 600 to 3100 m. The habitats were chosen on the basis of physical characters and dominance of vegetation. Attempts were made to select sites and habitats on each and every accessible aspect.

The Satluj river basin has tropical to alpine vegetation. The lower parts of the Satluj basin experiences high temperature abundant rainfall, especially during the monsoon. At higher altitudes temperature dips down below zero in winter and precipitation is in form of snow.

The natural forests which are present in the area are represented by trees of Chir (*Pinus roxburghii*), *Quercus* species, Deodar (*Cedrus deodara*), blue pine/kail (*Pinus wallichiana*), *Abies pindrow*, spruce (*Picea smithiana*) and Cypress (*Cupressus torulosa*). Associations of *Taxus baccata* and *Juniperus recurva* are met at higher elevation. The distribution pattern of conifers viz; Chir, Deodar, Kail and Fir confirm to the higher elevation above 2000m. However, climate, aspect, slope, geology and soil have significant role in the distribution of the species in the area.

Broad leaved trees are found along nallas, collar aspects and shady ravines. The oak (*Quercus species*), Walnut (*Juglans regia*), Horse Chest nut (*Aesculus indica*), Mapple (*Acer caesium*), Ash (*Fraxinus excelsior*), Pohu (*Parrotiopsis jacquemontiana*) are the dominant broad leaves tree species in the area.

The coniferous are pure forest in their respective habitats. Deodar as a pure crop and also association with Kail was observed in the higher elevation. While in the lower elevation Kail is found dominant on the southern aspects and on exposed slopes. Fir comes as a principal species in higher altitude and extends upto the alpine zone where it was succeeded by Birch (*Betula utilis*) and *Rhododenron campanulata*. Above this luxuriant ground flora was observed represent alpine pastures.

During the months of June-August, mountain slopes, meadows and alpine pasturelands become green giving a spectacular display of flowers. The area covered with snow during winter season. The vegetation is highly heterogeneous dominated by annuals and perennial herbs, followed by few stunted shrubs and bushes. Most of the species grow in patches with narrow distribution. Climate regime, elevation, aspect, soil, geology and disturbances all contribute towards the floral diversity.

The catchment area of proposed project is comprises of great range of elevation, ranging from 600 to 3100 m, the vegetation is diverse, unique and plentiful and classified into three broad types:-

- a) **Sub-Tropical (600-1800)**
- b) **Temperate (1800-3500 m)**

### **3.2.1 Sub-Tropical**

The sub-tropical zone is considered as transitional from the tropical to temperate zone. *Pinus roxburghii* is the characteristic species in this type of forest. In the area the crop is mostly middle aged and is low quality. *Pinus wallichiana* and *Quercus species* was associated at different elevation. Distribution of species depends on land use pattern and topography of the area. Near settlement *Quercus sp.* and *Pyrus pashia* are the associated species of *Pinus roxburghii*.

In lower drier areas *Mallotus philippensis* and *Dalbergia sissoo* occurs in the under heavy human pressure and commonly used as grazing land. *Pistacia integerrima*, *Myrsine africana*, *Daphne oleoides* etc. are the other species associated with *Pinus roxburghii* and *Dalbergia sissoo*. This type of vegetation cover was mostly spread over revenue land. It is common on the drier southern slopes along the Satluj River in Sub tropical zone of the study area.

Shrub species in the area was represented by *Woodfordia fruticosa*, *Rubus ellipticus*, *Colebrookea oppositifolia*, *Berberis spp.*, *Rosa moschata*, *Vitis spp.*, *Clematis spp.*, *Jasminum humile* are the climber *Zanthoxylum alatum*, *Rhus cotinus*, *Nerium indicum* etc. Ground cover is represented by *Rumex hastatus*, *Taraxcum officinale*, *Myosotis micrantha*, *Plectranthus rugosus*, *Artemisia vulgaris*, *Desmodium spp.*, *Fragaria vesca*, *Cynodon dactylon* etc.

### 3.2.2 Temperate Vegetation

The temperate type of vegetation is confined by the presence of trees of *Pinus wallichiana*, *Cedrus deodara*, *Quercus spp.*, *Ulmus wallichiana*, *Fraxinus excelsior*, *Picea smithiana* and *Cupressus torulosa*. Besides, *Juglans regia*, *Prunus armeniaca*, *Celtis australis*, *Populus ciliata*, *Salix tetrasperma* and species of *Malus* and *Sorbus* are also present. Shrubby vegetation is represented by *Rosa moschata*, *Myrsine africana*, *Daphne oleoides*, *Rosa macrophylla*, *Rosa webbiana*, *Sorbaria tomentosa* and species of *Berberis*, *Cotoneaster*, *Crataegus*, *Datisca*, *Fraxinus*, *Ribes*, and *Viburnum*. *Sorbaria tomentosa*, *Rosa webbiana* are commonly found near the settlements.

The herbaceous elements occurring as forest undergrowth include *Desmodium spp.*, *Buddleja paniculata*, *Inula grandiflora*, *Ranunculus spp.*, *Cirsium verutum*, *Codonopsis ovata*, *Fumaria indica*, *Gallium aparine*, *Gaultheria trichophylla*, *Primula denticulata*, *Viburnum spp.*, *Rheum webbianum*, *Rubus spp.*, *Silene vulgaris*, *Parrotia Jacquemontiana*, *Thalictrum foetidum*, *Smilax aspera*, *Clematis montana*, *Hedera helix*, *Vitis himalayensis* etc. The species which commonly grow in the rock crevices, in the shelters of boulders, on dry sandy slopes, and stones, and on moist slopes are *Arabis glabra*, *Arabis pterosperma*, *Arabis recta*, *Arenaria festucoides*, *Bupleurum gracillimum*, *Cerastium cerastoides*, *Cerastium glomeratum*, *Chrysanthemum pyrethroids*, *Cicer microphyllum*, *Clematis orientalis*, *Corydalis govaniana*, *Dianthus angulatus*, *Gypsophila cerastioides*, *Hedysarum astragaloides*, *Hylotelephium ewersii*, *Lepidium divaricatum*, *Linum perenne*, *Lychnis indica*, *Malva neglecta*, *Malva sylvestris*, *Malva verticillata*, *Meconopsis aculeata*, *Medicago falcata*, *Melilotus officinalis*, *Minuartia kashmirica*, *Ranunculus laetus*, *Rosularia alpestris*, *Silene stewartii*, *Thalictrum cultratum* etc.

In the meadows of high altitude herbaceous plants was represented by, *Anemone rivularis*, *Aster indamellus*, *Achillea millefolium*, *Bunium persicum*, *Capsella bursa-pastoris*, *Cirsium wallichii*, *Descurainia sophia*, *Heracleum lanatum*, *Leptorhabdos parviflora*, *Origanum vulgare*, *Oxyria digyna*, *Oxytropis macrophylla*, *Rumex nepalensis*, *Selenium cornifolium*, *Filipendula vestita*, *Thymus linearis*, *Verbascum thapsus*, *Veronica lanosa*.

*Melica persica*, *Pennisetum lanatum*, *Phleum alpinum*, *Poa bulbosa*, *Poa sterilis*, *Polypogon monspeliensis* and *Stipa jacquemontii*, *Agrostis gigantea*, *Agrostis stolonifera*, *Agrostis vinealis*, *Alopecurus arundinaceus*, *Bromus japonicus*, *Bromus oxyodon*, *Calamagrostis pseudophragmites*, *Calamagrostis pulchella*, *Carex melanantha*, *Dactylis glomerata*, *Elymus nutans*, *Festuca rubra*, *Festuca valesiaca*, *Kobresia royleana* are the prominent species of grasses and sedges.

### 3.3 FAUNA

#### 3.3.1 Mammals

The diverse floral composition, climate and altitudinal variation in the free draining catchment area possess habitat for faunal species. The main faunal species reported from the study are Ghoral, Serrow, Himalayan Thar, Himalayan Black Bear, Common Leopard, Langur, etc. Detail of Faunal species reported from the area is given in **Table 3.2**.

**Table 3.2: Mammalian Species Reported from the Area**

Name of Species	Common Name
<i>Panther pardus</i>	Common Leopard
<i>Felis bengalensis</i>	Leopard Cat
<i>Selenarctos thibetanus</i>	Himalayan Black Bear
<i>Ursus arctos</i>	Brown Bear
<i>Vulpes vulpes</i>	Himalayan fox
<i>Canis lupus</i>	Wolf
<i>Herpestes wardi</i>	Common mongoose
<i>Martes flavigula</i>	Yellow throated martin
<i>Mustela sibirica</i>	Himalayan weasel
<i>Hemitragus jemlahicus</i>	Himalayan Thar
<i>Pseudois nayaur</i>	Blue sheep
<i>Nemorhaedus ghoral</i>	Ghoral
<i>Capriicornis sumatraensis</i>	Seraw
<i>Muntiacus muntiac</i>	Barking Deer
<i>Moschus moschiferus</i>	Musk Deer
<i>Hysirix indica</i>	Porcupine
<i>Macaca mulatta</i>	Monkey
<i>Presbytis entellus</i>	Common langur
<i>Suncus murinus</i>	Grey musk shrew
<i>Rhinolophus affinis</i>	Horse shoe bat

#### 3.3.2 Avifauna

Among the avifauna pheasant species reported from the area are Western Tragopan (*Tragopan melanocephalus*), Monal (*Lophophorus impejanus*), Koklash (*Cerionis macrolophus*), Cheer Pheasant (*Catreus wallichii*), Khaleej Pheasant (*Gennacus albieristatus*). Other common avifauna in the study area is represent by Quail, Partridge, Treepies, Magpies, Vultures, Eagle, Kites, Falcons, Crows, Owls, Nightjars, Fly catchers, Redstart, Fork tails, Pigeon & Doves, Swift, Wagtail, Myna, Swift, Warbler, Cuckoo, Bulbul, Thrushes and Babblers.

## CHAPTER 4

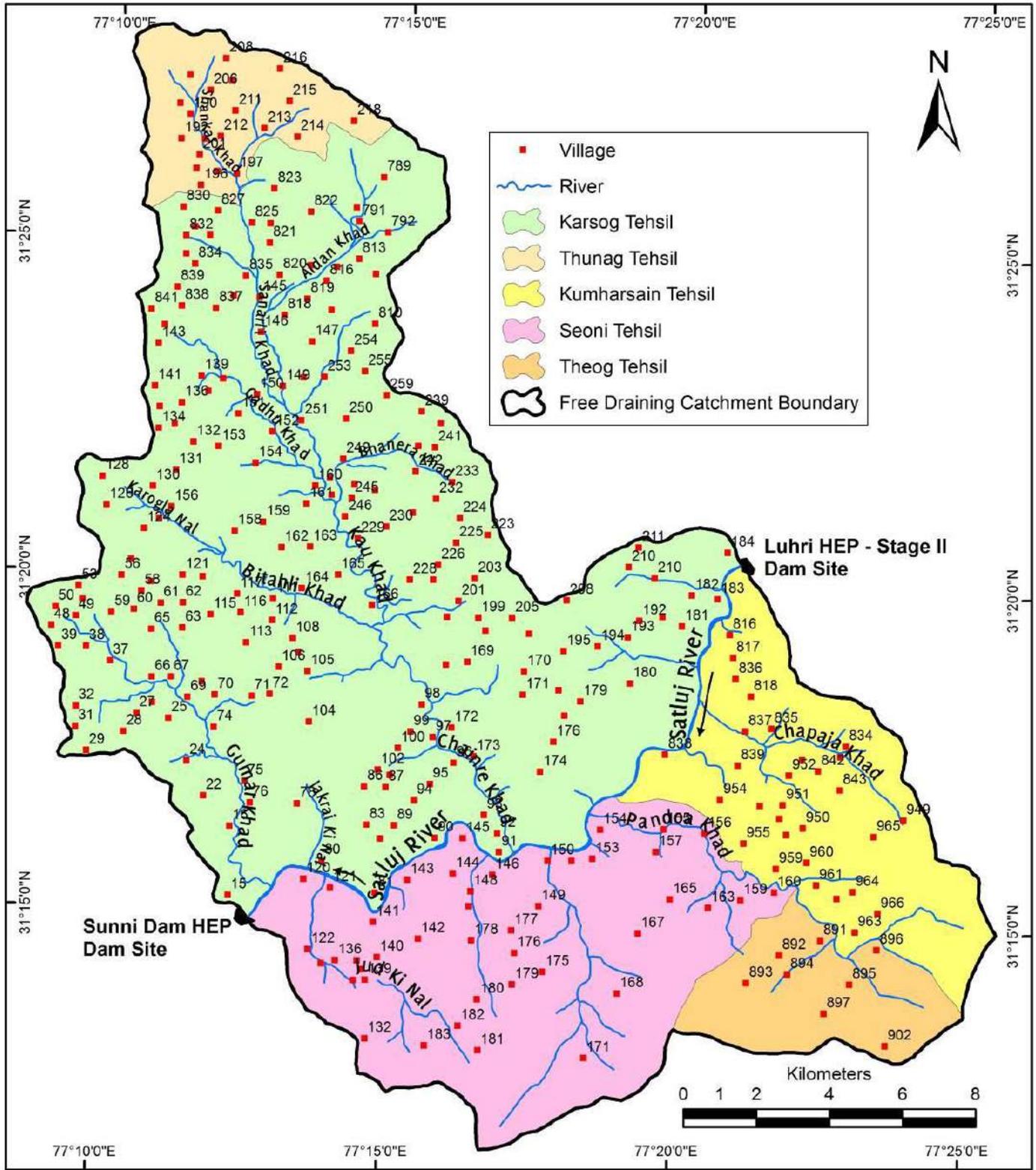
# SOCIO-ECONOMIC ENVIRONMENT

### 4.1 INTRODUCTION

For sustainable development it is important to understand social and economic conditions of the community in the region, impacts of development on the community, measures to mitigate negative impacts and enhance the positive impacts. Development work depends on an effective partnership between project developer and the local community. For new development initiatives, socio economic assessment plays an important role to ensure community participation and their acceptance of the development activity and also helps in planning the activities for local area development. The free draining catchment area of proposed Sunni Dam HEP falls in Karsog and Thunag tehsils of Mandi district and Kumharsain, Theog and Seoni tehsils of Shimla district of Himachal Pradesh.

### 4.2 DEMOGRAPHIC PROFILE OF FREE DRAINING CATCHMENT AREA

The baseline socio-economic profile is based on Census of India 2011. The free draining catchment area consists of 302 villages falling under 5 tehsils of 2 districts. 19 villages from Thunag tehsil and 202 villages from Karsog tehsil of Mandi district, 30 villages from Kumharsain tehsil, 8 villages from Theog tehsil and 43 villages from Seoni tehsil of Shimla district. The location of villages as per Census of India 2011 in the free draining catchment area is given at **Figure 4.1**. The total human population is 56355 of which 38658 (68.60%) belong to General category and 17535 (31.11%) belong to Scheduled Caste. There are 11762 households in the area with Karsog tehsil having the highest number (8503) followed by Seoni (1529), Kumharsain (1109), Thunag (266) and Theog (355). The overall average sex ratio in the study area is 999 females per 1000 males. The average family size in the study area villages is 4.8 persons per household. **Table 4.1** gives demographic profile of villages in the catchment area.



**Figure 4.1: Village Map of Free Draining Catchment Area  
(For names of Villages refer Table 4.1)**

Table 4.1: Villages in Free Draining Catchment Area

S. No.	Villages	Village Code	Population						Scheduled Caste			Scheduled Tribe			General
			HH	Total	M	F	Sex ratio	Family Size	Total	M	F	Total	M	F	
<b>District: Mandi</b>															
<b>Tehsil: Thunag</b>															
1	Thanar	015190	11	53	28	25	893	4.8	0	0	0	1	1	0	52
2	Dharwar	015192	18	64	32	32	1000	3.6	0	0	0	0	0	0	64
3	Narathi	015196	27	146	75	71	947	5.4	6	3	3	0	0	0	140
4	Sanoi	015197	34	189	92	97	1054	5.6	0	0	0	0	0	0	189
5	D.P.F.Bhalaon	015198	2	10	6	4	667	5.0	0	0	0	0	0	0	10
6	Kandhi Dhar	015200	23	119	62	57	919	5.2	109	56	53	0	0	0	10
7	Pokhri Dhar	015202	46	185	93	92	989	4.0	123	60	63	0	0	0	62
8	Bakaran	015204	20	83	40	43	1075	4.2	0	0	0	0	0	0	83
9	D.P.F.Thanti	015206	1	2	1	1	1000	2.0	0	0	0	0	0	0	2
10	Nasrar	015207	10	48	25	23	920	4.8	0	0	0	0	0	0	48
11	D.P.F.Dadhwar	015208	2	11	5	6	1200	5.5	0	0	0	0	0	0	11
12	Barain	015209	1	6	2	4	2000	6.0	0	0	0	0	0	0	6
13	D.P.F.Dhawara	015211	3	10	6	4	667	3.3	0	0	0	0	0	0	10
14	Seri	015212	30	133	67	66	985	4.4	73	36	37	0	0	0	60
15	Pakrar	015213	28	117	57	60	1053	4.2	0	0	0	0	0	0	117
16	D.P.F.Lambi Dhar	015214	2	8	3	5	1667	4.0	0	0	0	0	0	0	8
17	D.P.F.Devki Dhar	015215	1	2	1	1	1000	2.0	0	0	0	0	0	0	2
18	D.P.F.Kathyala	015216	4	18	9	9	1000	4.5	0	0	0	0	0	0	18
19	Samutla	015218	3	5	3	2	667	1.7	0	0	0	0	0	0	5
<b>Tehsil: Karsog</b>															
20	D .P.F. Dofa	015789	35	149	79	70	886	4.3	23	11	12	0	0	0	126
21	Parali Rehli	015790	10	42	20	22	1100	4.2	0	0	0	0	0	0	42
22	Puni	015791	33	140	71	69	972	4.2	0	0	0	0	0	0	140
23	Pehran	015792	9	38	20	18	900	4.2	0	0	0	0	0	0	38
24	Batala Bahal	015810	62	325	174	151	868	5.2	318	170	148	0	0	0	7
25	Kwagla	015812	31	120	61	59	967	3.9	7	5	2	0	0	0	113
26	D.P.F. Pehran	015813	5	24	12	12	1000	4.8	0	0	0	0	0	0	24
27	Kharkan	015814	38	186	94	92	979	4.9	7	4	3	0	0	0	179
28	Gothra	015815	37	167	81	86	1062	4.5	0	0	0	0	0	0	167
29	Drashti	015816	50	236	117	119	1017	4.7	175	85	90	0	0	0	61
30	D.P.F. Tikri Dhar	015817	7	27	15	12	800	3.9	24	14	10	0	0	0	3
31	Nehra	015818	108	554	266	288	1083	5.1	422	206	216	0	0	0	132

S. No.	Villages	Village Code	Population						Scheduled Caste			Scheduled Tribe			General
			HH	Total	M	F	Sex ratio	Family Size	Total	M	F	Total	M	F	
32	Dhalog	015819	20	102	53	49	925	5.1	52	28	24	0	0	0	50
33	Bhanthal	015820	173	892	449	443	987	5.2	342	172	170	0	0	0	550
34	Khanora	015821	117	517	235	282	1200	4.4	130	59	71	0	0	0	387
35	Bahan Gadhiman	015822	58	274	140	134	957	4.7	89	49	40	0	0	0	185
36	Bathar	015823	37	176	90	86	956	4.8	39	20	19	0	0	0	137
37	Riki	015824	114	567	288	279	969	5.0	94	50	44	0	0	0	473
38	Khanawari	015825	17	71	40	31	775	4.2	0	0	0	0	0	0	71
39	Tikkar	015827	4	17	11	6	545	4.3	4	3	1	0	0	0	13
40	Harnala	015828	4	25	13	12	923	6.3	0	0	0	0	0	0	25
41	Maghaar	015829	10	52	25	27	1080	5.2	12	6	6	0	0	0	40
42	Shainthal	015830	8	29	15	14	933	3.6	4	2	2	0	0	0	25
43	Uparla Pathron	015832	1	6	2	4	2000	6.0	0	0	0	0	0	0	6
44	Nichla Pathron	015833	1	2	1	1	1000	2.0	0	0	0	0	0	0	2
45	Bashlandi	015834	10	41	19	22	1158	4.1	0	0	0	0	0	0	41
46	Dachhen	015835	120	552	263	289	1099	4.6	156	77	79	0	0	0	396
47	Nawa	015836	12	59	31	28	903	4.9	0	0	0	0	0	0	59
48	Sarkol	015837	22	106	52	54	1038	4.8	11	7	4	0	0	0	95
49	Kufri Dhar	015838	62	306	152	154	1013	4.9	156	78	78	0	0	0	150
50	Galandhi	015839	9	48	25	23	920	5.3	0	0	0	0	0	0	48
51	Sanohal	015841	29	179	90	89	989	6.2	85	37	48	0	0	0	94
52	Bhora	016015	14	85	44	41	932	6.1	4	3	1	0	0	0	81
53	Guma-II	016016	1	5	3	2	667	5.0	0	0	0	0	0	0	5
54	Kund	016022	13	84	38	46	1211	6.5	6	3	3	0	0	0	78
55	Chogra	016024	1	4	2	2	1000	4.0	0	0	0	0	0	0	4
56	Shalag	016025	3	13	6	7	1167	4.3	0	0	0	0	0	0	13
57	Damog	016026	7	41	22	19	864	5.9	0	0	0	0	0	0	41
58	D.P.F.Thaltu	016027	1	2	1	1	1000	2.0	0	0	0	0	0	0	2
59	Gadari	016028	12	66	32	34	1063	5.5	0	0	0	0	0	0	66
60	Shaong	016029	40	275	135	140	1037	6.9	0	0	0	0	0	0	275
61	D.P.F.Bagshad	016031	22	119	59	60	1017	5.4	9	4	5	0	0	0	110
62	Bagshad	016032	169	821	414	407	983	4.9	447	223	224	7	3	4	367
63	Luharli	016037	36	173	80	93	1163	4.8	10	4	6	0	0	0	163
64	Parehati	016038	11	39	19	20	1053	3.5	39	19	20	0	0	0	0
65	Bahal	016039	36	174	93	81	871	4.8	60	33	27	0	0	0	114
66	Dwas	016048	19	82	44	38	864	4.3	11	7	4	0	0	0	71

S. No.	Villages	Village Code	Population						Scheduled Caste			Scheduled Tribe			General
			HH	Total	M	F	Sex ratio	Family Size	Total	M	F	Total	M	F	
67	Kalma	016049	1	1	0	1		1.0	1	0	1	0	0	0	0
68	Bohanda	016050	7	35	20	15	750	5.0	0	0	0	0	0	0	35
69	Sojha	016052	9	38	20	18	900	4.2	0	0	0	0	0	0	38
70	Patihncha	016053	2	12	6	6	1000	6.0	0	0	0	0	0	0	12
71	Kashmir	016055	47	221	105	116	1105	4.7	28	17	11	0	0	0	193
72	Kotla	016056	13	80	37	43	1162	6.2	5	2	3	0	0	0	75
73	D.P.F.Dharmor	016057	7	44	20	24	1200	6.3	0	0	0	0	0	0	44
74	Katahch	016058	4	20	9	11	1222	5.0	0	0	0	0	0	0	20
75	Jingal	016059	45	218	108	110	1019	4.8	51	24	27	0	0	0	167
76	D.P.F.Mehran	016060	1	4	3	1	333	4.0	0	0	0	0	0	0	4
77	Ghanuphari	016061	5	17	7	10	1429	3.4	10	4	6	0	0	0	7
78	D.P.F.Balaso	016062	5	28	15	13	867	5.6	0	0	0	0	0	0	28
79	Chamoli	016063	2	10	4	6	1500	5.0	0	0	0	0	0	0	10
80	Mehran	016065	128	634	319	315	987	5.0	294	145	149	0	0	0	340
81	Baloug	016066	3	11	7	4	571	3.7	0	0	0	0	0	0	11
82	Khandeyol	016067	1	5	2	3	1500	5.0	0	0	0	0	0	0	5
83	Kandhi-III	016068	200	940	477	463	971	4.7	361	182	179	0	0	0	579
84	D.P.F.Ghawla	016069	15	88	44	44	1000	5.9	0	0	0	0	0	0	88
85	Seri	016070	35	188	94	94	1000	5.4	15	7	8	0	0	0	173
86	D.P.F.Kalota	016071	16	74	40	34	850	4.6	0	0	0	0	0	0	74
87	Sawa Mahun	016072	59	284	148	136	919	4.8	14	7	7	0	0	0	270
88	Kashapri	016074	5	15	11	4	364	3.0	0	0	0	0	0	0	15
89	Dudhali-II	016075	6	27	13	14	1077	4.5	0	0	0	0	0	0	27
90	Dudhali-I	016076	2	4	2	2	1000	2.0	0	0	0	0	0	0	4
91	Manjhu	016078	22	119	62	57	919	5.4	0	0	0	0	0	0	119
92	Jaklin	016080	10	55	32	23	719	5.5	0	0	0	0	0	0	55
93	Magan	016081	9	49	28	21	750	5.4	7	4	3	0	0	0	42
94	Galed	016082	6	44	26	18	692	7.3	0	0	0	0	0	0	44
95	D.P.F.Kashot	016083	3	19	11	8	727	6.3	0	0	0	0	0	0	19
96	Sartyola	016086	14	71	40	31	775	5.1	0	0	0	0	0	0	71
97	Baru Kufri	016087	29	138	73	65	890	4.8	0	0	0	0	0	0	138
98	Bhanog	016089	18	92	46	46	1000	5.1	0	0	0	0	0	0	92
99	Fafan	016090	9	39	20	19	950	4.3	0	0	0	0	0	0	39
100	Parlog	016091	38	152	77	75	974	4.0	46	25	21	0	0	0	106
101	Chalaog	016092	1	5	1	4	4000	5.0	0	0	0	0	0	0	5

S. No.	Villages	Village Code	Population						Scheduled Caste			Scheduled Tribe			General
			HH	Total	M	F	Sex ratio	Family Size	Total	M	F	Total	M	F	
102	Khanoch	016093	15	57	31	26	839	3.8	8	5	3	0	0	0	49
103	Dwari Pash	016094	2	10	5	5	1000	5.0	0	0	0	0	0	0	10
104	Agla Chera	016095	7	33	19	14	737	4.7	33	19	14	0	0	0	0
105	Bhawan	016096	1	1	1	0	0	1.0	0	0	0	0	0	0	1
106	Ropari	016097	1	1	0	1	0	1.0	0	0	0	0	0	0	1
107	Loharli	016098	2	10	5	5	1000	5.0	0	0	0	0	0	0	10
108	D.P.F.Nagaltha	016099	7	22	10	12	1200	3.1	1	0	1	0	0	0	21
109	Daral	016100	24	94	45	49	1089	3.9	13	7	6	0	0	0	81
110	Uperla Karyala Nal	016101	1	8	4	4	1000	8.0	0	0	0	0	0	0	8
111	Chalaoni	016102	15	80	41	39	951	5.3	0	0	0	0	0	0	80
112	Jikhri	016104	15	57	28	29	1036	3.8	3	1	2	0	0	0	54
113	Bhargelu	016105	3	10	5	5	1000	3.3	0	0	0	8	4	4	2
114	D.P.F. Bag Bhakhari	016106	29	157	73	84	1151	5.4	1	0	1	0	0	0	156
115	Kashiun	016107	13	74	41	33	805	5.7	32	14	18	0	0	0	42
116	Shaindhal	016108	78	396	212	184	868	5.1	189	97	92	0	0	0	207
117	Batahali	016111	13	51	33	18	545	3.9	0	0	0	0	0	0	51
118	Bauh	016112	33	155	83	72	867	4.7	53	31	22	0	0	0	102
119	Bhamrara	016113	58	279	140	139	993	4.8	45	21	24	0	0	0	234
120	Balaso	016115	23	124	55	69	1255	5.4	12	4	8	0	0	0	112
121	D.P.F.Oda	016116	3	23	11	12	1091	7.7	23	11	12	0	0	0	0
122	Dhar Kandhlu	016117	102	531	275	256	931	5.2	112	56	56	0	0	0	419
123	Bahli	016120	31	147	69	78	1130	4.7	9	4	5	0	0	0	138
124	Kandhi	016121	21	106	48	58	1208	5.0	0	0	0	0	0	0	106
125	Panjyatari	016123	11	56	26	30	1154	5.1	22	12	10	0	0	0	34
126	Manola	016124	99	517	260	257	988	5.2	109	54	55	0	0	0	408
127	Dhawas	016126	10	52	22	30	1364	5.2	3	1	2	0	0	0	49
128	D.P.F.Jhao Prala	016128	9	67	36	31	861	7.4	67	36	31	0	0	0	0
129	Marandhi	016130	50	257	131	126	962	5.1	57	32	25	0	0	0	200
130	D.P.F.Marandhi	016131	2	10	5	5	1000	5.0	0	0	0	0	0	0	10
131	Matehal	016132	84	456	234	222	949	5.4	198	103	95	0	0	0	258
132	D.P.F.Kanjol	016133	8	47	24	23	958	5.9	35	17	18	0	0	0	12
133	Chindi	016134	20	104	51	53	1039	5.2	4	3	1	0	0	0	100
134	Dharbhaog	016135	15	52	26	26	1000	3.5	22	13	9	0	0	0	30
135	Dahr	016136	9	61	26	35	1346	6.8	52	24	28	0	0	0	9
136	Kot	016137	112	592	301	291	967	5.3	331	172	159	0	0	0	261

S. No.	Villages	Village Code	Population						Scheduled Caste			Scheduled Tribe			General
			HH	Total	M	F	Sex ratio	Family Size	Total	M	F	Total	M	F	
137	Karsog	016138	489	1907	974	933	958	3.9	410	202	208	1	1	0	1496
138	Bagain	016139	66	337	176	161	915	5.1	119	57	62	0	0	0	218
139	Upperla Dharbhaog	016141	10	60	30	30	1000	6.0	60	30	30	0	0	0	0
140	Bakhraut	016143	103	478	239	239	1000	4.6	53	29	24	8	5	3	417
141	Khanyari	016144	25	116	61	55	902	4.6	8	4	4	0	0	0	108
142	Sanarli	016145	307	1411	728	683	938	4.6	788	402	386	0	0	0	623
143	Panchakkar	016146	20	98	47	51	1085	4.9	71	34	37	0	0	0	27
144	Bhandarnu	016147	175	821	424	397	936	4.7	597	307	290	8	4	4	216
145	Mamel	016148	249	1082	539	543	1007	4.3	437	216	221	26	16	10	619
146	Baral	016149	102	444	218	226	1037	4.4	225	103	122	11	4	7	208
147	Lower Karsog	016150	213	894	431	463	1074	4.2	501	240	261	7	3	4	386
148	Kalaihani	016151	83	466	230	236	1026	5.6	37	14	23	0	0	0	429
149	Masog	016152	40	196	107	89	832	4.9	144	77	67	0	0	0	52
150	Shergal	016153	25	114	64	50	781	4.6	29	17	12	0	0	0	85
151	Majhas	016154	150	730	311	419	1347	4.9	373	187	186	14	7	7	343
152	Khalogara	016156	52	292	144	148	1028	5.6	34	16	18	0	0	0	258
153	Saned	016158	41	255	132	123	932	6.2	55	31	24	0	0	0	200
154	Kunhun	016159	80	440	213	227	1066	5.5	154	79	75	0	0	0	286
155	Bagaila	016160	79	426	216	210	972	5.4	314	157	157	0	0	0	112
156	Ghalog	016161	38	193	98	95	969	5.1	89	47	42	7	4	3	97
157	Takrol	016162	30	160	86	74	860	5.3	0	0	0	0	0	0	160
158	Bahanu	016163	100	501	246	255	1037	5.0	343	176	167	0	0	0	158
159	Shansh	016164	48	264	140	124	886	5.5	86	47	39	0	0	0	178
160	Dounhal	016165	60	316	165	151	915	5.3	84	45	39	0	0	0	232
161	Kandha	016166	48	233	120	113	942	4.9	0	0	0	19	10	9	214
162	Pichhala Chera	016168	7	40	25	15	600	5.7	11	7	4	15	10	5	14
163	Kot	016169	95	473	228	245	1075	5.0	293	135	158	0	0	0	180
164	Bagail	016170	48	275	132	143	1083	5.7	70	37	33	0	0	0	205
165	Kurna	016171	17	95	43	52	1209	5.6	0	0	0	0	0	0	95
166	D.P.F.Majhor	016172	2	13	6	7	1167	6.5	8	3	5	0	0	0	5
167	Parla Bhawa	016173	1	7	4	3	750	7.0	0	0	0	0	0	0	7
168	Belu Dhar	016174	72	363	170	193	1135	5.0	11	5	6	0	0	0	352
169	Belu Dhank	016176	71	295	164	131	799	4.2	50	27	23	0	0	0	245
170	D.P.F.Nihari Nal	016177	8	42	19	23	1211	5.3	0	0	0	0	0	0	42
171	Koti	016178	18	103	52	51	981	5.7	0	0	0	0	0	0	103

S. No.	Villages	Village Code	Population						Scheduled Caste			Scheduled Tribe			General
			HH	Total	M	F	Sex ratio	Family Size	Total	M	F	Total	M	F	
172	Kadehad	016179	82	452	230	222	965	5.5	5	4	1	0	0	0	447
173	Shahot	016180	66	349	175	174	994	5.3	62	31	31	0	0	0	287
174	Choa	016181	39	200	97	103	1062	5.1	1	1	0	0	0	0	199
175	Dateha	016182	28	139	71	68	958	5.0	0	0	0	0	0	0	139
176	Tundal	016183	44	242	124	118	952	5.5	20	10	10	0	0	0	222
177	Nanj	016184	108	600	301	299	993	5.6	0	0	0	0	0	0	600
178	Purana	016191	33	169	96	73	760	5.1	4	3	1	0	0	0	165
179	Ganu	016192	20	92	44	48	1091	4.6	0	0	0	0	0	0	92
180	Kehat	016193	25	131	59	72	1220	5.2	115	52	63	0	0	0	16
181	Sianjli	016194	38	210	108	102	944	5.5	0	0	0	0	0	0	210
182	Khamarla	016195	25	142	70	72	1029	5.7	99	50	49	0	0	0	43
183	Sehnj	016196	32	160	84	76	905	5.0	28	16	12	0	0	0	132
184	Jong	016198	32	149	81	68	840	4.7	0	0	0	0	0	0	149
185	Thach	016199	20	84	46	38	826	4.2	0	0	0	0	0	0	84
186	Mehndi	016200	51	232	123	109	886	4.5	4	2	2	0	0	0	228
187	Gajeha	016201	59	302	145	157	1083	5.1	17	7	10	26	13	13	259
188	Shanohu	016203	8	37	22	15	682	4.6	0	0	0	0	0	0	37
189	D.P.F.Sehnj	016205	3	17	8	9	1125	5.7	0	0	0	0	0	0	17
190	Bali Dhar	016208	8	34	16	18	1125	4.3	0	0	0	0	0	0	34
191	D.P.F.Kajeuni	016210	2	13	9	4	444	6.5	2	2	0	0	0	0	11
192	Sayanj	016211	147	723	372	351	944	4.9	349	188	161	0	0	0	374
193	D.P.F.Kandhi	016223	3	19	10	9	900	6.3	7	3	4	0	0	0	12
194	Kandhi	016224	25	132	64	68	1063	5.3	0	0	0	0	0	0	132
195	Thanali	016225	93	443	219	224	1023	4.8	111	53	58	0	0	0	332
196	D.P.F.Parala Dharthu	016226	1	1	1	0	0	1.0	1	1	0	0	0	0	0
197	Samotha	016227	1	1	1	0	0	1.0	1	1	0	0	0	0	0
198	Kunthari	016228	31	146	77	69	896	4.7	0	0	0	0	0	0	146
199	Dhanyara	016229	19	97	40	57	1425	5.1	38	16	22	0	0	0	59
200	Phinu	016230	22	112	56	56	1000	5.1	12	7	5	0	0	0	100
201	Dabrot	016231	114	603	301	302	1003	5.3	11	5	6	0	0	0	592
202	D.P.F.Bajh	016232	5	20	14	6	429	4.0	0	0	0	0	0	0	20
203	Kandlu	016233	31	176	86	90	1047	5.7	89	45	44	0	0	0	87
204	Kotlu	016238	43	219	103	116	1126	5.1	57	26	31	0	0	0	162
205	Chalaog	016239	11	53	26	27	1038	4.8	47	22	25	0	0	0	6
206	Bhanera	016240	101	551	304	247	813	5.5	301	172	129	0	0	0	250

S. No.	Villages	Village Code	Population						Scheduled Caste			Scheduled Tribe			General
			HH	Total	M	F	Sex ratio	Family Size	Total	M	F	Total	M	F	
207	Bagain	016241	71	330	167	163	976	4.6	191	97	94	0	0	0	139
208	D.P.F.Katach	016242	1	5	3	2	667	5.0	0	0	0	0	0	0	5
209	Dumhun	016243	47	261	128	133	1039	5.6	26	10	16	0	0	0	235
210	Hiundi	016244	35	186	94	92	979	5.3	151	76	75	0	0	0	35
211	Chamog	016245	43	217	124	93	750	5.0	77	46	31	0	0	0	140
212	Karaol	016246	28	131	62	69	1113	4.7	57	28	29	0	0	0	74
213	Kubshan	016247	57	329	158	171	1082	5.8	139	66	73	0	0	0	190
214	Kao	016248	122	502	256	246	961	4.1	68	30	38	0	0	0	434
215	Lol	016249	50	247	122	125	1025	4.9	102	47	55	0	0	0	145
216	Bag Salana	016250	77	340	177	163	921	4.4	219	115	104	0	0	0	121
217	Chalaru	016251	32	154	75	79	1053	4.8	110	52	58	0	0	0	44
218	Sanana	016253	109	512	252	260	1032	4.7	169	88	81	3	2	1	340
219	Kani Mandla	016254	118	566	293	273	932	4.8	251	134	117	0	0	0	315
220	D.P.F.Sihal	016255	28	148	73	75	1027	5.3	115	56	59	0	0	0	33
221	Kufri Dhar	016259	2	8	5	3	600	4.0	4	2	2	0	0	0	4
<b>District: Shimla</b>															
<b>Tehsil: Kumharsain</b>															
222	Talha	023816	62	292	142	150	1056	4.7	172	80	92	0	0	0	120
223	Bhuth	023817	20	107	51	56	1098	5.4	15	7	8	0	0	0	92
224	Kanda	023818	46	212	103	109	1058	4.6	6	3	3	0	0	0	206
225	Chekul	023834	14	54	30	24	800	3.9	0	0	0	0	0	0	54
226	Barori	023835	12	66	32	34	1063	5.5	0	0	0	0	0	0	66
227	Chopala	023836	26	127	56	71	1268	4.9	40	16	24	0	0	0	87
228	Majrog	023837	16	79	42	37	881	4.9	22	11	11	0	0	0	57
229	Jhunjan	023838	18	94	47	47	1000	5.2	0	0	0	0	0	0	94
230	Mogra	023839	118	527	255	272	1067	4.5	42	20	22	0	0	0	485
231	Kholwi	023840	35	157	82	75	915	4.5	4	3	1	0	0	0	153
232	Chamyala	023841	24	102	50	52	1040	4.3	46	22	24	0	0	0	56
233	Janjeli	023842	56	240	120	120	1000	4.3	198	98	100	0	0	0	42
234	Ahar	023843	60	234	121	113	934	3.9	156	81	75	0	0	0	78
235	Shehdari	023950	33	151	76	75	987	4.6	5	2	3	0	0	0	146
236	Chajol	023951	35	174	82	92	1122	5.0	14	4	10	0	0	0	160
237	Tramli	023952	28	109	49	60	1224	3.9	0	0	0	0	0	0	109
238	Bhuna	023953	51	242	116	126	1086	4.7	38	21	17	0	0	0	204
239	Hathiya	023954	31	137	68	69	1015	4.4	0	0	0	0	0	0	137

S. No.	Villages	Village Code	Population						Scheduled Caste			Scheduled Tribe			General
			HH	Total	M	F	Sex ratio	Family Size	Total	M	F	Total	M	F	
240	Ghughvi	023955	12	62	38	24	632	5.2	20	13	7	0	0	0	42
241	Kangal	023956	84	353	172	181	1052	4.2	267	130	137	1	0	1	85
242	Thah	023958	26	123	64	59	922	4.7	6	3	3	0	0	0	117
243	Kot	023959	15	93	35	58	1657	6.2	12	9	3	0	0	0	81
244	Thanu	023960	27	140	71	69	972	5.2	0	0	0	0	0	0	140
245	Nagali	023961	7	29	17	12	706	4.1	0	0	0	0	0	0	29
246	Koti	023962	90	373	190	183	963	4.1	178	83	95	0	0	0	195
247	Ropa	023963	24	101	49	52	1061	4.2	72	34	38	0	0	0	29
248	Dagrot	023964	25	144	63	81	1286	5.8	74	33	41	0	0	0	70
249	Bagain	023965	18	78	43	35	814	4.3	75	42	33	0	0	0	3
250	Dakolu	023966	55	227	114	113	991	4.1	113	58	55	0	0	0	114
251	Khuhan	023969	41	167	105	62	590	4.1	11	5	6	0	0	0	156
<b>Tehsil: Theog</b>															
252	Kiara	024891	41	159	78	81	1038	3.9	0	0	0	0	0	0	159
253	Dhar	024892	89	391	189	202	1069	4.4	105	53	52	0	0	0	286
254	Loli	024893	76	353	167	186	1114	4.6	8	3	5	0	0	0	345
255	Neori	024894	54	260	127	133	1047	4.8	8	3	5	0	0	0	252
256	Keokri	024895	34	187	92	95	1033	5.5	7	2	5	0	0	0	180
257	Thathal	024896	46	219	111	108	973	4.8	70	34	36	0	0	0	149
258	Jangal Narainti	024897	3	10	6	4	667	3.3	0	0	0	0	0	0	10
259	Jangal Narainti	024902	12	47	23	24	1043	3.9	0	0	0	0	0	0	47
<b>Tehsil: Seoni</b>															
260	Jaishi	024120	60	327	165	162	982	5.5	167	84	83	0	0	0	160
261	Bharara	024121	62	356	161	195	1211	5.7	85	34	51	0	0	0	271
262	Graon	024122	23	104	53	51	962	4.5	24	14	10	0	0	0	80
263	Nahwi	024132	35	156	80	76	950	4.5	12	6	6	0	0	0	144
264	Narar	024134	23	92	47	45	957	4.0	9	4	5	0	0	0	83
265	Sal	024135	39	186	83	103	1241	4.8	105	48	57	0	0	0	81
266	Drawl	024136	23	95	44	51	1159	4.1	0	0	0	0	0	0	95
267	Khun	024137	3	12	7	5	714	4.0	0	0	0	0	0	0	12
268	Kariali	024138	57	208	104	104	1000	3.6	32	17	15	0	0	0	176
269	Mandap	024139	35	176	79	97	1228	5.0	131	56	75	0	0	0	45
270	Mateog	024140	21	91	44	47	1068	4.3	0	0	0	0	0	0	91
271	Drabala	024141	15	53	25	28	1120	3.5	0	0	0	0	0	0	53
272	Jangal Drabala	024142	3	6	2	4	2000	2.0	0	0	0	0	0	0	6

S. No.	Villages	Village Code	Population						Scheduled Caste			Scheduled Tribe			General
			HH	Total	M	F	Sex ratio	Family Size	Total	M	F	Total	M	F	
273	Talah	024143	24	137	72	65	903	5.7	45	21	24	0	0	0	92
274	Manad	024144	22	114	57	57	1000	5.2	6	4	2	0	0	0	108
275	Ogli	024145	52	255	124	131	1056	4.9	34	15	19	0	0	0	221
276	Kothi	024146	28	159	80	79	988	5.7	58	26	32	0	0	0	101
277	Suma	024147	26	145	69	76	1101	5.6	74	34	40	0	0	0	71
278	Tharu	024148	59	282	139	143	1029	4.8	250	126	124	0	0	0	32
279	Jangal Malgi	024149	2	15	6	9	1500	7.5	0	0	0	0	0	0	15
280	Malgi	024150	34	137	75	62	827	4.0	27	17	10	0	0	0	110
281	Bathora	024151	58	259	119	140	1176	4.5	21	10	11	0	0	0	238
282	Newal	024153	8	35	17	18	1059	4.4	15	6	9	0	0	0	20
283	Pandoa	024154	36	128	57	71	1246	3.6	16	8	8	0	0	0	112
284	Gharaina	024155	26	113	53	60	1132	4.3	0	0	0	0	0	0	113
285	Bagh	024156	4	23	12	11	917	5.8	0	0	0	0	0	0	23
286	Sainj	024157	36	148	79	69	873	4.1	11	6	5	0	0	0	137
287	Maklog	024159	7	39	20	19	950	5.6	8	4	4	0	0	0	31
288	Anu	024160	14	59	32	27	844	4.2	42	22	20	0	0	0	17
289	Kayalu	024163	35	138	65	73	1123	3.9	79	40	39	0	0	0	59
290	Aisha	024165	27	119	51	68	1333	4.4	39	18	21	0	0	0	80
291	Dharogra	024167	143	677	329	348	1058	4.7	142	69	73	0	0	0	535
292	Sandoa	024168	114	566	272	294	1081	5.0	148	72	76	0	0	0	418
293	Galah	024171	12	53	27	26	963	4.4	0	0	0	0	0	0	53
294	Gadheri	024175	155	687	334	353	1057	4.4	239	117	122	0	0	0	448
295	Banuna	024176	40	149	76	73	961	3.7	32	17	15	0	0	0	117
296	Jangal Banuna	024177	7	13	8	5	625	1.9	1	1	0	0	0	0	12
297	Gadahu	024178	18	92	42	50	1190	5.1	15	8	7	0	0	0	77
298	Bagri	024179	31	132	58	74	1276	4.3	0	0	0	0	0	0	132
299	Himri	024180	43	214	103	111	1078	5.0	49	21	28	0	0	0	165
300	Jangal Himri	024181	1	1	1	0	0	1.0	0	0	0	0	0	0	1
301	Nalah	024182	29	167	90	77	856	5.8	8	4	4	0	0	0	159
302	Chaprani	024183	39	192	90	102	1133	4.9	0	0	0	0	0	0	192
			<b>11762</b>	<b>56355</b>	<b>28187</b>	<b>28168</b>	<b>999</b>	<b>4.8</b>	<b>17535</b>	<b>5546</b>	<b>8750</b>	<b>162</b>	<b>87</b>	<b>75</b>	<b>38658</b>

Source: Census of India: 2011 ; HH-House Hold, M-Male, F-Female

### 4.3 LITERACY PROFILE OF FREE DRAINING CATCHMENT AREA

Average literacy rate in Shimla district is at higher side as compared to that of Mandi district. Thunag and Karsog tehsils of Mandi district has an average literacy rate of 72.13% and 79.83% respectively. Kumharsain, Theog and Seoni tehsils of Shimla district has an average literacy rate of 81.24%, 85.56% and 84.43% respectively. Average literacy rate in the free draining catchment area is 80.54%. There are quite a few villages which has average literacy rate of 100% also. Male literacy rate is fairly high as compared to that of female literacy rate. Out of the total number of literates 88.92% are males. (Refer Table 4.2).

### 4.4 OCCUPATIONAL PATTERN OF FREE DRAINING CATCHMENT AREA

Work is defined as participation in any economically productive activity with or without compensation, wages or profit. Such participation may be physical and/or mental in nature. Work involves not only actual work but also includes effective supervision and direction of work. It even includes part time help or unpaid work on farm, family enterprise or in any other economic activity. All persons engaged in 'work' as defined above are workers. Persons who are engaged in cultivation or milk production even solely for domestic consumption are also treated as workers.

- Those workers who has worked for major part of the reference period (i.e. six months or more during the last one year preceding the date of enumeration) in any economically productive activity is termed as 'Main worker'.
- Those workers who worked for 3 months or less but less than six months of the reference period (i.e. in the last one year preceding the date of enumeration) in any economic activity is termed as 'Marginal worker'.
- A person is classified as cultivator if he or she is engaged in cultivation of land owned or held from Government or held from private persons or institutions for payment in money, kind or share.
- A person who works on another person's land for wages in money or kind or share is regarded as an agricultural labourer.
- Household Industry is defined as an industry conducted by one or more members of the household at home or within the village in rural areas and only within the precincts of the house where the household lives in urban areas.
- All workers, i.e., those who have been engaged in some economic activity during the last one year, but are not cultivators or agricultural labourers or in Household Industry, are 'Other Workers(OW)'. The type of workers that come under this category of 'OW' include all

government servants, municipal employees, teachers, factory workers, plantation workers, those engaged in trade, commerce, business, transport banking, mining, construction, political or social work, priests, entertainment artists, etc. In effect, all those workers other than cultivators or agricultural labourers or household industry workers, are 'Other Workers'. A person who did not at all work during the reference period was treated as non-worker.

Table 4.2: Literacy Profile of Free Draining Catchment Area

S. No.	Name	Population			Population (<6 Yrs)			Literate			Illiterate			Literate%**		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
<b>Tehsil: Thunag</b>																
1	Thanar	53	28	25	1	0	1	39	22	17	14	6	8	75.00	78.57	70.83
2	Dharwar	64	32	32	10	4	6	40	25	15	24	7	17	74.07	89.29	57.69
3	Narathi	146	75	71	13	9	4	102	55	47	44	20	24	76.69	83.33	70.15
4	Sanoi	189	92	97	25	15	10	138	72	66	51	20	31	84.15	93.51	75.86
5	D.P.F.Bhalaon	10	6	4	0	0	0	8	5	3	2	1	1	80.00	83.33	75.00
6	Kandhi Dhar	119	62	57	20	13	7	75	40	35	44	22	22	75.76	81.63	70.00
7	Pokhri Dhar	185	93	92	22	10	12	92	54	38	93	39	54	56.44	65.06	47.50
8	Bakaran	83	40	43	3	0	3	65	37	28	18	3	15	81.25	92.50	70.00
9	D.P.F.Thanti	2	1	1	0	0	0	1	1	0	1	0	1	50.00	100.00	0.00
10	Nasrar	48	25	23	5	4	1	28	15	13	20	10	10	65.12	71.43	59.09
11	D.P.F.Dadhwar	11	5	6	1	0	1	7	4	3	4	1	3	70.00	80.00	60.00
12	Barain	6	2	4	2	1	1	3	1	2	3	1	2	75.00	100.00	66.67
13	D.P.F.Dhawara	10	6	4	0	0	0	8	6	2	2	0	2	80.00	100.00	50.00
14	Seri	133	67	66	16	7	9	78	48	30	55	19	36	66.67	80.00	52.63
15	Pakrar	117	57	60	23	11	12	66	39	27	51	18	33	70.21	84.78	56.25
16	D.P.F.Lambi Dhar	8	3	5	3	1	2	4	2	2	4	1	3	80.00	100.00	66.67
17	D.P.F.Devki Dhar	2	1	1	0	0	0	0	0	0	2	1	1	0.00	0.00	0.00
18	D.P.F.Kathyala	18	9	9	3	3	0	8	4	4	10	5	5	53.33	66.67	44.44
19	Samutla	5	3	2	0	0	0	4	3	1	1	0	1	80.00	100.00	50.00
<b>Average Literacy % of villages coming under Thunag Tehsil</b>														<b>72.13</b>	<b>81.85</b>	<b>62.48</b>
<b>Tehsil: Karsog</b>																
20	D .P.F. Dofa	149	79	70	20	13	7	89	52	37	60	27	33	68.99	78.79	58.73
21	Parali Rehli	42	20	22	3	2	1	32	16	16	10	4	6	82.05	88.89	76.19
22	Puni	140	71	69	15	9	6	104	56	48	36	15	21	83.20	90.32	76.19
23	Pehran	38	20	18	6	2	4	25	16	9	13	4	9	78.13	88.89	64.29
24	Batala Bahal	325	174	151	44	27	17	215	127	88	110	47	63	76.51	86.39	65.67
25	Kwagla	120	61	59	14	10	4	77	44	33	43	17	26	72.64	86.27	60.00

S. No.	Name	Population			Population (<6 Yrs)			Literate			Illiterate			Literate%**		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
26	D.P.F. Pehran	24	12	12	6	2	4	11	8	3	13	4	9	61.11	80.00	37.50
27	Kharkan	186	94	92	20	12	8	140	77	63	46	17	29	84.34	93.90	75.00
28	Gothra	167	81	86	17	9	8	115	61	54	52	20	32	76.67	84.72	69.23
29	Drashti	236	117	119	38	18	20	130	70	60	106	47	59	65.66	70.71	60.61
30	D.P.F. Tikri Dhar	27	15	12	1	0	1	15	9	6	12	6	6	57.69	60.00	54.55
31	Nehra	554	266	288	93	35	58	375	211	164	179	55	124	81.34	91.34	71.30
32	Dhalog	102	53	49	16	5	11	71	45	26	31	8	23	82.56	93.75	68.42
33	Bhanthal	892	449	443	88	49	39	681	367	314	211	82	129	84.70	91.75	77.72
34	Khanora	517	235	282	55	27	28	361	177	184	156	58	98	78.14	85.10	72.44
35	Bahan Gadhiman	274	140	134	47	25	22	155	93	62	119	47	72	68.28	80.87	55.36
36	Bathar	176	90	86	22	10	12	111	63	48	65	27	38	72.08	78.75	64.86
37	Riki	567	288	279	69	34	35	348	200	148	219	88	131	69.88	78.74	60.66
38	Khanawari	71	40	31	5	3	2	53	35	18	18	5	13	80.30	94.59	62.07
39	Tikkar	17	11	6	4	3	1	12	7	5	5	4	1	92.31	87.50	100.00
40	Harnala	25	13	12	3	2	1	16	10	6	9	3	6	72.73	90.91	54.55
41	Maghaar	52	25	27	2	1	1	42	22	20	10	3	7	84.00	91.67	76.92
42	Shainthal	29	15	14	5	3	2	19	10	9	10	5	5	79.17	83.33	75.00
43	Uparla Pathron	6	2	4	0	0	0	5	2	3	1	0	1	83.33	100.00	75.00
44	Nichla Pathron	2	1	1	0	0	0	2	1	1	0	0	0	100.00	100.00	100.00
45	Bashlandi	41	19	22	7	4	3	20	13	7	21	6	15	58.82	86.67	36.84
46	Dachhen	552	263	289	71	33	38	405	213	192	147	50	97	84.20	92.61	76.49
47	Nawa	59	31	28	8	5	3	43	26	17	16	5	11	84.31	100.00	68.00
48	Sarkol	106	52	54	11	5	6	77	39	38	29	13	16	81.05	82.98	79.17
49	Kufri Dhar	306	152	154	43	22	21	201	113	88	105	39	66	76.43	86.92	66.17
50	Galandhi	48	25	23	10	7	3	27	16	11	21	9	12	71.05	88.89	55.00
51	Sanohal	179	90	89	16	6	10	139	77	62	40	13	27	85.28	91.67	78.48
52	Bhora	85	44	41	12	7	5	64	34	30	21	10	11	87.67	91.89	83.33
53	Guma-II	5	3	2	0	0	0	5	3	2	0	0	0	100.00	100.00	100.00
54	Kund	84	38	46	8	2	6	54	30	24	30	8	22	71.05	83.33	60.00
55	Chogra	4	2	2	0	0	0	1	1	0	3	1	2	25.00	50.00	0.00

S. No.	Name	Population			Population (<6 Yrs)			Literate			Illiterate			Literate%**		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
56	Shalag	13	6	7	0	0	0	9	6	3	4	0	4	69.23	100.00	42.86
57	Damog	41	22	19	6	4	2	23	13	10	18	9	9	65.71	72.22	58.82
58	D.P.F.Thaltu	2	1	1	0	0	0	2	1	1	0	0	0	100.00	100.00	100.00
59	Gadari	66	32	34	5	3	2	49	27	22	17	5	12	80.33	93.10	68.75
60	Shaong	275	135	140	31	16	15	199	110	89	76	25	51	81.56	92.44	71.20
61	D.P.F.Bagshad	119	59	60	7	1	6	84	46	38	35	13	22	75.00	79.31	70.37
62	Bagshad	821	414	407	116	54	62	558	324	234	263	90	173	79.15	90.00	67.83
63	Luharli	173	80	93	15	7	8	124	67	57	49	13	36	78.48	91.78	67.06
64	Parehati	39	19	20	2	2	0	29	16	13	10	3	7	78.38	94.12	65.00
65	Bahal	174	93	81	14	10	4	126	74	52	48	19	29	78.75	89.16	67.53
66	Dwas	82	44	38	10	4	6	65	39	26	17	5	12	90.28	97.50	81.25
67	Kalma	1	0	1	0	0	0	0	0	0	1	0	1	0.00	0.00	0.00
68	Bohanda	35	20	15	3	2	1	25	16	9	10	4	6	78.13	88.89	64.29
69	Sojha	38	20	18	2	2	0	26	14	12	12	6	6	72.22	77.78	66.67
70	Patihncha	12	6	6	2	0	2	8	6	2	4	0	4	80.00	100.00	50.00
71	Kashmir	221	105	116	26	14	12	158	81	77	63	24	39	81.03	89.01	74.04
72	Kotla	80	37	43	11	7	4	54	29	25	26	8	18	78.26	96.67	64.10
73	D.P.F.Dharmor	44	20	24	5	1	4	31	18	13	13	2	11	79.49	94.74	65.00
74	Katahch	20	9	11	1	1	0	17	8	9	3	1	2	89.47	100.00	81.82
75	Jingal	218	108	110	32	14	18	148	87	61	70	21	49	79.57	92.55	66.30
76	D.P.F.Mehran	4	3	1	2	2	0	1	1	0	3	2	1	50.00	100.00	0.00
77	Ghanuphari	17	7	10	0	0	0	13	6	7	4	1	3	76.47	85.71	70.00
78	D.P.F.Balaso	28	15	13	3	2	1	20	12	8	8	3	5	80.00	92.31	66.67
79	Chamoli	10	4	6	2	0	2	3	2	1	7	2	5	37.50	50.00	25.00
80	Mehran	634	319	315	66	40	26	452	254	198	182	65	117	79.58	91.04	68.51
81	Baloug	11	7	4	0	0	0	9	7	2	2	0	2	81.82	100.00	50.00
82	Khandeyol	5	2	3	1	0	1	3	1	2	2	1	1	75.00	50.00	100.00
83	Kandhi-III	940	477	463	126	61	65	625	355	270	315	122	193	76.78	85.34	67.84
84	D.P.F.Ghawla	88	44	44	10	5	5	60	36	24	28	8	20	76.92	92.31	61.54
85	Seri	188	94	94	23	14	9	147	78	69	41	16	25	89.09	97.50	81.18

S. No.	Name	Population			Population (<6 Yrs)			Literate			Illiterate			Literate%**		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
86	D.P.F.Kalota	74	40	34	4	2	2	61	36	25	13	4	9	87.14	94.74	78.13
87	Sawa Mahun	284	148	136	28	15	13	222	125	97	62	23	39	86.72	93.98	78.86
88	Kashapri	15	11	4	0	0	0	12	9	3	3	2	1	80.00	81.82	75.00
89	Dudhali-II	27	13	14	6	3	3	12	5	7	15	8	7	57.14	50.00	63.64
90	Dudhali-I	4	2	2	0	0	0	1	1	0	3	1	2	25.00	50.00	0.00
91	Manjhu	119	62	57	9	6	3	82	47	35	37	15	22	74.55	83.93	64.81
92	Jaklin	55	32	23	2	1	1	36	24	12	19	8	11	67.92	77.42	54.55
93	Magan	49	28	21	2	1	1	37	22	15	12	6	6	78.72	81.48	75.00
94	Galed	44	26	18	6	3	3	31	21	10	13	5	8	81.58	91.30	66.67
95	D.P.F.Kashot	19	11	8	4	2	2	13	9	4	6	2	4	86.67	100.00	66.67
96	Sartyola	71	40	31	9	7	2	48	28	20	23	12	11	77.42	84.85	68.97
97	Baru Kufri	138	73	65	13	5	8	99	60	39	39	13	26	79.20	88.24	68.42
98	Bhanog	92	46	46	7	3	4	71	39	32	21	7	14	83.53	90.70	76.19
99	Fafan	39	20	19	2	2	0	25	16	9	14	4	10	67.57	88.89	47.37
100	Parlog	152	77	75	22	10	12	109	63	46	43	14	29	83.85	94.03	73.02
101	Chalaog	5	1	4	0	0	0	4	1	3	1	0	1	80.00	100.00	75.00
102	Khanoch	57	31	26	11	8	3	33	18	15	24	13	11	71.74	78.26	65.22
103	Dwari Pash	10	5	5	0	0	0	9	5	4	1	0	1	90.00	100.00	80.00
104	Agla Chera	33	19	14	0	0	0	30	19	11	3	0	3	90.91	100.00	78.57
105	Bhawan	1	1	0	0	0	0	0	0	0	1	1	0	0.00	0.00	0.00
106	Ropari	1	0	1	0	0	0	0	0	0	1	0	1	0.00	0.00	0.00
107	Loharli	10	5	5	1	1	0	7	4	3	3	1	2	77.78	100.00	60.00
108	D.P.F.Nagaltha	22	10	12	2	0	2	17	10	7	5	0	5	85.00	100.00	70.00
109	Daral	94	45	49	8	4	4	62	32	30	32	13	19	72.09	78.05	66.67
110	Uperla Karyala Nal	8	4	4	1	1	0	6	3	3	2	1	1	85.71	100.00	75.00
111	Chalaoni	80	41	39	9	5	4	54	31	23	26	10	16	76.06	86.11	65.71
112	Jikhri	57	28	29	4	2	2	37	21	16	20	7	13	69.81	80.77	59.26
113	Bhargelu	10	5	5	1	0	1	1	1	0	9	4	5	11.11	20.00	0.00
114	D.P.F. Bag Bhakhari	157	73	84	11	6	5	118	61	57	39	12	27	80.82	91.04	72.15
115	Kashiun	74	41	33	8	7	1	47	27	20	27	14	13	71.21	79.41	62.50

S. No.	Name	Population			Population (<6 Yrs)			Literate			Illiterate			Literate%**		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
116	Shaindhal	396	212	184	33	20	13	304	173	131	92	39	53	83.75	90.10	76.61
117	Batahali	51	33	18	2	1	1	37	28	9	14	5	9	75.51	87.50	52.94
118	Bauh	155	83	72	9	7	2	122	70	52	33	13	20	83.56	92.11	74.29
119	Bhamrara	279	140	139	16	10	6	204	118	86	75	22	53	77.57	90.77	64.66
120	Balaso	124	55	69	13	3	10	84	45	39	40	10	30	75.68	86.54	66.10
121	D.P.F.Oda	23	11	12	6	3	3	14	8	6	9	3	6	82.35	100.00	66.67
122	Dhar Kandhlu	531	275	256	54	25	29	388	236	152	143	39	104	81.34	94.40	66.96
123	Bahli	147	69	78	11	6	5	115	60	55	32	9	23	84.56	95.24	75.34
124	Kandhi	106	48	58	7	0	7	76	42	34	30	6	24	76.77	87.50	66.67
125	Panjyadari	56	26	30	6	1	5	44	23	21	12	3	9	88.00	92.00	84.00
126	Manola	517	260	257	64	33	31	351	199	152	166	61	105	77.48	87.67	67.26
127	Dhawas	52	22	30	9	3	6	34	17	17	18	5	13	79.07	89.47	70.83
128	D.P.F.Jhao Prala	67	36	31	12	9	3	43	18	25	24	18	6	78.18	66.67	89.29
129	Marandhi	257	131	126	28	15	13	179	102	77	78	29	49	78.17	87.93	68.14
130	D.P.F.Marandhi	10	5	5	2	1	1	7	4	3	3	1	2	87.50	100.00	75.00
131	Matehal	456	234	222	45	25	20	334	192	142	122	42	80	81.27	91.87	70.30
132	D.P.F.Kanjol	47	24	23	5	2	3	33	18	15	14	6	8	78.57	81.82	75.00
133	Chindi	104	51	53	12	7	5	75	39	36	29	12	17	81.52	88.64	75.00
134	Dharbhaog	52	26	26	7	4	3	41	21	20	11	5	6	91.11	95.45	86.96
135	Dahr	61	26	35	10	3	7	40	21	19	21	5	16	78.43	91.30	67.86
136	Kot	592	301	291	68	42	26	431	234	197	161	67	94	82.25	90.35	74.34
137	Karsog	1907	974	933	190	106	84	1551	823	728	356	151	205	90.33	94.82	85.75
138	Bagain	337	176	161	32	17	15	247	136	111	90	40	50	80.98	85.53	76.03
139	Upperla Dharbhaog	60	30	30	8	4	4	32	16	16	28	14	14	61.54	61.54	61.54
140	Bakhrat	478	239	239	43	23	20	366	205	161	112	34	78	84.14	94.91	73.52
141	Khanyari	116	61	55	13	9	4	78	45	33	38	16	22	75.73	86.54	64.71
142	Sanarli	1411	728	683	177	99	78	959	539	420	452	189	263	77.71	85.69	69.42
143	Panchakkar	98	47	51	14	5	9	72	39	33	26	8	18	85.71	92.86	78.57
144	Bhandarnu	821	424	397	97	43	54	597	344	253	224	80	144	82.46	90.29	73.76
145	Mamel	1082	539	543	117	54	63	864	463	401	218	76	142	89.53	95.46	83.54

S. No.	Name	Population			Population (<6 Yrs)			Literate			Illiterate			Literate%**		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
146	Baral	444	218	226	35	21	14	359	180	179	85	38	47	87.78	91.37	84.43
147	Lower Karsog	894	431	463	99	48	51	692	349	343	202	82	120	87.04	91.12	83.25
148	Kalaihani	466	230	236	49	26	23	332	179	153	134	51	83	79.62	87.75	71.83
149	Masog	196	107	89	18	11	7	136	82	54	60	25	35	76.40	85.42	65.85
150	Shergal	114	64	50	9	5	4	86	53	33	28	11	17	81.90	89.83	71.74
151	Majhas	730	311	419	94	36	58	427	215	212	303	96	207	67.14	78.18	58.73
152	Khalogara	292	144	148	37	18	19	192	110	82	100	34	66	75.29	87.30	63.57
153	Saned	255	132	123	33	17	16	179	104	75	76	28	48	80.63	90.43	70.09
154	Kunhun	440	213	227	46	20	26	312	169	143	128	44	84	79.19	87.56	71.14
155	Bagaila	426	216	210	39	16	23	304	178	126	122	38	84	78.55	89.00	67.38
156	Ghalog	193	98	95	19	9	10	142	80	62	51	18	33	81.61	89.89	72.94
157	Takrol	160	86	74	17	9	8	116	69	47	44	17	27	81.12	89.61	71.21
158	Bahanu	501	246	255	62	26	36	330	186	144	171	60	111	75.17	84.55	65.75
159	Shansh	264	140	124	17	10	7	185	118	67	79	22	57	74.90	90.77	57.26
160	Dounhal	316	165	151	40	21	19	214	126	88	102	39	63	77.54	87.50	66.67
161	Kandha	233	120	113	31	18	13	159	88	71	74	32	42	78.71	86.27	71.00
162	Pichhala Chera	40	25	15	7	3	4	22	18	4	18	7	11	66.67	81.82	36.36
163	Kot	473	228	245	54	28	26	321	167	154	152	61	91	76.61	83.50	70.32
164	Bagail	275	132	143	50	17	33	173	101	72	102	31	71	76.89	87.83	65.45
165	Kurna	95	43	52	13	4	9	72	37	35	23	6	17	87.80	94.87	81.40
166	D.P.F.Majhor	13	6	7	1	1	0	8	4	4	5	2	3	66.67	80.00	57.14
167	Parla Bhawa	7	4	3	0	0	0	6	4	2	1	0	1	85.71	100.00	66.67
168	Belu Dhar	363	170	193	52	22	30	263	133	130	100	37	63	84.57	89.86	79.75
169	Belu Dhank	295	164	131	35	16	19	207	136	71	88	28	60	79.62	91.89	63.39
170	D.P.F.Nihari Nal	42	19	23	3	2	1	32	15	17	10	4	6	82.05	88.24	77.27
171	Koti	103	52	51	11	3	8	71	41	30	32	11	21	77.17	83.67	69.77
172	Kadehad	452	230	222	51	25	26	305	178	127	147	52	95	76.06	86.83	64.80
173	Shahot	349	175	174	51	30	21	215	116	99	134	59	75	72.15	80.00	64.71
174	Choa	200	97	103	22	11	11	134	76	58	66	21	45	75.28	88.37	63.04
175	Dateha	139	71	68	16	8	8	102	59	43	37	12	25	82.93	93.65	71.67

S. No.	Name	Population			Population (<6 Yrs)			Literate			Illiterate			Literate%**		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
176	Tundal	242	124	118	27	15	12	165	97	68	77	27	50	76.74	88.99	64.15
177	Nanj	600	301	299	78	39	39	406	229	177	194	72	122	77.78	87.40	68.08
178	Purana	169	96	73	14	10	4	110	74	36	59	22	37	70.97	86.05	52.17
179	Ganu	92	44	48	4	2	2	65	35	30	27	9	18	73.86	83.33	65.22
180	Kehat	131	59	72	21	10	11	77	40	37	54	19	35	70.00	81.63	60.66
181	Sianjli	210	108	102	31	13	18	127	79	48	83	29	54	70.95	83.16	57.14
182	Khamarla	142	70	72	21	9	12	89	43	46	53	27	26	73.55	70.49	76.67
183	Sehnj	160	84	76	22	12	10	110	63	47	50	21	29	79.71	87.50	71.21
184	Jong	149	81	68	12	5	7	113	71	42	36	10	26	82.48	93.42	68.85
185	Thach	84	46	38	10	4	6	57	37	20	27	9	18	77.03	88.10	62.50
186	Mehndi	232	123	109	16	9	7	185	106	79	47	17	30	85.65	92.98	77.45
187	Gajeha	302	145	157	43	21	22	210	108	102	92	37	55	81.08	87.10	75.56
188	Shanohu	37	22	15	3	1	2	28	19	9	9	3	6	82.35	90.48	69.23
189	D.P.F.Sehnj	17	8	9	0	0	0	13	8	5	4	0	4	76.47	100.00	55.56
190	Bali Dhar	34	16	18	1	0	1	23	13	10	11	3	8	69.70	81.25	58.82
191	D.P.F.Kajeuni	13	9	4	1	1	0	9	6	3	4	3	1	75.00	75.00	75.00
192	Sayanj	723	372	351	65	32	33	513	292	221	210	80	130	77.96	85.88	69.50
193	D.P.F.Kandhi	19	10	9	2	1	1	13	9	4	6	1	5	76.47	100.00	50.00
194	Kandhi	132	64	68	17	6	11	93	50	43	39	14	25	80.87	86.21	75.44
195	Thanali	443	219	224	43	21	22	309	171	138	134	48	86	77.25	86.36	68.32
196	D.P.F.Parala Dharthu	1	1	0	0	0	0	0	0	0	1	1	0	0.00	0.00	0.00
197	Samotha	1	1	0	0	0	0	0	0	0	1	1	0	0.00	0.00	0.00
198	Kunthari	146	77	69	17	7	10	101	63	38	45	14	31	78.29	90.00	64.41
199	Dhanyara	97	40	57	15	6	9	61	28	33	36	12	24	74.39	82.35	68.75
200	Phinu	112	56	56	18	10	8	73	42	31	39	14	25	77.66	91.30	64.58
201	Dabrot	603	301	302	69	38	31	424	236	188	179	65	114	79.40	89.73	69.37
202	D.P.F.Bajh	20	14	6	3	2	1	10	9	1	10	5	5	58.82	75.00	20.00
203	Kandlu	176	86	90	30	11	19	122	71	51	54	15	39	83.56	94.67	71.83
204	Kotlu	219	103	116	30	14	16	151	81	70	68	22	46	79.89	91.01	70.00
205	Chalaog	53	26	27	5	4	1	35	17	18	18	9	9	72.92	77.27	69.23

S. No.	Name	Population			Population (<6 Yrs)			Literate			Illiterate			Literate%**		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
206	Bhanera	551	304	247	62	39	23	384	239	145	167	65	102	78.53	90.19	64.73
207	Bagain	330	167	163	50	32	18	218	115	103	112	52	60	77.86	85.19	71.03
208	D.P.F.Katach	5	3	2	0	0	0	3	2	1	2	1	1	60.00	66.67	50.00
209	Dumhun	261	128	133	26	16	10	175	102	73	86	26	60	74.47	91.07	59.35
210	Hiundi	186	94	92	21	10	11	121	70	51	65	24	41	73.33	83.33	62.96
211	Chamog	217	124	93	24	19	5	152	94	58	65	30	35	78.76	89.52	65.91
212	Karaol	131	62	69	15	7	8	91	45	46	40	17	23	78.45	81.82	75.41
213	Kubshan	329	158	171	35	12	23	244	136	108	85	22	63	82.99	93.15	72.97
214	Kao	502	256	246	63	39	24	407	211	196	95	45	50	92.71	97.24	88.29
215	Lol	247	122	125	21	7	14	179	101	78	68	21	47	79.20	87.83	70.27
216	Bag Salana	340	177	163	34	17	17	225	141	84	115	36	79	73.53	88.13	57.53
217	Chalaru	154	75	79	15	9	6	108	52	56	46	23	23	77.70	78.79	76.71
218	Sanana	512	252	260	54	27	27	377	205	172	135	47	88	82.31	91.11	73.82
219	Kani Mandla	566	293	273	69	44	25	407	220	187	159	73	86	81.89	88.35	75.40
220	D.P.F.Sihhal	148	73	75	25	12	13	91	49	42	57	24	33	73.98	80.33	67.74
221	Kufri Dhar	8	5	3	3	3	0	5	2	3	3	3	0	100.00	100.00	100.00
<b>Average Literacy % of villages coming under Karsog Tehsil</b>													<b>79.83</b>	<b>88.63</b>	<b>70.94</b>	
<b>Tehsil: Kumharsain</b>																
222	Talha	292	142	150	42	19	23	190	102	88	102	40	62	76.00	82.93	69.29
223	Bhuth	107	51	56	13	5	8	78	43	35	29	8	21	82.98	93.48	72.92
224	Kanda	212	103	109	16	11	5	157	80	77	55	23	32	80.10	86.96	74.04
225	Chekul	54	30	24	8	4	4	39	22	17	15	8	7	84.78	84.62	85.00
226	Barori	66	32	34	8	2	6	42	24	18	24	8	16	72.41	80.00	64.29
227	Chopala	127	56	71	18	8	10	79	39	40	48	17	31	72.48	81.25	65.57
228	Majrog	79	42	37	11	6	5	50	27	23	29	15	14	73.53	75.00	71.88
229	Jhunjan	94	47	47	9	6	3	71	35	36	23	12	11	83.53	85.37	81.82
230	Mogra	527	255	272	49	20	29	403	215	188	124	40	84	84.31	91.49	77.37
231	Kholwi	157	82	75	23	11	12	105	62	43	52	20	32	78.36	87.32	68.25
232	Chamyala	102	50	52	10	9	1	74	39	35	28	11	17	80.43	95.12	68.63
233	Janjeli	240	120	120	21	9	12	185	98	87	55	22	33	84.47	88.29	80.56

S. No.	Name	Population			Population (<6 Yrs)			Literate			Illiterate			Literate%**		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
234	Ahar	234	121	113	14	8	6	195	108	87	39	13	26	88.64	95.58	81.31
235	Shehdari	151	76	75	18	10	8	118	61	57	33	15	18	88.72	92.42	85.07
236	Chajol	174	82	92	20	8	12	123	69	54	51	13	38	79.87	93.24	67.50
237	Tramli	109	49	60	6	2	4	87	42	45	22	7	15	84.47	89.36	80.36
238	Bhuna	242	116	126	27	9	18	172	100	72	70	16	54	80.00	93.46	66.67
239	Hathiya	137	68	69	15	6	9	104	60	44	33	8	25	85.25	96.77	73.33
240	Ghughvi	62	38	24	11	7	4	39	25	14	23	13	10	76.47	80.65	70.00
241	Kangal	353	172	181	49	19	30	266	142	124	87	30	57	87.50	92.81	82.12
242	Thah	123	64	59	8	3	5	104	58	46	19	6	13	90.43	95.08	85.19
243	Kot	93	35	58	14	5	9	69	26	43	24	9	15	87.34	86.67	87.76
244	Thanu	140	71	69	12	9	3	111	57	54	29	14	15	86.72	91.94	81.82
245	Nagali	29	17	12	6	3	3	20	13	7	9	4	5	86.96	92.86	77.78
246	Koti	373	190	183	45	21	24	269	156	113	104	34	70	82.01	92.31	71.07
247	Ropa	101	49	52	8	4	4	70	40	30	31	9	22	75.27	88.89	62.50
248	Dagrot	144	63	81	17	9	8	101	46	55	43	17	26	79.53	85.19	75.34
249	Bagain	78	43	35	13	6	7	43	28	15	35	15	20	66.15	75.68	53.57
250	Dakolu	227	114	113	28	14	14	148	78	70	79	36	43	74.37	78.00	70.71
251	Khuhan	167	105	62	19	16	3	92	58	34	75	47	28	62.16	65.17	57.63
<b>Average Literacy % of villages coming under Kumharsain Tehsil</b>													<b>81.24</b>	<b>88.21</b>	<b>74.30</b>	
<b>Tehsil: Theog</b>																
252	Kiara	159	78	81	16	8	8	120	66	54	39	12	27	83.92	94.29	73.97
253	Dhar	391	189	202	56	31	25	289	143	146	102	46	56	86.27	90.51	82.49
254	Loli	353	167	186	34	20	14	274	139	135	79	28	51	85.89	94.56	78.49
255	Neori	260	127	133	32	16	16	213	108	105	47	19	28	93.42	97.30	89.74
256	Keokri	187	92	95	29	12	17	129	69	60	58	23	35	81.65	86.25	76.92
257	Thathal	219	111	108	22	14	8	155	85	70	64	26	38	78.68	87.63	70.00
258	Jangal Narainti	10	6	4	0	0	0	9	6	3	1	0	1	90.00	100.00	75.00
259	Jangal Narainti	47	23	24	3	1	2	38	21	17	9	2	7	86.36	95.45	77.27
<b>Average Literacy % of villages coming under Theog Tehsil</b>													<b>85.56</b>	<b>92.19</b>	<b>79.41</b>	
<b>Tehsil: Seoni</b>																

S. No.	Name	Population			Population (<6 Yrs)			Literate			Illiterate			Literate%**		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
260	Jaishi	327	165	162	44	28	16	235	124	111	92	41	51	83.04	90.51	76.03
261	Bharara	356	161	195	50	22	28	263	129	134	93	32	61	85.95	92.81	80.24
262	Graon	104	53	51	15	11	4	71	38	33	33	15	18	79.78	90.48	70.21
263	Nahwi	156	80	76	24	12	12	99	56	43	57	24	33	75.00	82.35	67.19
264	Narar	92	47	45	11	9	2	72	34	38	20	13	7	88.89	89.47	88.37
265	Sal	186	83	103	21	8	13	139	69	70	47	14	33	84.24	92.00	77.78
266	Drawl	95	44	51	5	2	3	71	39	32	24	5	19	78.89	92.86	66.67
267	Khun	12	7	5	2	1	1	9	6	3	3	1	2	90.00	100.00	75.00
268	Kariali	208	104	104	22	10	12	152	87	65	56	17	39	81.72	92.55	70.65
269	Mandap	176	79	97	32	18	14	116	54	62	60	25	35	80.56	88.52	74.70
270	Mateog	91	44	47	10	5	5	64	33	31	27	11	16	79.01	84.62	73.81
271	Drabala	53	25	28	3	1	2	40	20	20	13	5	8	80.00	83.33	76.92
272	Jangal Drabala	6	2	4	0	0	0	4	1	3	2	1	1	66.67	50.00	75.00
273	Talah	137	72	65	17	11	6	90	50	40	47	22	25	75.00	81.97	67.80
274	Manad	114	57	57	19	13	6	78	42	36	36	15	21	82.11	95.45	70.59
275	Ogli	255	124	131	28	12	16	192	103	89	63	21	42	84.58	91.96	77.39
276	Kothi	159	80	79	23	8	15	119	67	52	40	13	27	87.50	93.06	81.25
277	Suma	145	69	76	16	7	9	114	58	56	31	11	20	88.37	93.55	83.58
278	Tharu	282	139	143	25	14	11	227	114	113	55	25	30	88.33	91.20	85.61
279	Jangal Malgi	15	6	9	2	0	2	10	5	5	5	1	4	76.92	83.33	71.43
280	Malgi	137	75	62	13	8	5	105	59	46	32	16	16	84.68	88.06	80.70
281	Bathora	259	119	140	18	5	13	201	103	98	58	16	42	83.40	90.35	77.17
282	Newal	35	17	18	6	2	4	24	14	10	11	3	8	82.76	93.33	71.43
283	Pandoa	128	57	71	23	6	17	76	44	32	52	13	39	72.38	86.27	59.26
284	Gharaina	113	53	60	18	10	8	79	38	41	34	15	19	83.16	88.37	78.85
285	Bagh	23	12	11	2	1	1	17	10	7	6	2	4	80.95	90.91	70.00
286	Sainj	148	79	69	16	10	6	109	61	48	39	18	21	82.58	88.41	76.19
287	Maklog	39	20	19	3	1	2	30	16	14	9	4	5	83.33	84.21	82.35
288	Anu	59	32	27	6	3	3	42	24	18	17	8	9	79.25	82.76	75.00
289	Kayalu	138	65	73	11	5	6	107	57	50	31	8	23	84.25	95.00	74.63

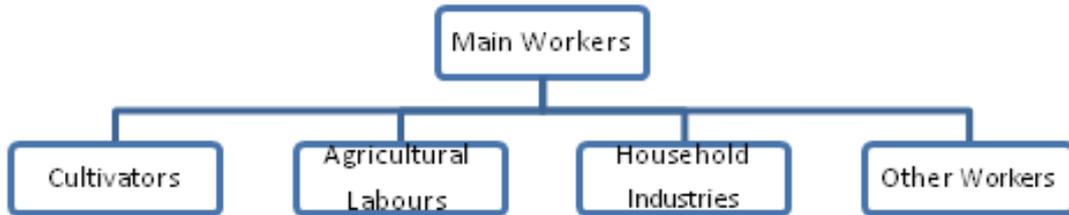
S. No.	Name	Population			Population (<6 Yrs)			Literate			Illiterate			Literate%**		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
290	Aisha	119	51	68	10	4	6	101	47	54	18	4	14	92.66	100.00	87.10
291	Dharogra	677	329	348	70	32	38	570	286	284	107	43	64	93.90	96.30	91.61
292	Sandoa	566	272	294	65	23	42	453	243	210	113	29	84	90.42	97.59	83.33
293	Galah	53	27	26	4	4	0	47	23	24	6	4	2	95.92	100.00	92.31
294	Gadheri	687	334	353	65	41	24	476	259	217	211	75	136	76.53	88.40	65.96
295	Banuna	149	76	73	10	6	4	128	68	60	21	8	13	92.09	97.14	86.96
296	Jangal Banuna	13	8	5	0	0	0	13	8	5	0	0	0	100.00	100.00	100.00
297	Gadahu	92	42	50	15	7	8	69	34	35	23	8	15	89.61	97.14	83.33
298	Bagri	132	58	74	16	5	11	106	51	55	26	7	19	91.38	96.23	87.30
299	Himri	214	103	111	18	10	8	155	87	68	59	16	43	79.08	93.55	66.02
300	Jangal Himri	1	1	0	0	0	0	1	1	0	0	0	0	100.00	100.00	0.00
301	Nalah	167	90	77	25	17	8	102	59	43	65	31	34	71.83	80.82	62.32
302	Chaprani	192	90	102	14	8	6	154	78	76	38	12	26	86.52	95.12	79.17
<b>Average Literacy % of villages coming under Seoni Tehsil</b>													<b>84.43</b>	<b>91.74</b>	<b>77.59</b>	
<b>Grand Total</b>		<b>56355</b>	<b>28187</b>	<b>28168</b>	<b>6420</b>	<b>3258</b>	<b>3162</b>	<b>40216</b>	<b>22168</b>	<b>18048</b>	<b>16139</b>	<b>6019</b>	<b>10120</b>			
<b>Average Literacy % of villages coming under Free Draining Catchment Area</b>													<b>80.54</b>	<b>88.92</b>	<b>72.17</b>	

Source: Census of India: 2011

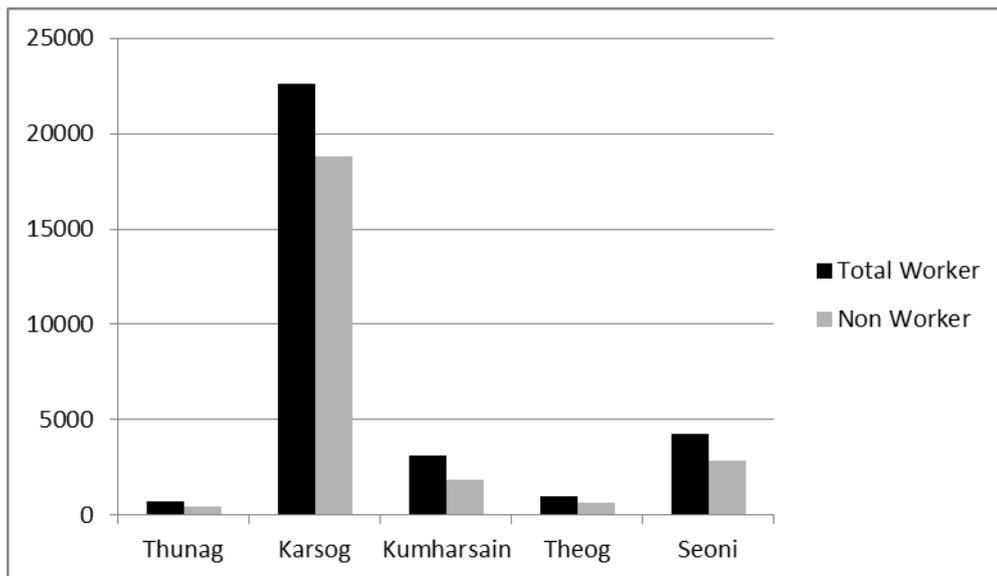
\*\* Literacy rate of population is defined as the percentage of literates to the total population age 7 years and above.

$$\text{Literacy rate} = \frac{\text{Number of Literates}}{\text{Population aged 7+}} \times 100$$

As per census 2011, 56.17% of the total population of this area is working population. Of this working population 55.17% are main workers and 44.83% are marginal workers. 43.83% of the total population is considered as non-workers. The occupation pattern is given at **Figure 4.2** and **Table 4.3**. The diagram below describes the categories of main workers:



The list of house-hold industries includes those engaged in house-hold manufacturing, processing, repairing, servicing, etc., and that of other workers includes factory workers, plantation workers, those in trade, commerce, business, transport, mining, construction, political or social work, all government servants, teachers, priests, artists, etc.



**Figure 4.2: Working Population of Free Draining Catchment Area**

**Table 4.3: Occupational Pattern Profile of Free Draining Catchment Area (tehsil wise)**

Tehsil	Total Worker			Main Worker			Marginal Worker			Non Worker		
	Total	M	F	Total	M	F	Total	M	F	Total	M	F
Thunag	729	376	353	62	46	16	667	330	337	480	231	249
Karsog	22616	12311	10305	12640	8086	4554	9976	4225	5751	18800	8542	10258
Kumharsain	3123	1578	1545	1569	1257	312	1554	321	1233	1871	905	966
Theog	959	479	480	701	393	308	258	86	172	667	314	353
Seoni	4228	2084	2144	2491	1499	992	1737	585	1152	2882	1367	1515

## CHAPTER 5

# MODELLING & PRIORITIZATION

### 5.1 APPROACH FOR THE STUDY

A detailed database on natural resources, terrain conditions, soil type of the catchment area, rainfall pattern of the catchment area, landuse/landcover, etc. is a pre-requisite to calculate soil erosion keeping in view the concept of sustainable development. Various thematic maps have been used for the calculation of soil erosion using GIS (Geographic Information System). GIS is extremely useful tool and has a capacity to perform numerous functions and operations on the various spatial data because of its special hardware and software characteristics. In order to ensure that latest and accurate data is used for the analysis, satellite data (LANDSAT 8) and digital elevation model derived from Shuttle Radar Topography Mission (SRTM) 3 Arc-Second Global Digital Terrain Elevation Model (DTEM) were used for deriving thematic layers for land use, slope and elevation. Ground truth studies, too, have been conducted. The various steps, covered in the study, are as follows:

- Defining study area
- Defining data requirement
- Data acquisition and preparation
- Output presentation

The above mentioned steps are briefly described in the following paragraphs:

#### 5.1.1 *Defining Study Area*

As stated in previous chapters, purpose of the study is preparation of CAT plan for the free draining catchment of Sunni Dam HEP. Hence, study area is defined as free draining catchment of Sunni Dam HEP. In order to plan watershed management and to formulate action plans it requires micro-watershed delineation, therefore, free draining catchment area was further delineated into micro-watersheds. For the delineation of micro-watershed, Watershed Atlas of India prepared by Soil and Land Use Survey of India (SLUSI) has been referred.

Soil and Land Use Survey of India (SLUSI) has Watershed Atlas of India under digital environment using GIS and produced a Digital Watershed Atlas (DWA) where the delineation and codification of watersheds in the country has been undertaken in GIS environment. The delineation for DWS has been done in seven stages starting with Water Resource Regions and their subsequent division and subdivisions into Basins, Catchments, Sub-catchments, Watershed, Sub watershed and Micro-watersheds in decreasing size of the delineated hydrologic unit.

As per Watershed Atlas of India, the free draining catchment area of Sunni Dam HEP falls in 49 micro-watersheds. The nomenclature of micro-watersheds has been assigned as follows: Indus Region (1); Satluj Basin (1A); Satluj above Bhakra Dam Catchment (1A2); Sub-Catchment (1A2B); Watershed Anun (1A2B1) and Watershed Nauti (1A2B2); Sub-Watersheds 1A2B1q, 1A2B1r, 1A2B1s, 1A2B1t, 1A2B1u, 1A2B2m, 1A2B2n and 1A2B2p; and lastly 49 Micro-Watersheds. The detail of micro-watersheds delineated for the free draining catchment area is given below (Table 5.1 and Figure 5.1).

**Table 5.1: Micro-Watersheds delineated in the Free Draining Catchment Area**

S. No.	Watershed	Sub-Watershed Code	Micro-Watershed Code	Micro-Watershed Area (ha)	
I	<b>Indus Region (1)</b>				
II	<b>Sutlej Basin (1A)</b>				
III	<b>Sutlej above Bhakra Dam Catchment (1A2)</b>				
IV	<b>Sub-Catchment (1A2B)</b>				
1	Anun (1A2B1)	1A2B1q	1A2B1q3	707.16	
2			1A2B1q4	1099.94	
3			1A2B1q5	965.78	
4			1A2B1q6	709.33	
5			1A2B1q7	866.96	
6			1A2B1q8	599.75	
7			1A2B1r	1A2B1r1	607.68
8				1A2B1r2	760.94
9		1A2B1r3		900.51	
10		1A2B1r4		1067.33	
11		1A2B1r5		684.47	
12		1A2B1s	1A2B1s1	679.70	
13			1A2B1s2	806.77	
14			1A2B1s3	1101.29	
15			1A2B1s4	654.16	
16			1A2B1s5	665.08	
17			1A2B1s6	956.23	
18			1A2B1s7	801.70	
19			1A2B1s8	845.07	
20		1A2B1t	1A2B1t1	689.90	
21			1A2B1t2	852.58	
22			1A2B1t3	731.42	
23			1A2B1t4	1229.77	
24			1A2B1t5	761.93	
25			1A2B1t6	965.60	
26			1A2B1t7	785.70	
27		1A2B1u	1A2B1u1	501.73	
28			1A2B1u2	728.89	
29			1A2B1u3	1074.68	
30			1A2B1u4	704.37	
31		Nauti (1A2B2)	1A2B2m	1A2B2m3	956.65
32				1A2B2m4	851.39
33				1A2B2m5	804.63
34				1A2B2m6	1083.26
35				1A2B2m7	1006.55
36				1A2B2m8	1046.82

S. No.	Watershed	Sub-Watershed Code	Micro-Watershed Code	Micro-Watershed Area (ha)		
37	1A2B2n	1A2B2n	1A2B2m9	895.93		
38			1A2B2n1	527.19		
39			1A2B2n2	744.41		
40			1A2B2n3	849.67		
41			1A2B2n4	666.60		
43			1A2B2n5	684.63		
43			1A2B2n6	925.45		
44			1A2B2n7	742.37		
45			1A2B2p	1A2B2p	1A2B2p1	583.17
46					1A2B2p2	910.54
47	1A2B2p3	1045.33				
48	1A2B2p4	509.17				
49	1A2B2p5	96.31				
<b>TOTAL</b>				<b>39436.49</b>		

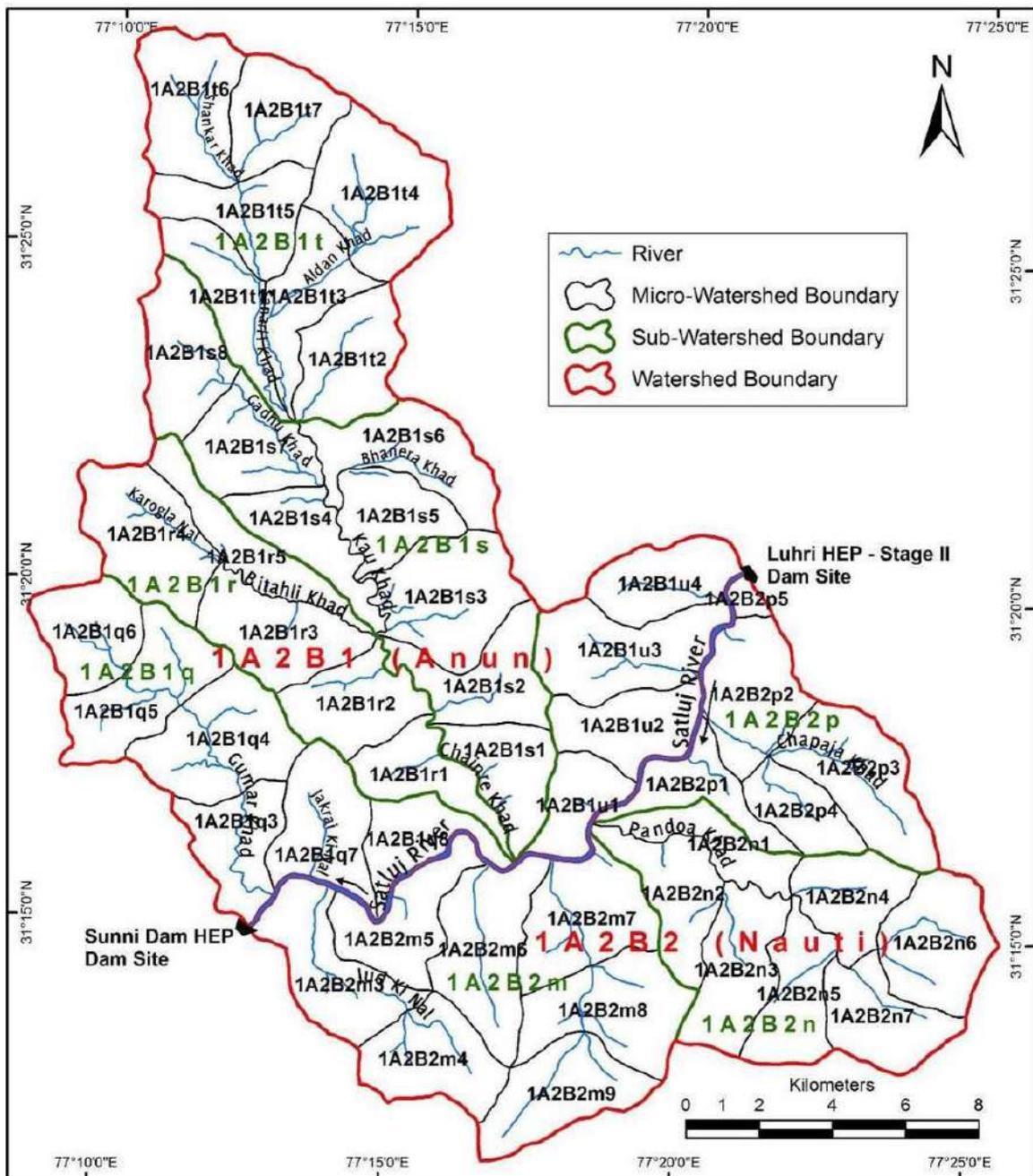


Figure 5.1: Map of Free Draining Catchment Area Showing Micro-Watersheds

As stated in **Chapter 1**, Micro watersheds delineated in CCP SRB are larger in size in comparison to micro watersheds delineated in present study as per SLUSI, hence same adopted in present study are more fine-tuned and micro level. For easier interpretability, understanding and aligning the present CAT plan in sync with the CCP SRB, the number of micro watersheds delineated into both the studies have been overlaid and are presented in detail as below:

As per the CCP SRB, total 21 micro watersheds fall within the free draining catchment area. Out of these 21 micro watersheds, 20 micro watersheds fall completely within free draining catchment area while 1 micro watershed partially. The correspondence between these 21 micro watersheds delineated in CCP SRB with 49 micro watersheds delineated in present study is highlighted in Table and shown in Figure as below:

S. No.	Micro-Watershed Code (As per CCP SRB)	S. No.	Micro-Watershed Code (As per Present Study)
1	Si1d	1	1A2B1q3
		2	1A2B1q4
2	Si1e	3	1A2B1q5
		4	1A2B1q6
3	Si1f (excluding part of 1A2B1q8)	5	1A2B1q7
		6	1A2B1q8
4	Si2a (inclusive of part of 1A2B1u1 also)	7	1A2B1s1
		8	1A2B1s2
5	Si2b (inclusive of part of 1A2B1q8 also)	9	1A2B1r1
		10	1A2B1r2
6	Si2c	11	1A2B1r3
		12	1A2B1r4
		13	1A2B1r5
7	Si2d (excluding part of 1A2B1s6)	14	1A2B1s3
		15	1A2B1s5
		16	1A2B1s6
8	Si2e	17	1A2B1s4
		18	1A2B1s7
		19	1A2B1s8
9	Si2f (inclusive of part of 1A2B1s6, 1A2B1t1 and 1A2B1t3 also)	20	1A2B1t2
10	Si2g (excluding part of 1A2B1t1)	21	1A2B1t1
		22	1A2B1t5
		23	1A2B1t6
		24	1A2B1t7
11	Si2h (excluding part of 1A2B1t3)	25	1A2B1t3
		26	1A2B1t4
12	Si3a (excluding part of 1A2B1u1 and 1A2B1u3)	27	1A2B1u1
		28	1A2B1u2
		29	1A2B1u3
13	Si3b (inclusive of part of	30	1A2B1u4

S. No.	Micro-Watershed Code (As per CCP SRB)	S. No.	Micro-Watershed Code (As per Present Study)
	1A2B1u3 also)		
14	Sj2a (includes a small part of 1A2B2m3 only)		
15	Sj2b (excluding part of 1A2B2m3 and 1A2B2m5)	31	1A2B2m3
		32	1A2B2m4
16	Sj2c (inclusive of part of 1A2B2m5 also)	33	1A2B2m5
		34	1A2B2m6
17	Sj2d	35	1A2B2m7
		36	1A2B2m8
		37	1A2B2m9
18	Sj2e (excluding part of 1A2B2n1 and 1A2B2n3)	38	1A2B2n1
		39	1A2B2n2
		40	1A2B2n3
19	Sj2f (inclusive of part of 1A2B2n1 and 1A2B2n3 also)	41	1A2B2n4
		43	1A2B2n5
		43	1A2B2n6
		44	1A2B2n7
20	Sj2g	45	1A2B2p1
21	Sj2h	46	1A2B2p2
		47	1A2B2p3
		48	1A2B2p4
		49	1A2B2p5

### 5.1.2 Defining Data Requirement

Soil loss has been calculated through RUSLE (Revised Universal Soil Loss Equation) model which is computed by the following equation:

$$\text{Soil Loss (A)} = R * K * LS * C * P$$

Wherein;

A = Soil loss (Tons/ha/year)

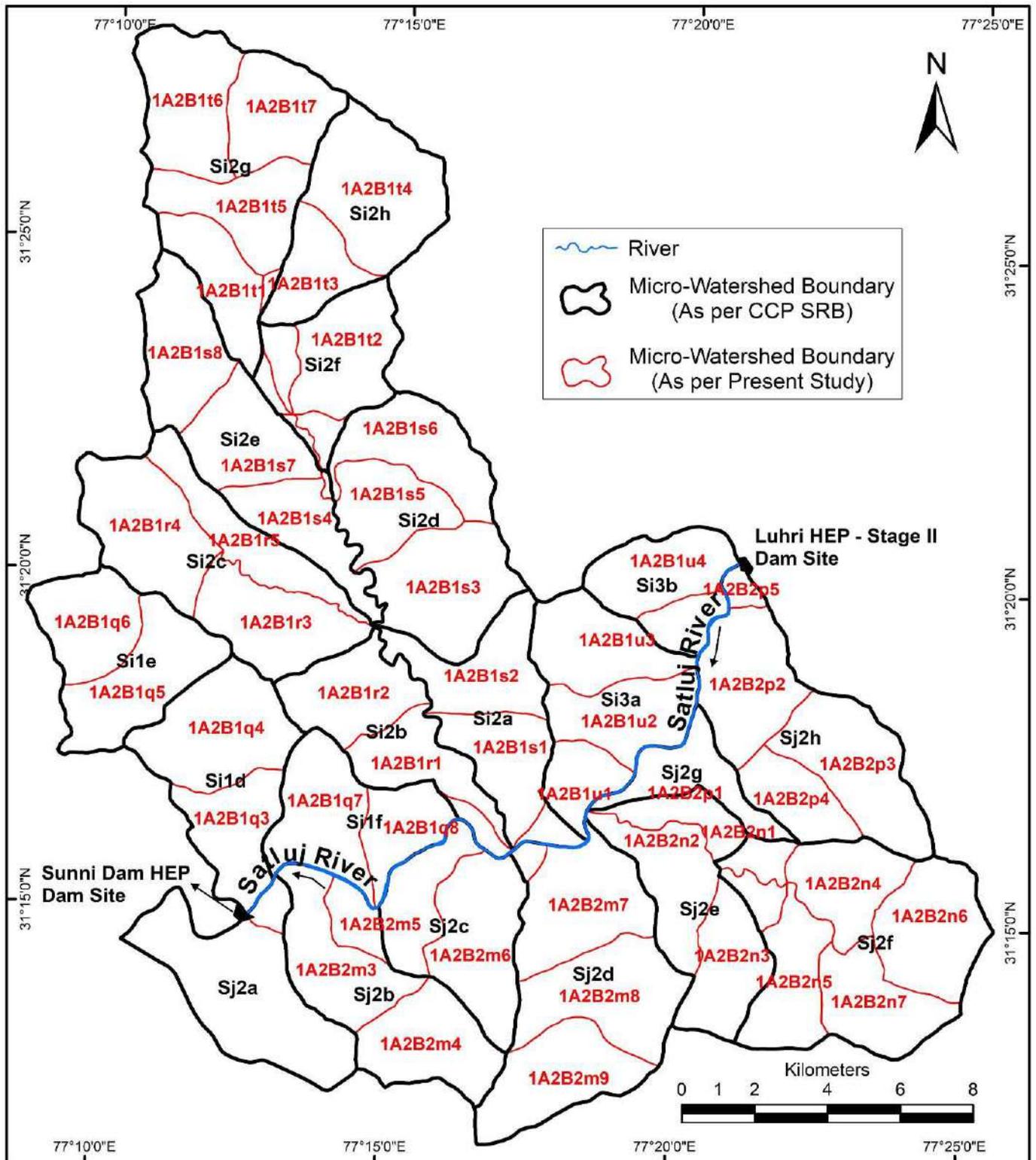
R is Rainfall & Runoff Erosivity Factor ( $\text{MJ mm/ha}^{-1}/\text{h}^{-1}/\text{year}^{-1}$ ), which depends upon the annual average rainfall in mm. Data required for R factor is rainfall intensity.

K is Soil Erodibility Factor ( $\text{Tons/ha/h/ha}^{-1}/\text{MJ}^{-1}/\text{mm}^{-1}$ ), which depends on the organic matter, texture permeability and profile structure of the soil. Also, it is a constant value for each soil type. Data required for K factor is soil type.

LS is Topographic Factor (dimensionless) which depends upon flow accumulation and steepness and length of slope in the area. Data required for LS factor is slope length and slope gradient.

C = Vegetation Cover and Crop Management Factor (dimensionless), which is the ratio of bare soil to vegetation and non- photosynthetic material. It is a constant value for each land use category. Data required for C factor is landuse/ landcover.

P is Conservation Supporting Practice Factor (dimensionless), which takes into account specific erosion control practices like contour bunding, bench terracing etc.



**Figure Showing Delineation of Micro Watersheds as per Present Study and as per CCP SRB**

**5.1.3 Data Acquisition and Preparation**

The base map of free draining catchment area is prepared from Survey of India Toposheets at 1:50000 scale. The data on various aspects was collected from

different sources. The rainfall data in the Study area was procured from the Tropical Rainfall Measuring Mission (TRMM) of NASA from their website <https://pmm.nasa.gov/data-access/downloads/trmm>. Soil map of the study area was prepared from soil map of Himachal Pradesh procured from Regional Centre of National Bureau of Soil Survey & Land Use Planning (NBSS&LUP), New Delhi.

For the preparation of DEM and preparation of Slope map, Shuttle Radar Topography Mission (SRTM) 3 Arc-Second Global Digital Terrain Elevation Data (DTED) data has been used. For the preparation of landuse/ landcover, forest cover data for the year 2017 has been procured from Forest Survey of India (FSI), as well as LANDSAT 8 digital satellite data of Path 147 and Row 38 dated 6<sup>th</sup> October 2017 has also been used.

### **5.1.3.1 Rainfall Erosivity (R) Factor**

R factor is a function of the falling raindrop and rainfall intensity and is estimated as the product of the kinetic energy (E) of the raindrop and the maximum intensity of rainfall ( $I_{30}$ ) over duration of 30 min in a storm. The erosivity of rain is calculated for each storm, and these values are summed up for each year.

In this study, the storm wise rainfall data were not available for the computation of rainfall erosivity factor (R); therefore, the relationship between seasonal value of R and average rainfall has been used. The rainfall erosivity factor has been defined as  $R = 81.5 + 0.38X$ , where, R is the average seasonal erosivity factor ( $\text{MJ mm/ha}^{-1}/\text{h}^{-1}/\text{year}^{-1}$ ), and X is the annual average rainfall (mm).

For the estimation of rainfall erosivity in the free draining catchment area, average rainfall of 10 years has been taken from the Tropical Rainfall Measuring Mission (TRMM) data (**Figure 5.2**). As can be seen in the **Figure 5.2**, the free draining catchment area comprises of two average annual rainfall ranges i.e. 1000-2000 mm/year and 2000-3000 mm/year. Similarly, free draining catchment area was divided into two zones and was assigned with X values 1500 mm and 2500 mm for the average annual rainfall range of 1000-2000 mm/year and 2000-3000 mm/year respectively. The R factors thus arrived are 651.5 and 1031.5 for the zones having average annual rainfall range of 1000-2000 mm/year and 2000-3000 mm/year respectively and zones have been shown in map given at **Figure 5.3**.

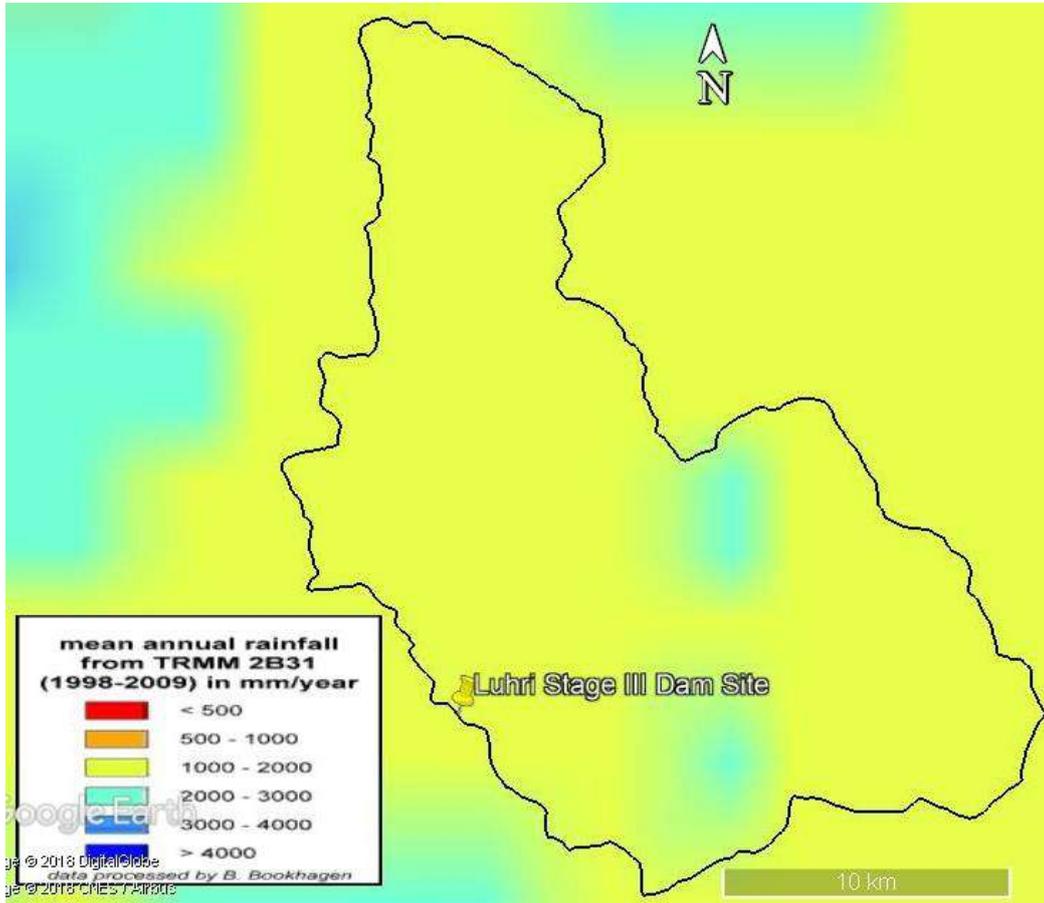


Figure 5.2: Average Annual Rainfall Map as per TRMM

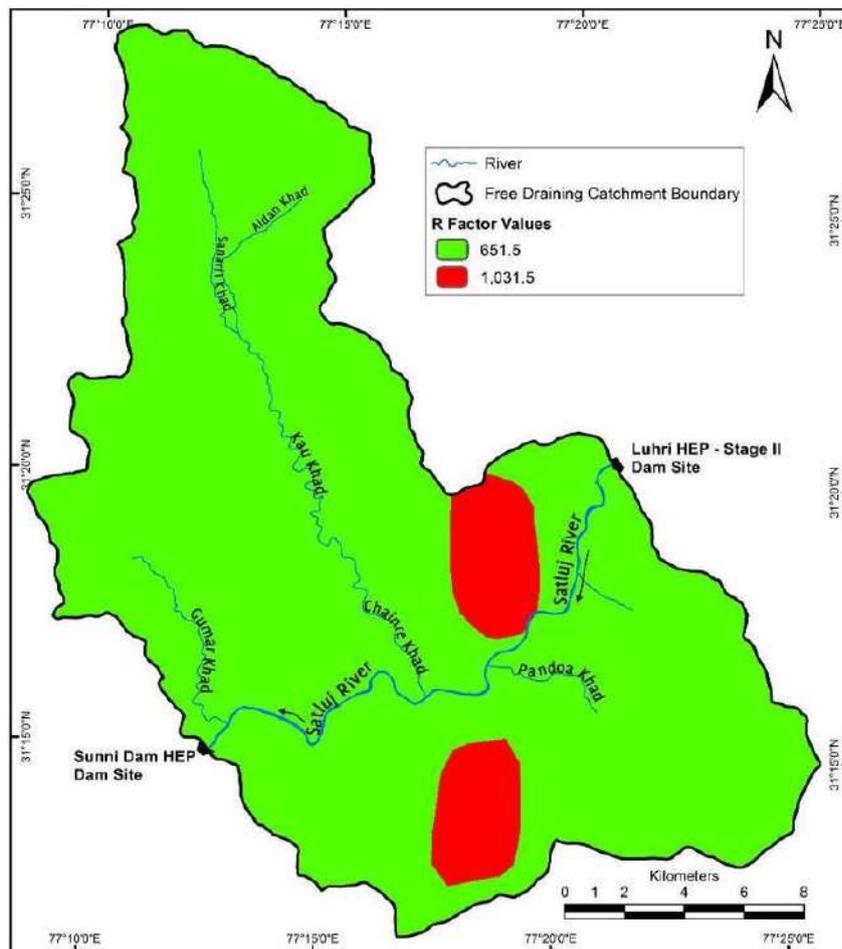
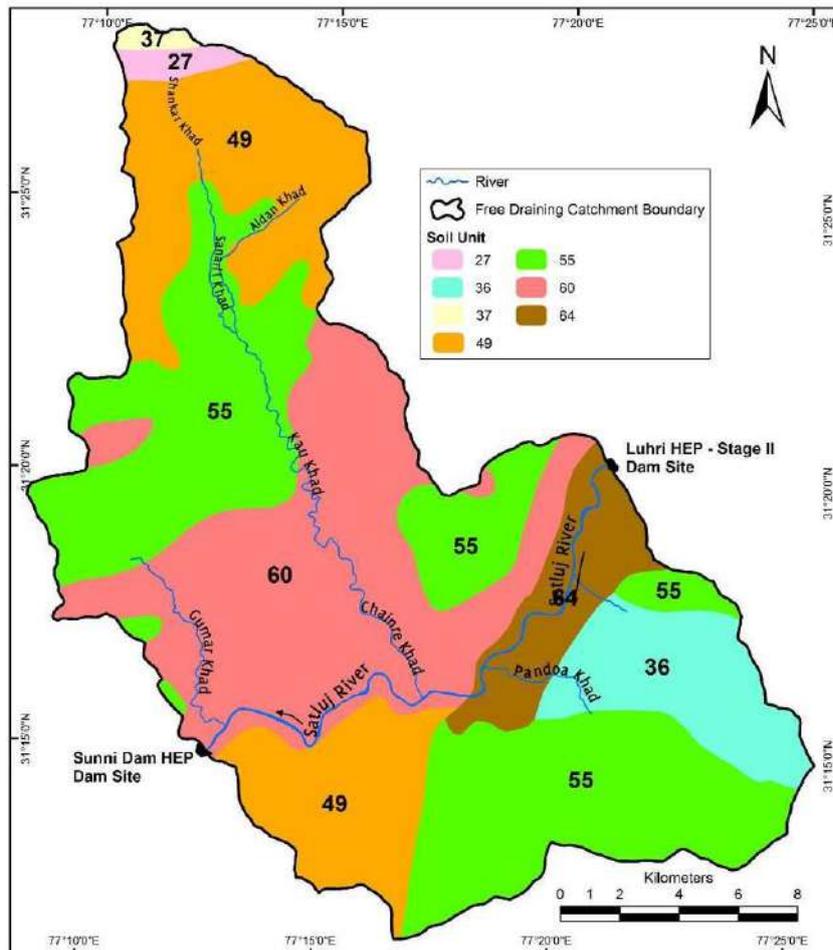


Figure 5.3: R Factor Values Map

**5.1.3.2 Soil Erodibility (K) Factor**

The K factor is an expression of the inherent erodibility of the soil or surface material at a particular site under standard experimental conditions. It is a function of the particle-size distribution, organic-matter content, structure, and permeability of the soil or surface material. Prior to deciding the K values, soil map for the area is prerequisite. Soil map has been digitized and produced using soils map of Himachal Pradesh, prepared and published by National Bureau of Soil Survey & Land Use Planning (NBSS&LUP), Nagpur in co-operation with Department of Agriculture, Govt. of Himachal Pradesh. The above said map has been collected from the Regional Centre of National Bureau of Soil Survey & Land Use Planning (NBSS&LUP), New Delhi. The soils in the free draining catchment area are of Side/Reposed Slopes (92.89%), Fluvial Valley (6.16%) and Lesser Himalayas (0.95%). The dominant soil type is soil unit 55 (36.45%), which is deep, well drained, thermic, fine-loamy soils on moderate slopes with loamy surface and moderate erosion; associated with medium deep, well drained, loamy-skeletal soils with loamy surface and severe erosion. The other prominent soil type is soil unit 60 (27.34%), which is medium deep, well drained, thermic, fine-loamy soils on moderate slopes with loamy surface and severe erosion; associated with: shallow, well drained, coarse-loamy soils with loamy surface and severe erosion and slight stoniness. Soil map has been shown in **Figure 5.4**. The legend for soil classes has been given in **Table 5.2**.



**Figure 5.4: Soil Map**  
(For details of Soil Unit legend refer Table 5.2)

**Table 5.2: Description of Soil Units**

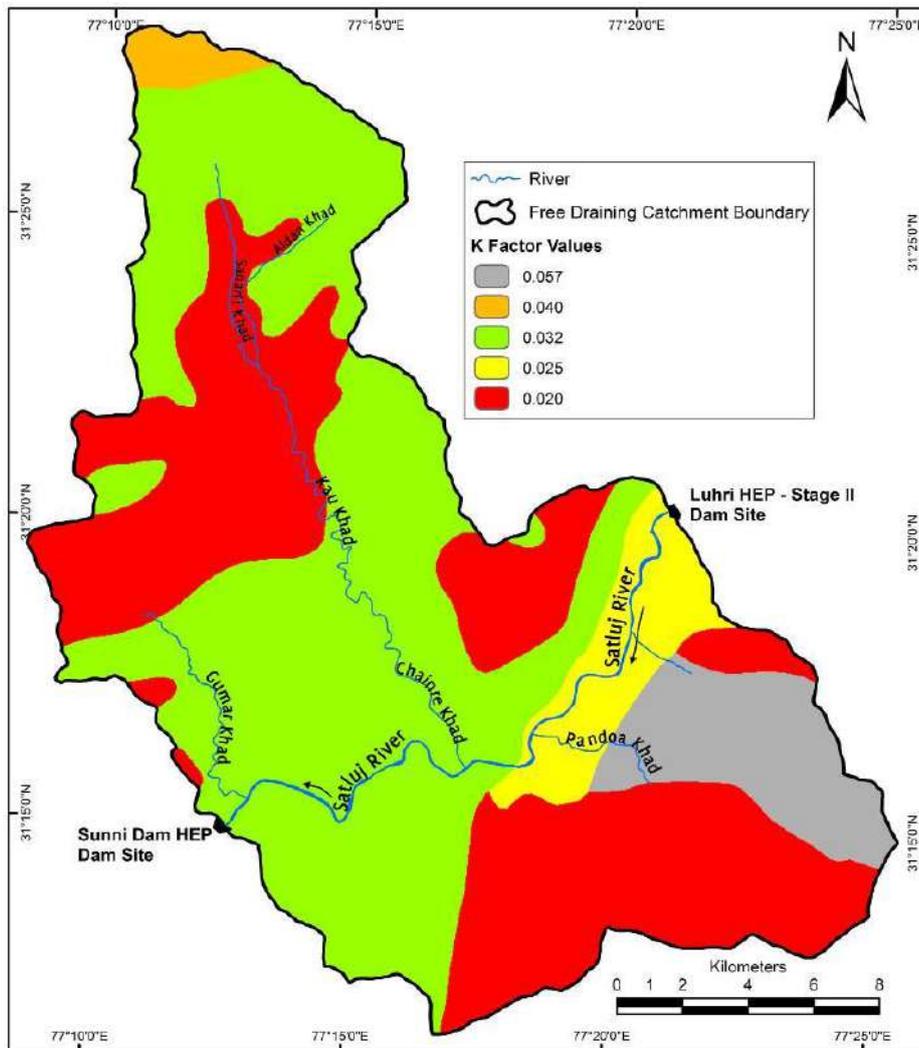
Soil Unit	Description	Soil Taxonomy	Area (ha)	Area (%)
	<b>SOILS OF LESSER HIMALAYAS (Soils of Summit and Ridge Tops)</b>			
27	Shallow, somewhat excessively drained, mesic, coarse-loamy soils on moderate slopes with loamy surface and severe erosion; <i>associated with:</i> Medium deep, somewhat excessively drained, fine-loamy surface and severe erosion.	<i>Typic Udorthents</i>	376.17	0.95
	<b>SOILS OF SIDE/ REPOSED SLOPES</b>			
36	Shallow, excessively drained, thermic, sandy-skeletal soils on steep slopes with loamy surface, very severe erosion and strong stoniness; <i>associated with:</i> Rock Outcrops.	<i>Typic Udorthents</i>	3063.96	7.77
37	Shallow, somewhat excessively drained, thermic, loamy-skeletal soils on moderately steep slopes with loamy surface, severe erosion and strong stoniness; <i>associated with:</i> Rock Outcrops.	<i>Typic Udorthents</i>	184.78	0.47
49	Medium deep, well drained, thermic, fine-loamy calcareous soils on moderately steep slopes with loamy surface, severe erosion and slight stoniness; <i>associated with:</i> Shallow, well drained, fine-loamy soils with loamy surface and moderate erosion.	<i>Dystric Eutrochrepts</i>  <i>Typic Udorthents</i>	8222.62	20.85
55	Deep, well drained, thermic, fine-loamy soils on moderate slopes with loamy surface and moderate erosion; <i>associated with:</i> Medium deep, well drained, loamy-skeletal soils with loamy surface and severe erosion.	<i>Dystric Eutrochrepts</i>  <i>Typic Udorthents</i>	14375.52	36.45
60	Medium deep, well drained, thermic, fine-loamy soils on moderate slopes with loamy surface and severe erosion; <i>associated with:</i> Shallow, well drained, coarse-loamy soils with loamy surface and severe erosion and slight stoniness.	<i>Dystric Eutrochrepts</i>  <i>Typic Udorthents</i>	10782.85	27.34
	<b>SOILS OF FLUVIAL VALLEY</b>			
64	Medium deep, well drained, thermic, coarse-loamy soils on moderate slopes with loamy surface and moderate erosion; <i>associated with:</i> Shallow, excessively drained, coarse-loamy, calcareous soils with loamy surface and moderate erosion.	<i>Typic Udorthents</i>  <i>Typic Udifluvents</i>	2430.58	6.16
	<b>TOTAL</b>		<b>39436.49</b>	<b>100</b>

As per the soil map of the free draining catchment area, the soil can be classified in five major categories. Deep with moderate erosion have low K values i.e. 0.020 because of high infiltration resulting in low runoff even though these particles are

easily detached. Medium deep with moderate erosion have moderate K value i.e. 0.025, because they are less susceptible to particle detachment and they produce runoff at moderate rates. Medium deep with severe erosion have slightly high K value i.e. 0.032, because they are susceptible to particle detachment and they produce runoff at high rates. Shallow with severe erosion have high K value i.e. 0.040. Shallow with very severe erosion have very high K value i.e. 0.057. Various classes of soil and the values of K are shown in **Figure 5.5** and given in **Table 5.3**.

**Table 5.3: Soil Erodibility Factor for Different Soil Types**

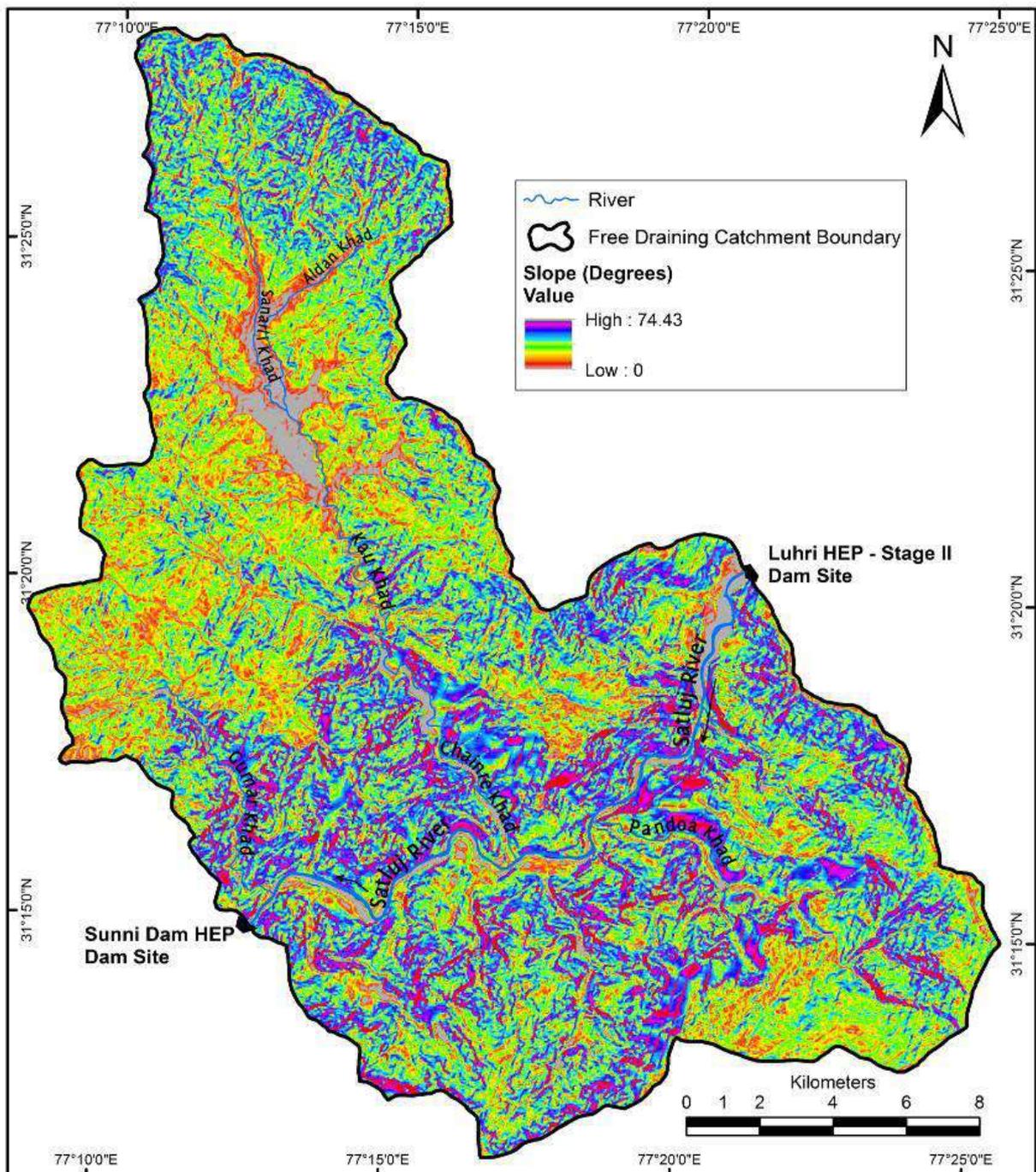
S. No.	Soil Unit	Soil Type	Erosion Intensity	K Value
1	55	Deep	Moderate erosion	0.020
2	64	Medium deep	Moderate erosion	0.025
3	49, 60	Medium deep	Severe erosion	0.032
4	27, 37	Shallow	Severe erosion	0.040
5	36	Shallow	Very severe erosion	0.057



**Figure 5.5: K Factor Value Map**

**5.1.3.3 Topographic (LS) Factor**

The LS factor is an expression of the effect of topography, specifically hill slope length and steepness, on rates of soil loss at a particular site. The value of ‘LS’ increases as hill slope length and steepness increase, under the assumption that runoff accumulates and accelerates in the down-slope direction. Digital Elevation Model (DEM) and Slope of a particular area is prerequisite for LS factor. As already discussed, SRTM data has been used for DEM and the same DEM has been used for the preparation of slope map. The slope map in degrees prepared for the free draining catchment area is given at **Figure 5.6**. As can be seen from the figure, in the free draining catchment area, the slope ranges from 0° to more than 70°. The LS factor prepared for the catchment area is given at **Figure 5.7**.



**Figure 5.6: Slope Map**

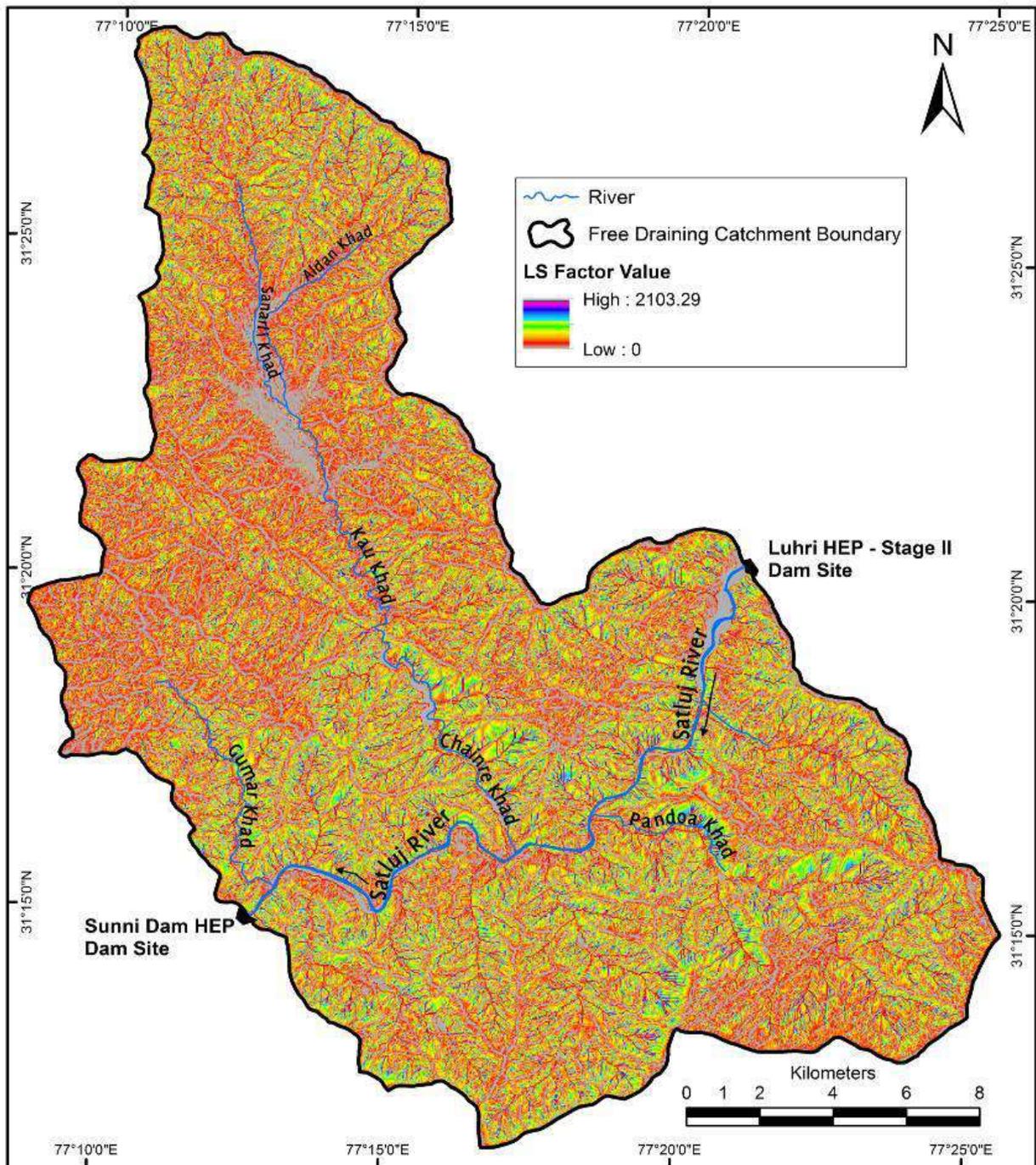


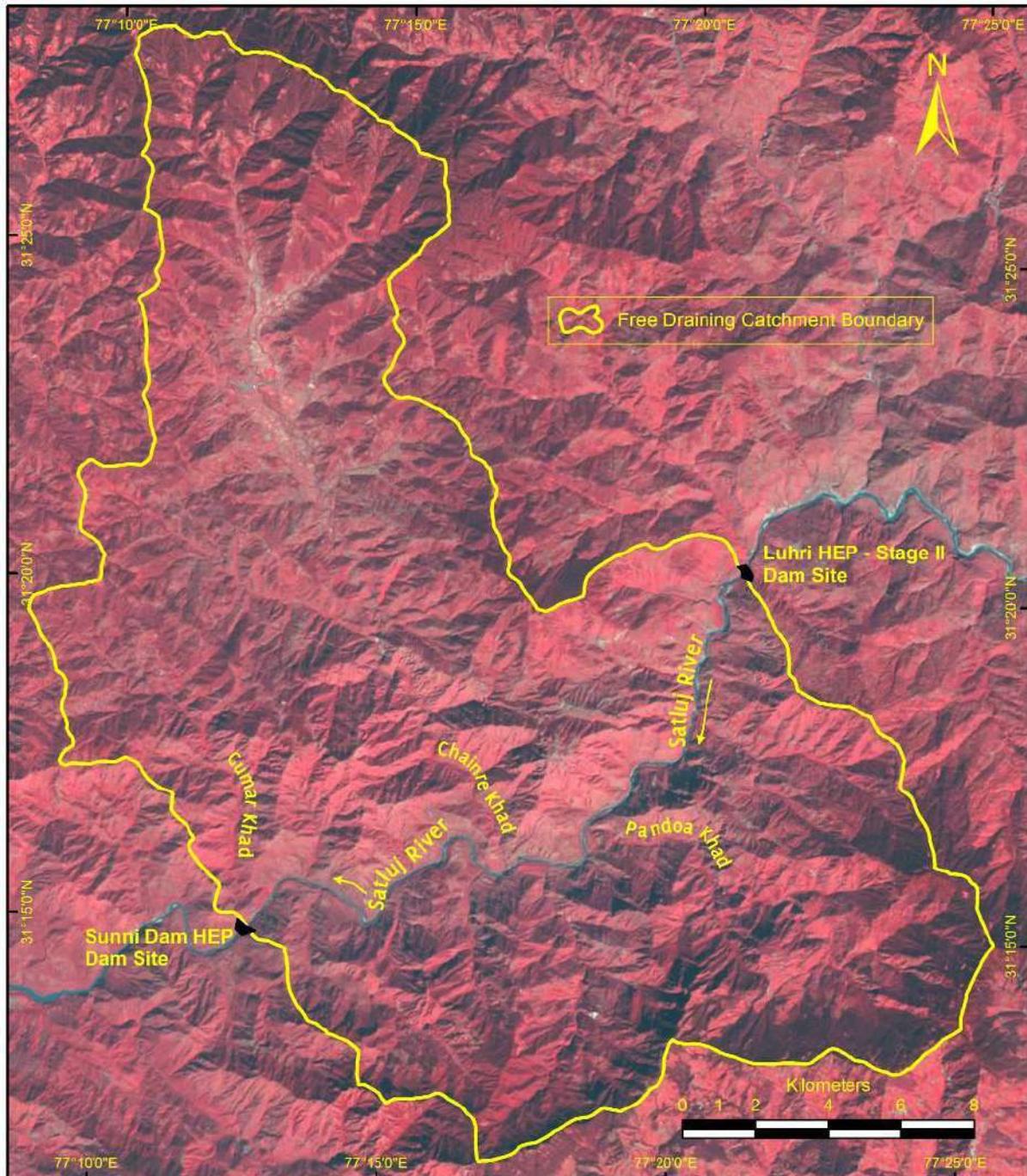
Figure 5.7: LS Factor Map

**5.1.3.4 Crop Management (C) Factor**

The C factor is an expression of the effect of surface cover and roughness, soil biomass, and soil-disturbing activities on rates of soil loss at a particular site. The value of C decreases as surface cover and soil biomass increase, thus protecting the soil from rain splash and runoff. In the present study, the land use/land cover map prepared from Landsat Data has been used in the allocation of C factor for different land use classes.

For the land use/ land cover classification of the free draining catchment area, forest cover data for the year 2017 has been procured from Forest Survey of India (FSI). FSI

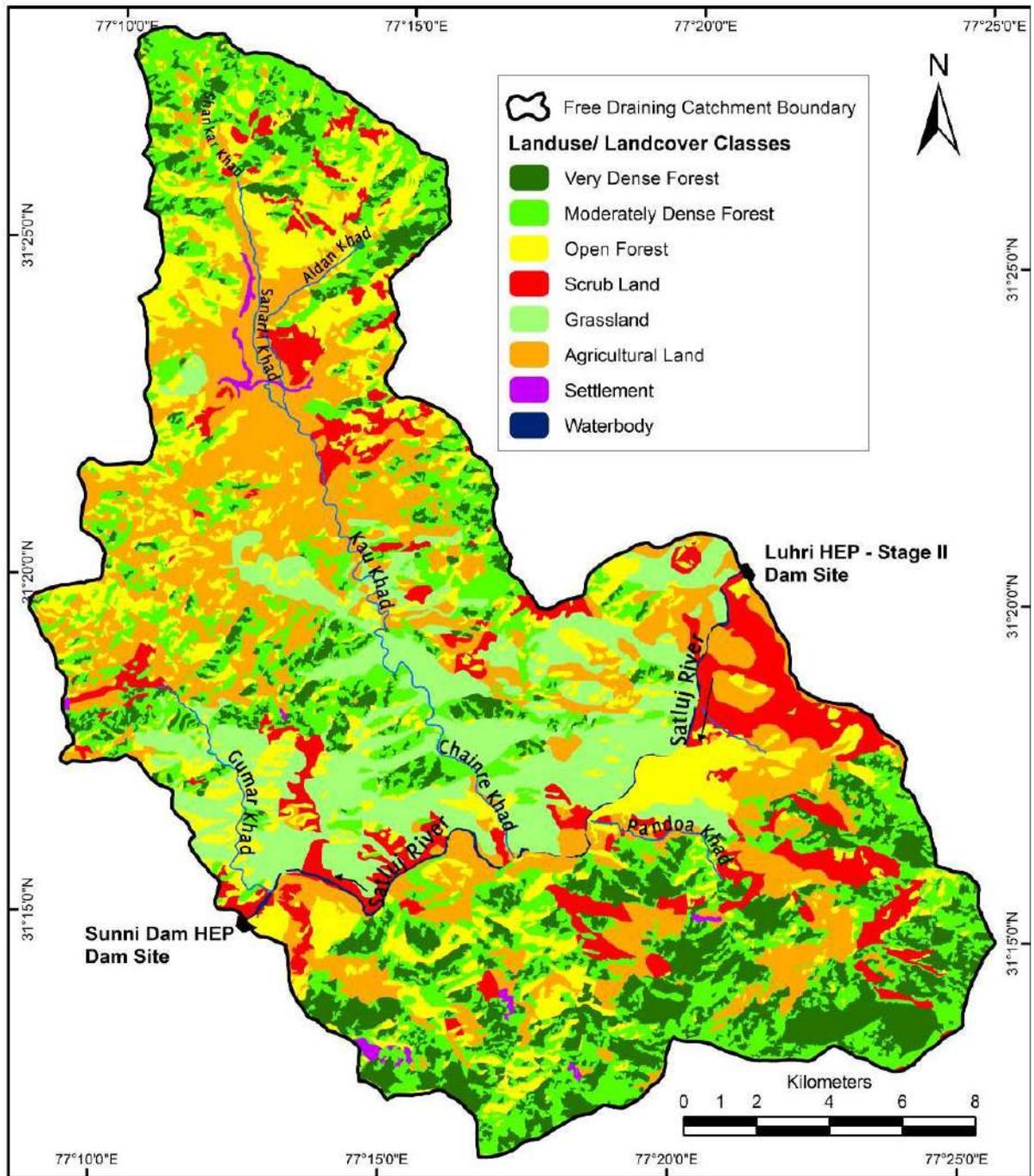
has classified the area into six classes viz., very dense forest, moderately dense forest, open forest, scrub land, non forest and waterbody. In the present study, all the classes except non forest classified by FSI were used as it is and the non forest area was further classified into agricultural land, settlement and grassland. For the classification of non forest area LANDSAT 8 digital satellite data of Path 147 and Row 38 dated 6<sup>th</sup> October 2017 has been used. The data has been procured in GeoTIFF format (**Figure 5.8**).



**Figure 5.8: Satellite Imagery Map**

The interpretation of geo-referenced satellite data has been done using standard enhancement techniques, ground checks and experiences of qualified professionals.

A detailed ground truth verification exercise has been undertaken as a part of field survey to enrich the image interpretation process. The classified land use map of the free draining catchment area is shown as **Figure 5.9**. The land use pattern of the free draining catchment area is summarized in **Table 5.4**.



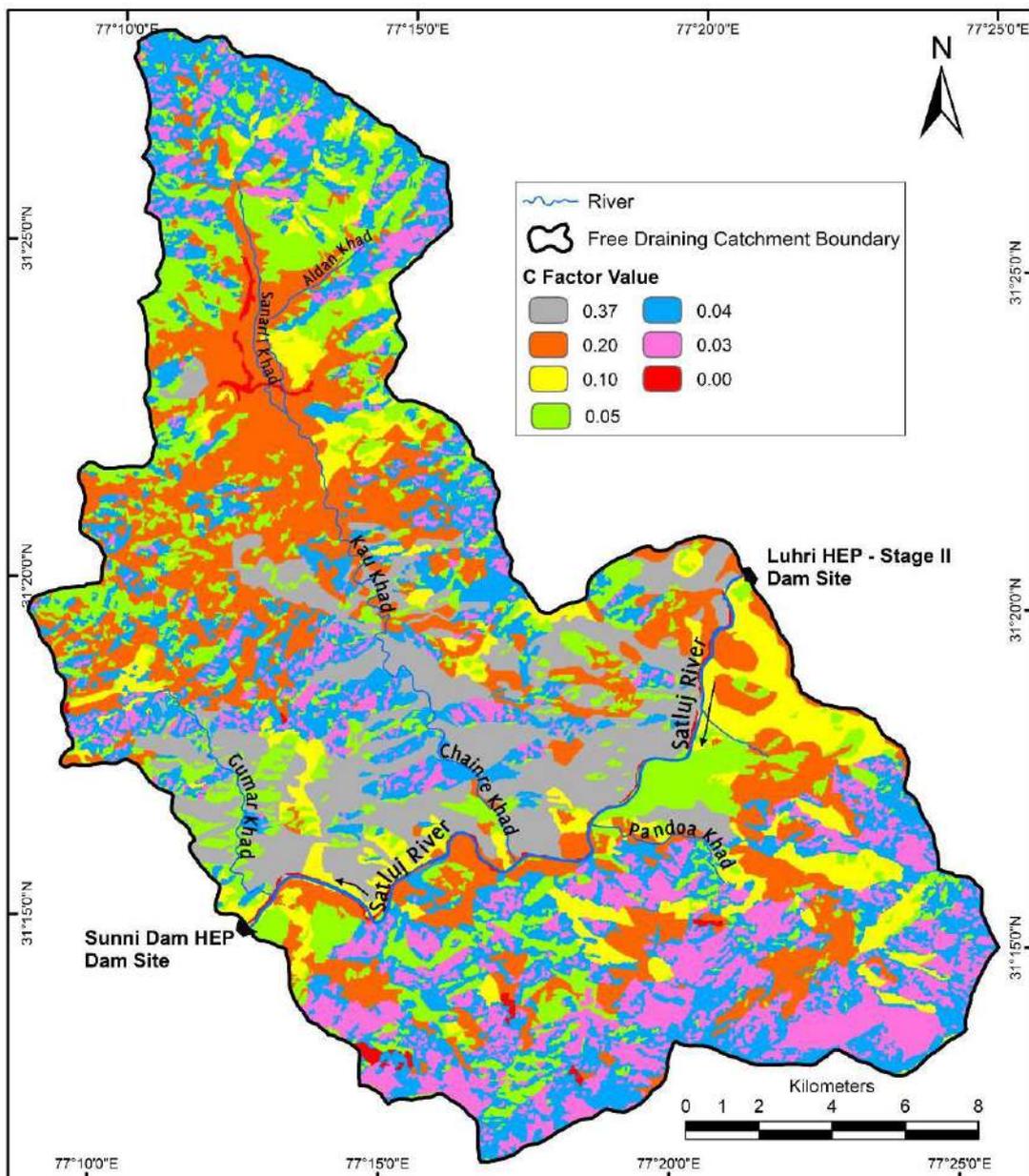
**Figure 5.9: Landuse/ Landcover Classification Map**

Very Dense Forest covers around 14% of the free draining catchment area, while, Moderately Dense Forest categories covers around 23% and Open Forest covers around 18%. Scrub and grassland covers around 22% of the free draining catchment area. Agricultural land and settlement covers around 23% and waterbody covers less than 1% of the free draining catchment area.

**Table 5.4: Area falling Under Different Land use/ Land cover Class**

Landuse/ Landcover Class	Area (ha)	Area (%)
Very Dense Forest	5351.53	13.57
Moderately Dense Forest	9171.37	23.26
Open Forest	7143.45	18.11
Scrub	3527.60	8.95
Grassland	5149.08	13.06
Agricultural Land	8804.41	22.33
Settlement	164.06	0.42
Waterbody	124.98	0.32
<b>Total</b>	<b>39436.49</b>	<b>100</b>

**Table 5.5** describes the cover management factors used in the model under different land use/land cover categories and the same is shown in the map of cover management factors given at **Figure 5.10**.



**Figure 5.10: C Factor Value Map**

**Table 5.5: Crop Management Factor Used**

S. No.	Land use/ Land cover Type	C Value
1	Very Dense Forest	0.03
2	Moderately Dense Forest	0.04
3	Open Forest	0.05
4	Scrub Land	0.10
5	Grassland	0.37
6	Agricultural Land	0.20
7	Settlement & Waterbody	0.00

#### 5.1.3.5 Conservation Support Practice (P) Factor

The P factor is an expression of the effects of supporting conservation practices, such as contouring, buffer strips of vegetation, and terracing, on soil loss at a particular site. It is the ratio of soil loss with specific support practice to the corresponding loss with up- or down-slope cultivation. In the present study, the P factor has been considered as 0.85.

#### 5.1.4 Output Presentation

A thematic map for soil loss of the free draining catchment area has been prepared using RUSLE model as mentioned in the above section. The free draining catchment area was then demarcated into different soil erosion intensity mapping units or classes based upon the extent of soil loss (see **Table 5.6 & Figure 5.11**). The free draining catchment area under different Erosion Intensity categories is given in **Table 5.7**. As can be seen from the figure and table, around 27% of the free draining catchment area is prone to less than 1 tons/ha/annum soil erosion, i.e. under negligible erosion intensity category. Around 23% of its area is prone to Severe and Very Severe soil erosion.

**Table 5.6: Soil Loss Range and Erosion Intensity Categories**

S. No.	Soil loss in tons/hectare/annum	Erosion Intensity Category
1	<1	Negligible
2	1-5	Slight
3	5-10	Very Low
4	10-20	Low
5	20-40	Moderate
6	40-80	Severe
7	>80	Very Severe
	<b>Total</b>	

**Table 5.7: Area Falling Under Different Erosion Intensity Categories**

Erosion Intensity Category	Area (ha)	Area (%)
Negligible	10807.06	27.40
Slight	1617.42	4.10
Very Low	4633.91	11.75

Erosion Intensity Category	Area (ha)	Area (%)
Low	7141.24	18.11
Moderate	6276.61	15.92
Severe	3946.77	10.01
Very Severe	5013.48	12.71
<b>Total</b>	<b>39436.49</b>	<b>100</b>

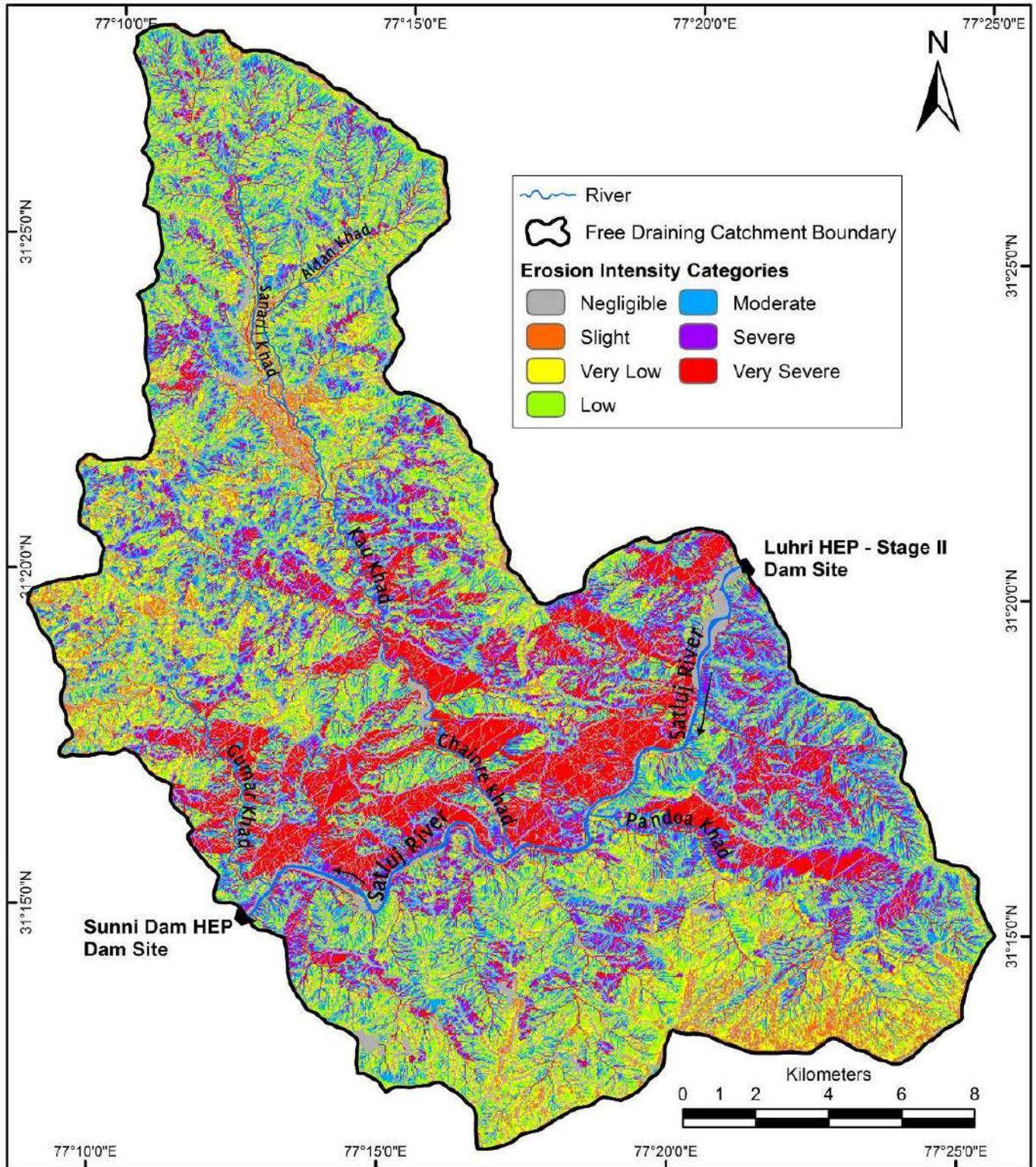


Figure 5.11: Erosion Intensity Map of Free Draining Catchment Area

## 5.2 PRIORTIZATION OF MICRO-WATERSHEDS USING SILT YIELD INDEX (SYI) METHOD

'Silt Yield Index' (SYI), method has been used for prioritization of micro-watersheds in the catchment for treatment. The Silt Yield Index (SYI) is defined as the Yield per unit area and SYI value for hydrologic unit is obtained by taking the weighted arithmetic mean over the entire area of the hydrologic unit by using suitable empirical equation. The Silt Yield Index Model (SYI) considers sedimentation as product of erosivity, morphometry and delivery ratio of a particular sub-watershed and was conceptualized by Soil and Land Use Survey of India (SLUSI) as early as 1969 and has been operational since then to meet the requirements of prioritization of smaller hydrologic units within river valley project catchment areas. Silt yield index (SYI) was calculated using following empirical formula:

$$SYI = \frac{\sum (A_i * W_i) * D_i}{A_w} * 100 ; \quad \text{where } i = 1 \text{ to } n$$

where,

- A<sub>i</sub> = Area of ith unit (EIMU)
- W<sub>i</sub> = Weightage value of ith mapping unit
- n = No. of mapping units
- A<sub>w</sub> = Total area of sub-watershed.
- D<sub>i</sub> = Delivery ratio

### 5.2.1 Erosion Intensity Mapping Unit

Erosion Intensity Mapping Units (EIMU) are demarcated and defined as per the soil erosion intensity map prepared above. Various EIMU categories, such as Very Severe, Severe, Moderate, Low, Very Low, and Negligible & Slight (clubbed together), were then used to calculate sub-watershed-wise SYI. Erosion Intensity Mapping Units (EIMU) is a composite expression of physiography, land use, and conservation practices adopted. While computing soil erosion intensity in a catchment all the factors (physiography, land use, and conservation practices) are already taken into consideration. Therefore, EIMUs are assumed as per the soil erosion intensity in the micro-watershed.

### 5.2.2 Weightage Value

Each erosion intensity unit is assigned a weightage value. When considered collectively, the weightage value represents approximately the comparative erosion intensity. A basic factor of K = 10 was used in determining the weightage values. The value of 10 indicates a static condition of equilibrium between erosion and deposition. Any addition to the factor K (10+X) is suggestive of erosion in ascending order whereas subtraction, i.e. (10-X) is indicative of

deposition possibilities. The weightage value assigned to erosion mapping unit in a sub-watershed ranges from 11-20.

### 5.2.3 Delivery Ratio

Delivery ratios were adjusted for each of the erosion intensity unit. The delivery ratio suggests the percentage of eroded material that finally finds entry into reservoir or river/ stream. Delivery ratios are assigned to all erosion intensity units depending upon their distance from the nearest stream. The criteria adopted for assigning the delivery ratio are as follows:

Nearest Stream	Delivery ratio
0 - 0.9 km	1.00
1.0 - 2.0 km	0.95
2.1 - 5.0 km	0.90
5.1 - 15.0 km	0.80
15.1 - 30.0 km	0.70

### 5.2.4 Silt Yield Index

The area of each of the mapping units is computed and silt yield indices of individual micro-watersheds are calculated using the equations mentioned above. The SYI values for classification of various categories of erosion intensity rates are given in **Table 5.8**.

**Table 5.8: Calculation of SYI in Micro-Watersheds**

Micro-Watershed	EIMU	EIMU Area (ha) (EA)	Weightage Factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100) / SA
1A2B1q3	1	191.26	20	3825.29	0.9	1352
	2	73.23	18	1318.15		
	3	103.71	16	1659.33		
	4	91.48	14	1280.69		
	5	31.95	12	383.42		
	6	215.53	10	2155.27		
<b>Total</b>		<b>707.16</b>		<b>10622.15</b>		<b>1352</b>
1A2B1q4	1	238.77	20	4775.39	0.85	1228
	2	97.55	18	1755.89		
	3	133.83	16	2141.26		
	4	173.86	14	2434.04		
	5	113.37	12	1360.39		
	6	342.57	10	3425.68		
<b>Total</b>		<b>1099.94</b>		<b>15892.65</b>		<b>1228</b>
1A2B1q5	1	9.73	20	194.65	0.85	1049
	2	40.32	18	725.81		
	3	114.57	16	1833.18		
	4	191.04	14	2674.58		
	5	192.70	12	2312.38		
	6	417.41	10	4174.06		

Micro-Watershed	EIMU	EIMU Area (ha) (EA)	Weightage Factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100) / SA
<b>Total</b>		<b>965.78</b>		<b>11914.66</b>		<b>1049</b>
1A2B1q6	1	8.28	20	165.57	0.8	992
	2	33.52	18	603.34		
	3	95.55	16	1528.87		
	4	122.69	14	1717.72		
	5	143.58	12	1723.02		
	6	305.69	10	3056.94		
<b>Total</b>		<b>709.33</b>		<b>8795.47</b>		<b>992</b>
1A2B1q7	1	404.37	20	8087.44	0.85	1385
	2	90.38	18	1626.83		
	3	79.89	16	1278.24		
	4	47.47	14	664.53		
	5	12.29	12	147.47		
	6	232.57	10	2325.69		
<b>Total</b>		<b>866.96</b>		<b>14130.19</b>		<b>1385</b>
1A2B1q8	1	255.13	20	5102.51	0.85	1367
	2	77.11	18	1387.95		
	3	61.83	16	989.25		
	4	24.62	14	344.74		
	5	6.90	12	82.83		
	6	174.16	10	1741.59		
<b>Total</b>		<b>599.75</b>		<b>9648.88</b>		<b>1367</b>
1A2B1r1	1	149.69	20	2993.85	0.85	1258
	2	46.81	18	842.58		
	3	88.82	16	1421.17		
	4	107.56	14	1505.84		
	5	39.42	12	473.03		
	6	175.37	10	1753.73		
<b>Total</b>		<b>607.68</b>		<b>8990.21</b>		<b>1258</b>
1A2B1r2	1	125.12	20	2502.49	0.85	1193
	2	43.05	18	774.98		
	3	104.14	16	1666.27		
	4	173.57	14	2430.04		
	5	78.80	12	945.57		
	6	236.25	10	2362.46		
<b>Total</b>		<b>760.94</b>		<b>10681.82</b>		<b>1193</b>
1A2B1r3	1	49.91	20	998.13	0.8	1087
	2	99.69	18	1794.50		
	3	165.02	16	2640.38		
	4	165.14	14	2312.00		
	5	142.73	12	1712.78		
	6	278.02	10	2780.15		
<b>Total</b>		<b>900.51</b>		<b>12237.94</b>		<b>1087</b>
1A2B1r4	1	33.16	20	663.14	0.8	1066
	2	109.36	18	1968.47		
	3	210.92	16	3374.79		
	4	187.92	14	2630.83		
	5	161.12	12	1933.42		

Micro-Watershed	EIMU	EIMU Area (ha) (EA)	Weightage Factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100) / SA
	6	364.85	10	3648.52		
<b>Total</b>		<b>1067.33</b>		<b>14219.17</b>		<b>1066</b>
1A2B1r5	1	91.87	20	1837.36	0.8	1132
	2	109.78	18	1976.05		
	3	94.26	16	1508.21		
	4	84.45	14	1182.36		
	5	71.95	12	863.43		
	6	232.16	10	2321.56		
<b>Total</b>		<b>684.47</b>		<b>9688.96</b>		<b>1132</b>
1A2B1s1	1	368.64	20	7372.88	0.85	1426
	2	54.07	18	973.22		
	3	48.93	16	782.92		
	4	41.45	14	580.34		
	5	15.04	12	180.45		
	6	151.56	10	1515.64		
<b>Total</b>		<b>679.70</b>		<b>11405.45</b>		<b>1426</b>
1A2B1s2	1	235.70	20	4714.02	0.85	1278
	2	82.70	18	1488.58		
	3	83.04	16	1328.71		
	4	98.56	14	1379.84		
	5	77.01	12	924.06		
	6	229.76	10	2297.56		
<b>Total</b>		<b>806.77</b>		<b>12132.77</b>		<b>1278</b>
1A2B1s3	1	191.10	20	3821.92	0.85	1233
	2	149.70	18	2694.55		
	3	160.96	16	2575.44		
	4	169.31	14	2370.34		
	5	103.45	12	1241.38		
	6	326.77	10	3267.73		
<b>Total</b>		<b>1101.29</b>		<b>15971.36</b>		<b>1233</b>
1A2B1s4	1	46.32	20	926.36	0.85	1170
	2	69.75	18	1255.53		
	3	133.78	16	2140.48		
	4	117.16	14	1640.18		
	5	84.31	12	1011.67		
	6	202.85	10	2028.48		
<b>Total</b>		<b>654.16</b>		<b>9002.71</b>		<b>1170</b>
1A2B1s5	1	75.10	20	1502.09	0.85	1227
	2	119.73	18	2155.20		
	3	127.56	16	2040.96		
	4	94.67	14	1325.39		
	5	49.49	12	593.92		
	6	198.52	10	1985.18		
<b>Total</b>		<b>665.08</b>		<b>9602.74</b>		<b>1227</b>
1A2B1s6	1	34.26	20	685.15	0.85	1125
	2	73.82	18	1328.78		
	3	146.99	16	2351.79		
	4	243.97	14	3415.53		

Micro-Watershed	EIMU	EIMU Area (ha) (EA)	Weightage Factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100) / SA
	5	152.18	12	1826.20		
	6	305.02	10	3050.16		
<b>Total</b>		<b>956.23</b>		<b>12657.60</b>		<b>1125</b>
1A2B1s7	1	13.58	20	271.65	0.8	1008
	2	50.74	18	913.37		
	3	130.34	16	2085.51		
	4	141.93	14	1987.00		
	5	94.66	12	1135.94		
	6	370.44	10	3704.36		
<b>Total</b>		<b>801.70</b>		<b>10097.84</b>		<b>1008</b>
1A2B1s8	1	65.28	20	1305.55	0.8	1105
	2	102.12	18	1838.08		
	3	154.39	16	2470.27		
	4	161.03	14	2254.36		
	5	89.24	12	1070.86		
	6	273.02	10	2730.24		
<b>Total</b>		<b>845.07</b>		<b>11669.36</b>		<b>1105</b>
1A2B1t1	1	25.34	20	506.90	0.8	1031
	2	43.15	18	776.64		
	3	101.70	16	1627.13		
	4	145.79	14	2041.02		
	5	102.17	12	1225.99		
	6	271.76	10	2717.59		
<b>Total</b>		<b>689.90</b>		<b>8895.26</b>		<b>1031</b>
1A2B1t2	1	21.41	20	428.25	0.8	1047
	2	63.47	18	1142.48		
	3	152.94	16	2447.11		
	4	176.60	14	2472.34		
	5	141.90	12	1702.86		
	6	296.25	10	2962.48		
<b>Total</b>		<b>852.58</b>		<b>11155.52</b>		<b>1047</b>
1A2B1t3	1	15.78	20	315.56	0.8	1048
	2	52.08	18	937.51		
	3	128.43	16	2054.92		
	4	171.69	14	2403.66		
	5	116.77	12	1401.28		
	6	246.66	10	2466.58		
<b>Total</b>		<b>731.42</b>		<b>9579.52</b>		<b>1048</b>
1A2B1t4	1	28.75	20	574.94	0.8	1076
	2	98.02	18	1764.37		
	3	246.87	16	3949.99		
	4	347.80	14	4869.19		
	5	152.41	12	1828.92		
	6	355.92	10	3559.16		
<b>Total</b>		<b>1229.77</b>		<b>16546.57</b>		<b>1076</b>
1A2B1t5	1	19.72	20	394.48	0.8	1072
	2	53.36	18	960.43		
	3	148.35	16	2373.59		

Micro-Watershed	EIMU	EIMU Area (ha) (EA)	Weightage Factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100) / SA
	4	220.27	14	3083.83		
	5	97.77	12	1173.21		
	6	222.45	10	2224.54		
<b>Total</b>		<b>761.93</b>		<b>10210.08</b>		<b>1072</b>
1A2B1t6	1	37.43	20	748.59	0.8	1080
	2	83.38	18	1500.75		
	3	180.70	16	2891.19		
	4	258.24	14	3615.34		
	5	111.81	12	1341.76		
	6	294.04	10	2940.44		
<b>Total</b>		<b>965.60</b>		<b>13038.08</b>		<b>1080</b>
1A2B1t7	1	15.87	20	317.40	0.8	1072
	2	62.46	18	1124.22		
	3	159.86	16	2557.74		
	4	213.91	14	2994.75		
	5	97.26	12	1167.14		
	6	236.35	10	2363.46		
<b>Total</b>		<b>785.70</b>		<b>10524.70</b>		<b>1072</b>
1A2B1u1	1	264.79	20	5295.72	0.85	1423
	2	60.55	18	1089.98		
	3	34.25	16	548.01		
	4	10.78	14	150.99		
	5	1.68	12	20.18		
	6	129.68	10	1296.77		
<b>Total</b>		<b>501.73</b>		<b>8401.65</b>		<b>1423</b>
1A2B1u2	1	302.05	20	6040.94	0.85	1337
	2	68.10	18	1225.74		
	3	57.43	16	918.90		
	4	53.43	14	748.07		
	5	25.27	12	303.23		
	6	222.61	10	2226.15		
<b>Total</b>		<b>728.89</b>		<b>11463.02</b>		<b>1337</b>
1A2B1u3	1	305.86	20	6117.14	0.85	1295
	2	157.64	18	2837.43		
	3	138.30	16	2212.81		
	4	98.98	14	1385.73		
	5	38.46	12	461.51		
	6	335.45	10	3354.52		
<b>Total</b>		<b>1074.68</b>		<b>16369.14</b>		<b>1295</b>
1A2B1u4	1	171.76	20	3435.15	0.85	1285
	2	96.19	18	1731.36		
	3	103.60	16	1657.62		
	4	101.69	14	1423.64		
	5	46.31	12	555.66		
	6	184.83	10	1848.31		
<b>Total</b>		<b>704.37</b>		<b>10651.74</b>		<b>1285</b>
1A2B2m3	1	87.98	20	1759.55	0.9	1268
	2	128.80	18	2318.44		

Micro-Watershed	EIMU	EIMU Area (ha) (EA)	Weightage Factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100) / SA
	3	181.84	16	2909.42		
	4	187.27	14	2621.74		
	5	80.30	12	963.65		
	6	290.45	10	2904.55		
<b>Total</b>		<b>956.65</b>		<b>13477.36</b>		<b>1268</b>
1A2B2m4	1	22.18	20	443.61	0.85	1104
	2	51.65	18	929.63		
	3	126.69	16	2027.01		
	4	217.23	14	3041.28		
	5	140.57	12	1686.89		
	6	293.07	10	2930.72		
<b>Total</b>		<b>851.39</b>		<b>11059.14</b>		<b>1104</b>
1A2B2m5	1	42.55	20	851.06	0.85	1158
	2	84.27	18	1516.89		
	3	150.15	16	2402.46		
	4	188.75	14	2642.53		
	5	80.90	12	970.76		
	6	258.00	10	2580.04		
<b>Total</b>		<b>804.63</b>		<b>10963.75</b>		<b>1158</b>
1A2B2m6	1	69.12	20	1382.41	0.85	1165
	2	111.59	18	2008.57		
	3	196.61	16	3145.75		
	4	252.85	14	3539.95		
	5	121.15	12	1453.74		
	6	331.94	10	3319.43		
<b>Total</b>		<b>1083.26</b>		<b>14849.86</b>		<b>1165</b>
1A2B2m7	1	46.94	20	938.89	0.9	1224
	2	108.61	18	1954.96		
	3	183.41	16	2934.59		
	4	227.98	14	3191.65		
	5	139.04	12	1668.49		
	6	300.57	10	3005.69		
<b>Total</b>		<b>1006.55</b>		<b>13694.26</b>		<b>1224</b>
1A2B2m8	1	53.97	20	1079.42	0.85	1144
	2	89.93	18	1618.70		
	3	154.54	16	2472.66		
	4	270.82	14	3791.55		
	5	178.15	12	2137.79		
	6	299.41	10	2994.05		
<b>Total</b>		<b>1046.82</b>		<b>14094.17</b>		<b>1144</b>
1A2B2m9	1	8.20	20	164.07	0.8	994
	2	20.91	18	376.42		
	3	94.00	16	1504.05		
	4	229.47	14	3212.62		
	5	222.68	12	2672.22		
	6	320.65	10	3206.55		
<b>Total</b>		<b>895.93</b>		<b>11135.93</b>		<b>994</b>
1A2B2n1	1	66.97	20	1339.47	0.85	1170

Micro-Watershed	EIMU	EIMU Area (ha) (EA)	Weightage Factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100) / SA
	2	28.60	18	514.79		
	3	71.83	16	1149.22		
	4	92.80	14	1299.15		
	5	142.59	12	1711.05		
	6	124.41	10	1244.10		
<b>Total</b>		<b>527.19</b>		<b>7257.79</b>		<b>1170</b>
1A2B2n2	1	42.13	20	842.70	0.85	1149
	2	68.89	18	1239.94		
	3	128.41	16	2054.62		
	4	157.11	14	2199.51		
	5	121.44	12	1457.33		
	6	226.43	10	2264.28		
<b>Total</b>		<b>744.41</b>		<b>10058.39</b>		<b>1149</b>
1A2B2n3	1	7.68	20	153.68	0.85	1039
	2	24.21	18	435.74		
	3	83.26	16	1332.15		
	4	178.67	14	2501.33		
	5	203.96	12	2447.47		
	6	351.90	10	3518.97		
<b>Total</b>		<b>849.67</b>		<b>10389.34</b>		<b>1039</b>
1A2B2n4	1	150.61	20	3012.19	0.8	1231
	2	126.94	18	2284.88		
	3	120.44	16	1926.97		
	4	71.63	14	1002.86		
	5	29.43	12	353.14		
	6	167.55	10	1675.54		
<b>Total</b>		<b>666.60</b>		<b>10255.57</b>		<b>1231</b>
1A2B2n5	1	18.09	20	361.88	0.8	996
	2	32.90	18	592.27		
	3	84.14	16	1346.24		
	4	104.68	14	1465.54		
	5	153.07	12	1836.89		
	6	291.73	10	2917.33		
<b>Total</b>		<b>684.63</b>		<b>8520.15</b>		<b>996</b>
1A2B2n6	1	52.72	20	1054.40	0.8	1091
	2	96.04	18	1728.78		
	3	177.92	16	2846.66		
	4	190.15	14	2662.10		
	5	118.85	12	1426.23		
	6	289.77	10	2897.72		
<b>Total</b>		<b>925.45</b>		<b>12615.89</b>		<b>1091</b>
1A2B2n7	1	2.76	20	55.21	0.8	948
	2	15.09	18	271.55		
	3	52.60	16	841.55		
	4	121.78	14	1704.92		
	5	212.04	12	2544.45		
	6	338.11	10	3381.12		
<b>Total</b>		<b>742.37</b>		<b>8798.80</b>		<b>948</b>

Micro-Watershed	EIMU	EIMU Area (ha) (EA)	Weightage Factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100) / SA
1A2B2p1	1	39.00	20	780.06	0.9	1282
	2	73.61	18	1324.99		
	3	151.88	16	2430.07		
	4	131.87	14	1846.19		
	5	30.19	12	362.28		
	6	156.62	10	1566.16		
<b>Total</b>		<b>583.17</b>		<b>8309.74</b>		<b>1282</b>
1A2B2p2	1	235.69	20	4713.73	0.9	1490
	2	251.21	18	4521.86		
	3	239.21	16	3827.29		
	4	33.21	14	465.00		
	5	16.21	12	194.50		
	6	135.01	10	1350.09		
<b>Total</b>		<b>910.54</b>		<b>15072.47</b>		<b>1490</b>
1A2B2p3	1	127.05	20	2541.09	0.85	1263
	2	158.16	18	2846.91		
	3	286.76	16	4588.09		
	4	184.86	14	2587.99		
	5	41.61	12	499.26		
	6	246.90	10	2468.98		
<b>Total</b>		<b>1045.33</b>		<b>15532.32</b>		<b>1263</b>
1A2B2p4	1	135.65	20	2713.02	0.75	1169
	2	95.84	18	1725.19		
	3	83.02	16	1328.29		
	4	51.69	14	723.63		
	5	7.44	12	89.30		
	6	135.53	10	1355.26		
<b>Total</b>		<b>509.17</b>		<b>7934.70</b>		<b>1169</b>
1A2B2p5	1	8.13	20	162.58	0.85	1191
	2	17.70	18	318.56		
	3	18.91	16	302.60		
	4	11.35	14	158.95		
	5	2.29	12	27.50		
	6	37.92	10	379.24		
<b>Total</b>		<b>96.31</b>		<b>1349.43</b>		<b>1191</b>

### 5.2.5 Prioritization of Micro-Watersheds

The micro-watersheds are subsequently rated into various categories corresponding to their respective SYI values. The criteria followed for priority categorization of micro-watersheds depending upon their SYI values is given below and the priority classification of individual micro-watershed is given in **Table 5.9** and **Figure 5.12**.

Priority categories	SYI Values
Very high	> 1300
High	1200-1299
Medium	1100-1199
Low	1000-1099
Very Low	<1000

**Table 5.9: Priority Number as per SYI Classification**

S. No.	Micro-Watershed	Area (ha)	SYI	Priority	Priority Number
1	1A2B1q3	707.16	1352	Very High	1
2	1A2B1q4	1099.94	1228	High	2
3	1A2B1q5	965.78	1049	Low	4
4	1A2B1q6	709.33	992	Very Low	5
5	1A2B1q7	866.96	1385	Very High	1
6	1A2B1q8	599.75	1367	Very High	1
7	1A2B1r1	607.68	1258	High	2
8	1A2B1r2	760.94	1193	Medium	3
9	1A2B1r3	900.51	1087	Low	4
10	1A2B1r4	1067.33	1066	Low	4
11	1A2B1r5	684.47	1132	Medium	3
12	1A2B1s1	679.70	1426	Very High	1
13	1A2B1s2	806.77	1278	High	2
14	1A2B1s3	1101.29	1233	High	2
15	1A2B1s4	654.16	1170	Medium	3
16	1A2B1s5	665.08	1227	High	2
17	1A2B1s6	956.23	1125	Medium	3
18	1A2B1s7	801.70	1008	Low	4
19	1A2B1s8	845.07	1105	Medium	3
20	1A2B1t1	689.90	1031	Low	4
21	1A2B1t2	852.58	1047	Low	4
22	1A2B1t3	731.42	1048	Low	4
23	1A2B1t4	1229.77	1076	Low	4
24	1A2B1t5	761.93	1072	Low	4
25	1A2B1t6	965.60	1080	High	2
26	1A2B1t7	785.70	1072	High	2
27	1A2B1u1	501.73	1423	Very High	1
28	1A2B1u2	728.89	1337	Very High	1
29	1A2B1u3	1074.68	1295	High	2
30	1A2B1u4	704.37	1285	High	2
31	1A2B2m3	956.65	1268	High	2
32	1A2B2m4	851.39	1104	Medium	3
33	1A2B2m5	804.63	1158	Medium	3
34	1A2B2m6	1083.26	1165	Medium	3
35	1A2B2m7	1006.55	1224	High	2
36	1A2B2m8	1046.82	1144	Medium	3
37	1A2B2m9	895.93	994	Very Low	5
38	1A2B2n1	527.19	1170	Medium	3

S. No.	Micro-Watershed	Area (ha)	SYI	Priority	Priority Number
39	1A2B2n2	744.41	1149	Medium	3
40	1A2B2n3	849.67	1039	Low	4
41	1A2B2n4	666.60	1231	High	2
42	1A2B2n5	684.63	996	Very Low	5
43	1A2B2n6	925.45	1091	Low	4
44	1A2B2n7	742.37	948	Very Low	5
45	1A2B2p1	583.17	1282	High	2
46	1A2B2p2	910.54	1490	Very High	1
47	1A2B2p3	1045.33	1263	High	2
48	1A2B2p4	509.17	1169	Medium	3
49	1A2B2p5	96.31	1191	Medium	3

It can be observed from above table that only 7 micro-watersheds are falling in very high priority category while maximum number of micro-watersheds i.e. 14 falls in high priority category. In terms of area also maximum area comes under high priority category whereas minimum area comes under very low priority category. Area wise prioritization is given in **Table 5.10** and shown in **Figure 5.12**.

**Table 5.10: Summary of Prioritization of Micro-Watersheds**

Priority	No. of Micro-Watersheds	Area (ha)	Area (%)
Very High	7	4994.74	12.67
High	14	12069.40	30.60
Medium	13	9564.07	24.25
Low	11	9776.02	24.79
Very Low	4	3032.26	7.69
<b>Total</b>	<b>49</b>	<b>39436.49</b>	<b>100</b>

The objective of the SYI method is to prioritize micro-watershed in a catchment area for treatment. The micro-watersheds with very high and high priority category in the catchment are required to be treated on priority basis. Thus, the prioritization will help in understanding which micro-watershed to be taken for priority during the 10 year CAT plan. In the present CAT plan implementation, the micro-watersheds would be treated as per the priority defined in **Table 5.10**.

All the biological measures except upgradation of existing nurseries prescribed in micro-watersheds falling in the very high and high priority category would be taken up in the second year, while, all the biological measures prescribed in micro-watersheds falling in the medium, low and very low priority category would be taken up in the third year. Maintenance of biological treatment measures will be taken up for subsequent seven years.

All the engineering measures prescribed in micro-watersheds falling in the very high priority category would be taken up in the first year, engineering measures prescribed in micro-watersheds falling in the high priority category would be taken up in the second year, engineering measures prescribed in micro-watersheds falling in the medium priority category would be taken up in the third year and engineering measures prescribed in micro-watersheds falling in the low and very low priority category would be taken up in the fourth year.

First year has been kept for development of new nursery, upgrading existing nurseries, establishing silt observatory sites, other entry point activities and for other components.

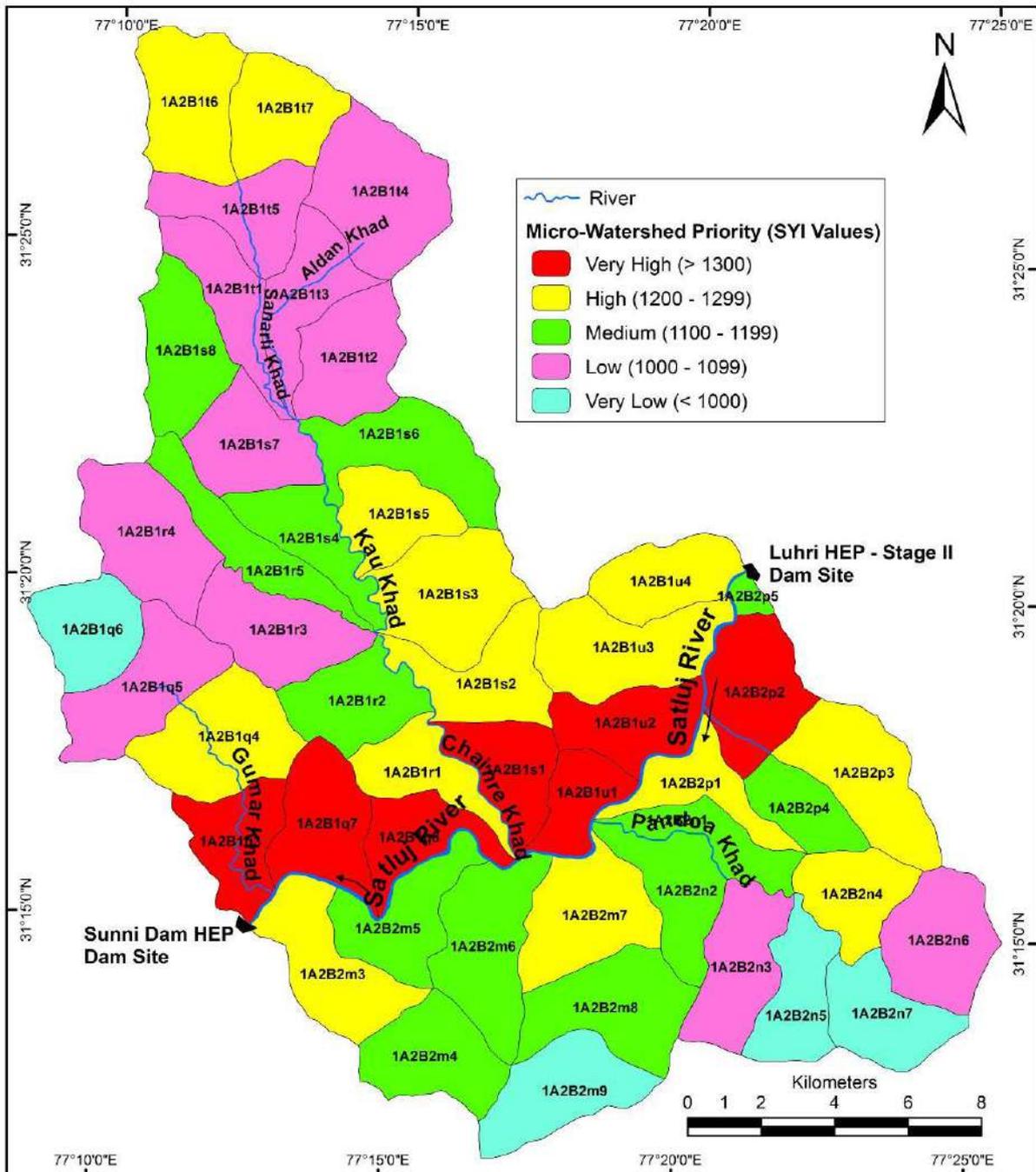


Figure 5.12: Prioritization of Micro-Watersheds

## CHAPTER 6

# FIELD SURVEYS & TREATMENTS

### 6.1 FIELD SURVEY

It was decided to carry out physical surveys in all micro-watersheds where the classification of the micro-watershed would be presented based on the vulnerability and sediment loads, and to seek feedback on the reasons for such patterns of sediment loads as well as the potential and possible methods and activities to reduce the vulnerability and sediment load. The area was physically traversed along with forest staff and officials. The surveys have been carried out in all inhabited micro-watersheds. Extensive use of Survey of India toposheets, base maps generated during the study, GPS and GIS tools was made.

Based on the feedback on the reasons for higher sediment loads and vulnerability in terms of soil erosion and degradation, and the forest quality and cover data in the micro-watershed, an evaluation of the reasons for high sediment load was identified. The purpose in all cases, (except those due to insurmountable reasons such as any specific major geological feature) where treatment actions can reduce the sediment load, these surveys and consultation shall help in identification of (i) in what type of context, what kind of treatment measures, or combination of typical treatment measures will be required, (ii) where treatment will give best results (benefit/ cost ratio), (iii) the cost of these treatments in different physical contexts, (iv) the methods of monitoring and evaluation of success from each type of treatment in each physical context.

All micro-watersheds have been physically traversed and primary data has been recorded. In addition, data/information about all inhabitants of micro-watersheds has been recorded through primary or secondary sources. This has been described micro-watersheds wise in ensuing paragraphs.

#### 6.1.1 *Analysis of Problem*

The key issues which needs to be addressed by this CAT plan are, silt load in the river Satluj and environmental degradation in the catchment and project area. The two issues apparently look different but in essence they are intricately linked and have their genesis in the common problem.

The catchment area of river Satluj extends well in to the territory of Tibet. In the Tibet region, the river flows in a narrow, deep channel with steep and barren hills rising on either side. Even after entering India, the river travels through a large

barren tract. The hills are very steep and most of the catchment particularly beyond Kanam is devoid of any vegetation. Due to poor vegetal cover, the rate of soil erosion is rather high. Terrain and geology of the area makes it very susceptible to high incidence of landslides, glacier movement and other forms of erosion. Some of these problems owe their existence to the natural/ physical factors existing in the tract like topography, geology, climate, soil etc., while the other problems are either manmade or aggravated by human actions. Very little can be done to change natural factors except to limit their adverse impacts. But problems due to human actions can be reduced to large extent by taking suitable preventive as well as remedial measures. The following forms of soil erosion are prevalent in the area:

- i) **Rill Erosion:** Rill erosion removes the soil in localized small washes in defined channels with dimensions of few centimetres and depth not exceeding 15-25 cms. This further leads to gully formation.
- ii) **Gully Erosion:** Accelerated rill erosion lead to formation of gullies by the process of combining of unattended rills. Gully erosion is responsible for heavy sediment flow in streams and rivers as the eroded soil goes immediately and wholly into the streams owing to turbulence on steep gradients.
- iii) **Stream and River Bank Erosion:** A large number of rivulets and streams in the catchment bring large quantities of sediment into the river with frequent under cutting and resulting in slope failures. This phenomenon occurs all along the river. The problem is very acute in the area having loose strata. Many streams cascading down the hill sides with uncontrolled furry during the peak months of monsoon and cut away large chunks of land. Flood prone nalas/ streams have been identified. The flow of streams and nala in the tract is very turbulent. The loose strata combine with lack of vegetation and overgrazing aggravates the situation resulting in erosion of banks due to surface flow as well as scouring and under cutting the soil below the water surface. Frequent floods in these nalas also precipitate the bank erosion.
- iv) **Landslide/ Landslip Erosion:** The region is quite prone to landslides/ landslips that take a heavy toll on valuable lands, property and life besides aggravating the problem of siltation in the rivers. The overall geological formation in the region is unstable, very loose and fragile. Thin beds of clayey, limestones, shales, highly joined sedimentary beds and schist varieties in the region with deformities like steep dips, folds and faults are

all pointers to the landslides/ landslips problems. The areas of such locations have been identified for treatment in the CAT Plan.

- v) **Soil Erosion:** Lack of vegetal cover is a contributing factor for accelerated soil erosion in the tract as also for environmental degradation. While ideally, dense tree cover or forests would have been the best insurance against soil loss and environmental degradation, the condition in the tract are otherwise. Large areas are either blank or bear thin tree crop. The lower reaches of the tract along the river are generally barren and devoid of any tree growth. The good forests are confined to upper reaches. Thus these natural conditions are a limiting factor in addressing the problem of soil erosion and environmental degradation. Nevertheless remedial measures can be undertaken to minimize their impact to some extent.
- vi) **Man-made Factors:** Certain problems of the region are either wholly due to human action or influenced to a large extent by his actions and upcoming economic activities in the region. The socio-economic pattern is also fast changing and transforming into modern society. Human being is disturbing the nature due to fast changing day to day life by way of his aspiration for constructing activities and other related action which are causing detrimental effects.
- vii) **Livestock Practices:** Livestock practices in the area are rather primitive. Mostly open grazing is practiced with little stall feeding and minimal fodder cultivation. Incidence of grazing in the high lying alpine pasture as well as low lying village pasture land is very high and fodder resources are fast decreasing. The carrying capacity of pastures adjoining villages is very low as these remain over grazed throughout the year without any rest or adequate provision for rehabilitation. Almost all the forests are burdened with the right of local people to graze their cattle without any ceiling to the number of cattle which may be allowed to graze. This open access to forest for grazing lead to great damage to vegetation as well as to plantations. Besides this, the heavy cattle grazing also is a precursor to soil erosion as the cattle not only eat and trample young seedlings but also reduce the permeability soil through its compaction resulting in increasing run-off.
- viii) **Collection of Fuel Wood and Fodder:** The local population depend on adjoining forest for their day to day requirement of fuel wood and fodder. They have the right to collect dry and fallen wood for their domestic use

and to lop tree for fodder. Often heavy lopping of trees is resorted to by the local population which is injurious for the well being of forests.

- ix) **Unscientific Farming Practices:** Land use and farm practices being adopted by the people are most of the time incompatible with the physical conditions of the site. Steep gradient of terrain and fragile nature of soil call for improved farm practice on scientific lines to reduce the danger of soil loss as also to improve the productivity. But the farm practices and land use prevalent in the tract are obsolete.
- x) **Unscientific Disposal of Debris Generated by Road Construction:** Roads are the only means of communication and form an important development activity in the region. In most of the cases, the roads are built along the river/ stream courses, the natural openings to different valleys. Road construction in the mountainous terrain requires a lot of blasting and construction in a zigzag fashion. The debris thus produced is not properly disposed at dumping sites and is just pushed onto the river side slopes. This results in heavy erosion during the rainy season, contributing silt to the river flow. Ecology and developments are in conflict.

## 6.2 TREATMENT MEASURES

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Watershed management is the optimal use of soil and water resources within a given geographical area so as to enable sustainable production. It implies changes in land use, vegetative cover, and other structural and non-structural action that are taken in a watershed to achieve specific watershed management objectives. The overall objectives of watershed management programme are to:

- increase infiltration into soil;
- control excessive runoff;
- manage & utilize runoff for useful purpose.

To achieve this, massive afforestation alongwith soil conservation along with meeting the demands of fuel, fodder, timber etc. of local people. Intensive soil and water conservation measures are proposed to be undertaken in the catchment area ensuring sediment free yield of water in the river Satluj. Energy plantation and grazing land development will be done in catchment area so as to reduce the pressure on forests. In addition to biological treatment measures, emphasis has been put on engineering measures also. Following Engineering and Biological measures have been suggested for the catchment area treatment depending upon the requirement and suitability:

### 6.2.1 **Biological Measures**

A well stocked forest is the best insurance against soil loss as well as for ecological rehabilitation. It is therefore proposed to increase the vegetation cover in the tract. For this, hitherto barren areas which are devoid of tree growth or the degraded forestland with scanty vegetation shall be brought under afforestation. The locality factors prevalent in the area are fairly adverse to the establishment of plantations. Thus, special and intensive efforts are needed to ensure the success of afforestation work. Owing to the above enumeration factors, the plantation will require higher levels of maintenance also. Thrust will also be laid on improving quality of nursery stock in the existing departmental nurseries so that sturdy nursery plants are available which can withstand the rigorous site conditions. The afforestation activities will be undertaken under seven different schemes as detailed below to make them specific to the needs of the areas being treated. The cost norms for each of the seven schemes are enclosed as **Annexure IVa**. These cost norms are as per the “Norms for plantation and maintenance of old plantations for Non-Tribal and Tribal Areas for the year 2020-21” issued by the Office of HP State Compensatory Afforestation Fund Management & Planning Authority (HP State Authority), refer (**Annexure IVb**), “Cost Norms for raising new Plantations and Maintenance of Old Plantations (Normal Plantations) for Non-Tribal & Tribal Areas for the year 2020-21” issued by Himachal Pradesh Forest Department, refer (**Annexure IVc**) and “Cost norms for raising plants (Normal and Tall plants) in nurseries for Non-Tribal & Tribal Areas for the year 2020-21” issued by Himachal Pradesh Forest Department, refer (**Annexure IVd**). The maintenance period is prescribed as per the discussions held with the staff of forest department during field survey i.e. 7 years.

**None of the areas proposed for plantation under this CAT Plan are listed in the DPR for rejuvenation of Rivers prepared by ICFRE.**

#### **i) Normal Afforestation of Degraded Forest Lands**

Under this scheme blank areas devoid of tree growth or degraded forests areas shall be taken up for planting. This will include raising of multi-tier mixed vegetation of suitable local species in steep and sensitive catchment areas of rivers/streams with the objective of keeping such areas under permanent vegetative cover. While effort is to raise a mixture of conifer and broad leaved species so far as practical however choice of species might change at the time of actual implementation. 1100 plants per hectare will be planted under this scheme. Planting will be done in pits. Earth work should be done well in advance. Plants should be healthy with strong stems. Planting should be done in June when the water supply starts. The plantation will be maintained for subsequent seven years. RCC fence posts with 4 strand barbed wire fencing, interlaced with thorny bushes will be done in the plantation areas. A total of 120 ha area has been identified as available for tackling under this scheme. Out of

the total, 114 ha have been identified in Karsog Forest Division and 6 ha in Kotgarh Forest Division. Cost for afforestation including 7 years maintenance and nursery cost of plant is Rs. 1,41,740/- per ha.

#### **ii) Enrichment Plantation**

Many of the regular forest areas of the tract have been depleted due to excessive pressure of local population for timber, fuel wood and fodder. The crop in these areas has become quite open and natural regeneration due to biotic pressure interference is absent. It is essential to restore such areas to their optimum productive potential so that their protective influence in ameliorating the environment is utilized to the full. Thus, it is imperative that such forest areas are planted by artificial means to increase their stocking to the required level. Some plantation raised in the past, although established, contain small blanks caused due to various factors like grazing etc. Such areas shall also be taken up under this scheme to replant gaps so as to raise the stocking in such deficient areas to the optimum level. 800 plants per hectare will be planted under this scheme. The plantation will be maintained for subsequent seven years. Wooden fence posts, interlaced with thorny bushes will be done in the plantation areas. A total of 295 ha area has been identified as available for tackling under this scheme. Out of the total, 194 ha have been identified in Karsog Forest Division, 60 ha in Shimla Forest Division, 29 ha in Kotgrah Forest Division and 12 ha in WL Kullu Forest Division. Cost for enrichment plantation including 7 years maintenance and nursery cost of plant is Rs. 93,650/- per ha.

#### **iii) Energy Plantation**

Energy plantation scheme is essential in large scale for a continuous supply of fuel. It can be easily carried out and it is economical to carry out. Agricultural land will not be used for energy plantation, instead, non-agricultural land, farm wasteland, any land used for general purposes in the village, land on either side of nalas and road, infertile forest lands and waste lands will be used for energy plantation. 1100 plants per hectare will be planted under this scheme. The plantation will be maintained for subsequent seven years. Wooden fence posts, interlaced with thorny bushes will be done in the plantation areas. A total of 15 ha area has been identified as available for tackling under this scheme. Out of the total, 10 ha have been identified in Karsog Forest Division and 5 ha in Kotgarh Forest Division. Cost for energy plantation including 7 years maintenance and nursery cost of plant is Rs. 1,20,690/- per ha.

#### **iv) Grazing Land Development**

Grazing land development will be undertaken for treatment under silvo-pastoral model. Areas will be closed and staggered trenching of size 30x30 cm will be dug over the areas to be treated. About 400 running meters of trenches will be dug per

hectare. Improved variety of grasses will be sown on the berm of the trenches. In the space between the trenches, fodder tree species shall be raised. 1100 plants per hectare will be planted under this scheme. The plantation will be maintained for subsequent seven years. Wooden fence posts, interlaced with thorny bushes will be done in the plantation areas. A total of 13 ha area in Karsog Forest Division has been identified as available for tackling under this scheme. Cost for development of grazing land including 7 years maintenance and nursery cost of plant is Rs. 1,20,690/- per ha.

**v) Planting of Tall Plants**

500 plants per hectare will be planted under this scheme. The plantation will be maintained for subsequent seven years. Wooden fence posts, interlaced with thorny bushes will be done in the plantation areas. A total of 87 ha area has been identified as available for tackling under this scheme. Out of the total, 35 ha have been identified in Karsog Forest Division and 52 ha in Shimla Forest Division. Cost for energy plantation including 7 years maintenance and nursery cost of plant is Rs. 1,21,860/- per ha.

**vi) Assisted Natural Regeneration**

In some forest areas, conditions are conducive to natural regeneration provided some sort of assistance is provided. Such area shall be taken up under this component. The areas shall be closed to reduce biotic interference. Forest floor will be cleared of slash, debris and felling refuse to afford a clean seed bed to the falling seed. At certain places some soil raking may also have to be done to facilitate germination of seeds. Where natural regeneration is found deficient it will be supplemented by artificial planting. Patch sowing in suitable areas may also be done. 250 plants per ha will be planted to hasten the process of regeneration the area uniformly. The plantation areas will be fenced with barbed wire fencing on wooden fence posts. The plantation will be maintained for subsequent seven years. A total of 27 ha area in Shimla Forest Division has been identified as available for tackling under this scheme. Cost for assisted natural regeneration including 7 years maintenance and nursery cost of plant is Rs. 44310/- per ha.

**vii) Development of Medicinal Plants**

One of the major factors impacting the effective conservation of forests is the dependence of rural communities on the forest biomass resources for meeting their fuel, fodder, small timber and other livelihood needs. While schemes to augment availability of fuel wood, fodder, small timber have attracted much attention, the need to address the livelihood issue by encouraging forest based enterprise has not received the desired attention. Propagation of medicinal plants is an innovative land use strategy to address the livelihood issues of local people on sustainable

basis as it provides alternative income generation activity. Moreover, this will help in in-situ conservation of medicinal plants. With this purpose, medicinal herbs will be propagated under this component. 13200 plants per ha will be raised in the selected areas. The plants can be raised as intercrop in the other plantation areas taken for tree plantation. Tree can be planted as intercrop in the areas suggested for assisted natural regeneration. The plantation areas will be fenced with barbed wire fencing on wooden fence posts. The plantation will be maintained for subsequent five years. A total of 25 ha area in Shimla Forest Division has been identified as available for tackling under this scheme. Cost for development of medicinal plants including 5 years maintenance and nursery cost of plant is Rs. 1,12,820/- per ha.

### viii) Nurseries Management

There are 7 nurseries existing in the free draining catchment area which cater to the current needs. Of which 5 nurseries are in Karsog forest division and one each in Kotgarh and Shimla forest division. Details of all these existing nurseries are given in following **Table 6.1**. However, all these nurseries would need to be upgraded/ modified/ developed and strengthened to meet requirements for catchment area treatment plan interventions. Provisions have been made to upgrade all these. A total provision of Rs 102 lakh has been made for upgradation of these 7 nurseries. In addition, two new nurseries have been proposed in Kotgarh forest division. A provision of Rs 50 lakh has been made for new nurseries. These funds i.e. **Rs. 152 lakh** shall be utilized for infrastructural development works only.

### Establishment of Model/Modern Nursery

In the pre-planting activities, production of quality planting stock is the most important aspect, which has direct bearing on successful establishment of productive plantations. The seed processing and storage of important species to be planted in the particular forest circle/division should also be done at that nursery. The new nursery will be well equipped with all the facilities as mentioned below:

#### ➤ **Infrastructure Facilities Required:**

The following facilities are required immediately for early establishment of Model/Modern Nursery:

- Fencing of nursery site
- Approach road
- Water supply and storage tank
- Compost unit with power chaff cutter and Grinder
- Forest Guard quarters and Mali Hut
- Store for tools & equipments
- Green house/Polyhouse
- Potting mixture shed

- Shade house
- Drying platform.
- Electrification
- Permanent mother beds
- Open growing area with sprinkler system
- Nursery tools and equipments including root trainers

Details and justification of the facilities required at Model/Modern Nursery are as under:

**Fencing of nursery site:**

Fencing is essential to start nursery activity at any given site to protect plants from domestic and wild animals. Therefore, chain-link/barbed wire fencing is required at least in core area of the nursery before the initiation of other developmental activities there.

**Approach road:**

Nursery site should be well connected with roads. For speedy establishment of various components of 'Model Nursery' the approach road is required essentially in the beginning. Further, after establishment the approach road facilitate for the transportation of various materials into the nursery and transportation of quality seedlings from the nursery.

**Water supply and storage tank:**

There is permanent water problem in hill areas during summer season. A fundamental requirement for all nurseries is an adequate supply of good quality water along with sufficient storage facilities for hot summer months. The model nursery is not the exception and these facilities should be looked upon before establishing the nursery. Only those sites should be selected for the establishment of model nurseries where sufficient water is available throughout the year.

**Compost Unit with power chaff cutter:**

Production of compost has become the integral part of all the nurseries of present day. Composting unit for aerobic composting of organic material with power driver chaff cutter and grinder is required at nursery site. The capacity of the unit would be ideally to produce around 25-30m<sup>3</sup> compost annually for meeting the manure requirements of root trainers and other containerized nursery plants. In higher temperate regions production of vermi-compost may be included in the activity calendar for meeting the organic matter requirements of the nursery.

**Forest Guard Quarters and Mali hut:**

Model nursery generally possesses costly tools and equipment and other modern infrastructures, which requires constant watch and ward. It is in the interest of the organization if one or two guard quarter would be constructed at the nursery site to permanently station some staff there. Therefore, at least one guard quarter and one

mali hut is required to be constructed at the selected site along with other developmental activities.

**Store for tools and equipment:**

A nursery store of size 5x4m with rakes, shelves etc. is needed to house various tools and equipments, seeds, fertilizers and other materials.

**Green House/ Poly House:**

The purpose of this structure is to provide optimum conditions of quick growth for the plants. For most parts of the country an affective cooling system is required to be installed in green houses. But for hill region temperature enhancement and increased growing period would be the main aims of green house. The structure should be covered with UV stabilized polythene sheet for increasing temperature inside and must have bottom heating and photoperiod enhancement facilities. It is essential to arrange for the mist irrigation system inside along with exhaust fans.

**Potting mixture shed:**

Uniform and thoroughly mixed potting mixture plays an important role for the production of uniform quality nursery stock. For temporarily storing and properly mixing of different components of potting media, a potting mixture shed is a must. Knowing the importance of potting media in model nursery, a structure of size 5m X 5m is require to be established at the selected site.

**Shade house:**

Shade house is an important component where rooted cuttings from clonal propagation, root trainer plants and the seedlings from seeds of seed stands or plus trees congregate for gradual hardening or initial establishment. The temperature beneath the shade is much less compared to the heat outside. The Agroshade net, which provides 50% or 75% shade, is enough for various parts of the state and watering in shade house would be done through an elaborate overhead macro-sprinkler system. The shade house of size 15m x 8m is required.

**Drying Platform:**

A cement concrete platform, 7m x 5m would be sufficient for drying and processing seeds, drying compost, preparation of potting media by mixing ingredients, filling of root-trainers etc. The said platform would be erected near to composting unit and potting mixture shed.

**Electrification:**

Single and 3 phase electric connection is required at nursery site for running motors of green house, composting unit, sprinkler system and various nursery machines & equipments etc.

**Permanent Mother beds:**

Permanent mother/germination beds are also an important component in modern nurseries. They are concrete beds with total control on potting media mostly sterilized sand having drainage holes at bottom. Ten no. germination beds of size 10x1 m are enough to meet the needs of the nursery.

### Open growing area with sprinkler system:

The plants produced in controlled environment i.e. in mist chamber/shade house etc. need gradual hardening before out-planting in open area of the nursery. Besides these, the open area is also needed for bare-root & polybag seedling production systems. About 0.5 ha area is need to be developed into an open growing area with provision of micro-sprinkler irrigation system. In the hilly region, generally terracing and bed preparation will be needed for the establishment of such area.

### Nursery tools & equipments including root-trainers:

The following nursery tools and equipments are essentially required to start various activities at model nursery:

Garden Fork, Spade, Sickle, Secateurs, Plastic buckets, Tasa, Shovels, Axe, Plastic cans, Rubber pipe, Pick-axe, Bed roller, Bed marker, Drill marker, Under-cutter and wrencher, poly-globule, poly-hut, refrigerator, pH meter, Hot air oven, Electronic balance, Electric grinder, Measuring cylinders, Glass-wares, seed storage bins, Root-trainers & their stands etc. these facilities need to be developed at the earliest to start various works at model nursery.

**Table 6.1: Description of Nursery Management**

S. No.	Name of Division	Name of Range	Name of Block	Name of Beat	Name of Nursery	Area (ha)	Amount (Rs)*
1	Karsog	Karsog	Bagsad	Mahunag	Tatmu	0.7	15,00,000
2			Mamail	Mehandani	Mehandani	0.2	10,00,000
3		Mamail		Mamail	0.5	15,00,000	
4		Pangna		Tattapani	Telehan	Mahota	0.5
5		Seri	Seri	Niharinal	Niharinal	0.3	12,00,000
6	Kotgarh	Kumarsain	Kangal		Dibber	0.5	20,00,000
7	Shimla	Bhajji	Himri			0.5	15,00,000
<b>Cost for upgradation of existing nurseries</b>							<b>1,02,00,000</b>
8	Kotgarh	Kumarsain	Kangal	Dhar	New nursery		25,00,000
9				Ahar	New nursery		25,00,000
<b>Cost for establishing new nurseries</b>							<b>50,00,000</b>
<b>Grand Total</b>							<b>1,52,00,000</b>

*\*Note: Funds to be utilized for infrastructural development works only.*

## 6.2.2 Soil Conservation Works - Engineering and Bio-Engineering Measures

Engineering measures are more effective in conserving soil and water when they are supplemented by vegetative methods. Soil conservation and bio engineering measures stabilize or protect eroded soils and reduces further soil erosion. The plant and plant parts (root, stems) act as the main structural components to reinforce the soil and to provide protection. Soil bio-engineering technique must be cost effective solution using locally available material and executable through unskilled or semi-skilled labour. Traditional methods of controlling stream flow and erosion rely on structural practices like retaining walls and check dams and are often expensive and ineffective if erected alone.

Bio-engineering is the use of vegetation, either alone or in conjunction with civil engineering structures, to reduce instability and erosion on slopes. Bio-engineering has the advantage over other measures as:

- It provides the best way to armour slopes against erosion
- It is relatively low in cost, it uses local material and skills, and provides livelihood benefits (i.e. economically useful products)
- It is simply part of wise and sustainable asset management
- Plants reduce the supply of debris from degrading slopes
- It is an “appropriate” way of enhancing civil engineering structures to increase stability as far as possible
- Vegetative structures are also flexible, being capable of absorbing movement and recovering from damage.

Bio-engineering uses live plants alone or in combination with dead or inorganic material, to produce living, functioning systems to prevent erosion, control sediment and provide habitat. Both structural practices and live vegetation are used to provide erosion protection for streams. The techniques suggested is use of woody plants that root mostly from dormant plants. The species selected for bio-engineering should be available locally and suitable for that zone. Cutting and rooted plants are only to be used during the winter months (dormant season) and sodding techniques be used during the vegetation (summer) season. With different type of brush layering streams can be stabilized. If plants are rooted, they are called hedge layer and if they are un-rooted, they are called brush layer. Different techniques suggested are:

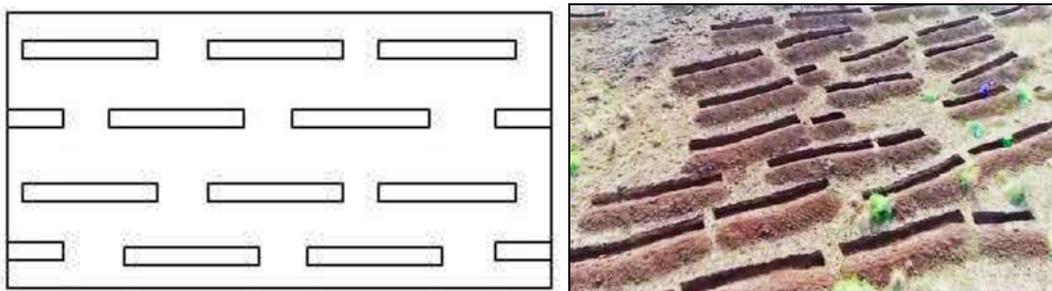
- Staggered Trenches for soil and moisture retention in the areas prescribed for normal afforestation and enrichment plantations
- Live vegetative hedges in the upper reaches of the streams/ nalas and along the bank of stream/ nala
- Brushwood check-dams made up of posts and brushes across the gully to hold fine materials carried by flowing water in the gully.

But in certain situations, only engineering measures can be proposed. Various engineering measures have been suggested for flood prone nalas, landslides/ landslips, treatment of nalas and soil and water conservation in forest area in the free draining catchment area. Description of various engineering treatment measures is given in **Table 6.2**.

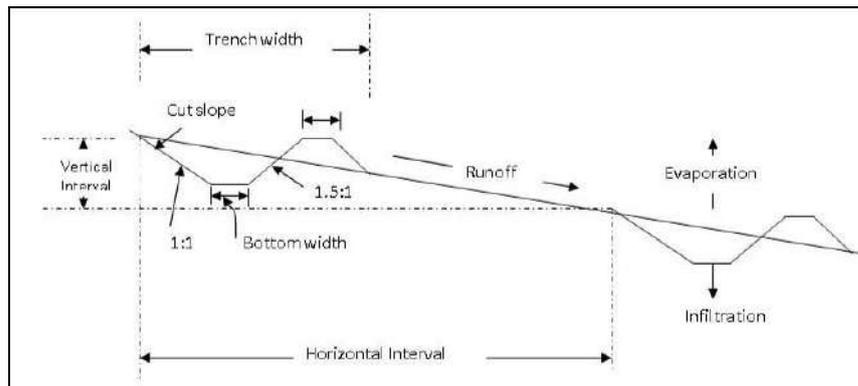
#### **i) Moisture Retention Measures**

To improve soil & moisture regime in forests, Staggered trenches of size 1x0.3x0.3m are prescribed in the area. The staggered trenching involves the excavation of trenches of shorter length in a row along the contour with interspace between them. These trenches are arranged in straight line (staggered form). Suitable

vertical intervals between the rows are restricted to impound the runoff without overflow. In the alternate row, the trenches are located directly below one another. The trenches in successive rows are thus staggered, with the trenches in the upper row and the interspace in the lower row being directly below each other. The length of the trench and the interspace between the trenches in the same row should be suitably designed such that no long unprotected or uninterrupted slope to cause unexpected runoff or erosion. As the trenches are not continuous, no vertical disposal drain is excavated. Trenches will be prepared above the pits in the areas prescribed for afforestation and enrichment plantation. The general layout of the staggered trench is presented below.



**Schematic and Thematic Diagram of Staggered Trenching**



**Definition Sketch of Staggered Trenching**

A total of 415 ha area has been identified as available for tackling under this scheme. Out of the total, 308 ha have been identified in Karsog Forest Division, 35 ha in Kotgarh Forest Division, 60 in Shimla Forest Division and 12 ha in WL Kullu Forest Division. Cost for preparation of Staggered trench is Rs 62/- per running meter.

**ii) Drainage Line Treatment**

The nalas/ streams will be treated to check the velocity of runoff, detention of silt and prevention of cutting of banks. The treatment will include bio-engineering measures like vegetative shrub barriers, brushwood check dams and engineering measures like check dams and check walls in dry stone as well as wire crate, water harvesting structures, farm ponds (big and small). Planting of grasses, shrubs and trees will also be done on the banks wherever feasible. A total of 147 nalas/ streams has been identified to be treated under the CAT plan. Out of these, 112 nalas/

streams fall in Karsog Forest Division, 18 nalas/ streams fall in Shimla Forest Division, 13 nalas/ streams fall in Kotgarh Forest Division and 4 nalas/ streams fall in WL Kullu Forest Division. Dimensions of various engineering measures along with their cost to be implemented for drainage line treatment are given in **Table 6.2**. Various treatment measures suggested for drainage line treatment has been explained below.

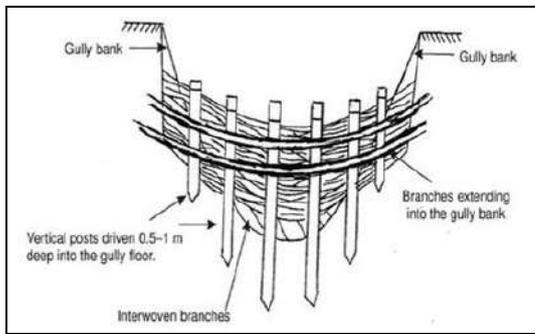
- **Brushwood Check Dam**

Brushwood check-dams made up of posts and brushes are placed across the gully. The main objective of brushwood check-dams is to hold fine materials carried by flowing water in the gully. Small gully heads, can also be stabilized by brushwood check dams. The main requirement of brushwood check dam is that, they must be quick and easy to construct, should be made by using cheap and readily available material in nearby areas. In areas where the soil in the gully is deep enough, brushwood check dams can be used if proper construction is assured. The gradient of the gully channel may vary from 5 to 12 percent, but the gully catchment area should not be as such huge which produces high amount of runoff volume. There are two types of brushwood check-dams: these are single row and double row brush wood check-dams. The type chosen for a particular site depends on the amount and kind of brush available and on the rate and volume of runoff. The maximum height of the dam is one meter from the ground (effective height).

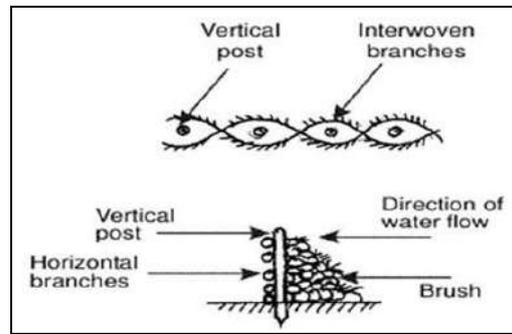
- a. Single Row Brushwood Check-dams*

These check-dams can be used where the rate of runoff is less than 0.5 m<sup>3</sup>/sec. The structure is temporary and its durability will depend on the quality of posts used. If possible live posts of willow, popular and other trees should be used (8-10 cm dia). Flexible branches are cut and woven around the posts. This dam is constructed across the channel or gully with the brush wood materials, laid along the flow of water, keeping the butt ends towards u/s face of the gully. The brushwood is kept in position by tying to the posts. Before the dam construction is begun, the sides of the gully or channel should be sloped to 1:1 and the gully bed should also be excavated for 15 cm depth along the entire gully width over which brushwood have to be laid. In addition, 15 cm excavation is also done into the bank to give necessary notch capacity.

After excavation, the wooden posts of about 10 cm in diameter are driven in a line across the gully at an interval of 90 cm up to a depth of 75 cm in gully bed. The top of wooden posts should be kept at such a height so as to form a notch of required size. The brushwood is tied from the front line and the other lines are tied using galvanized wire for keeping them in position. The lowest layer of the brushwood must be the longest.



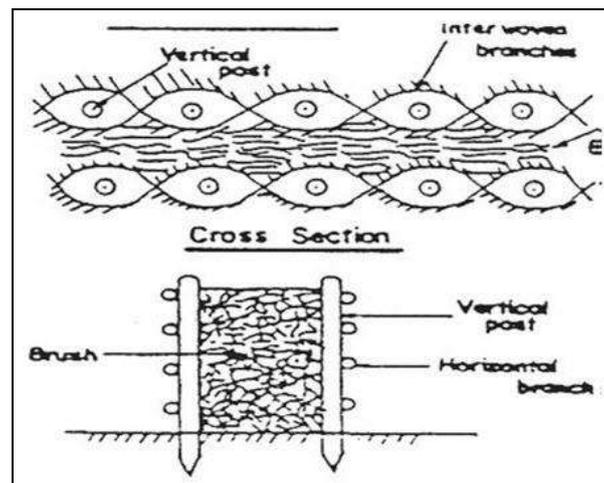
A single row brushwood check-dam front view



Vertical and side views of single row check-dam

**b. Double Row Brushwood Check-Dam**

This type of brushwood check-dam is suited where the rate of runoff is less than 1 m<sup>3</sup>/sec. The construction of the dam starts with an excavation in the floor and into the sides of the gully to a depth of 0.3-0.5 m. Two rows of posts, 5-10 cm in diameter and 1-2 m in length are placed into the holes, across the floor of the gully to a depth of 0.5-0.6 m. The spacing between the posts is 0.5 m. Brushwood or branches are packed between the posts. The height of the posts in the center should not exceed the height of the spillway otherwise the flow will be blocked and water may be forced to move to the gully sides.



Double row brush wood check-dam

- **Live Hedge**

Live hedges, a type of retards are structures near the stream bank for retarding or reducing the stream velocity. The purpose of retards is to prevent the bank erosion or scouring of its toe by inducing deposition. Live hedges are most commonly used in small streams. These are planted in the upper reaches of stream and close to the vulnerable bank in the stream. The hedges have very strong root and shoot systems to resist to erosion by flood flow. A pictorial view of live hedge to protect stream bank erosion is given below.

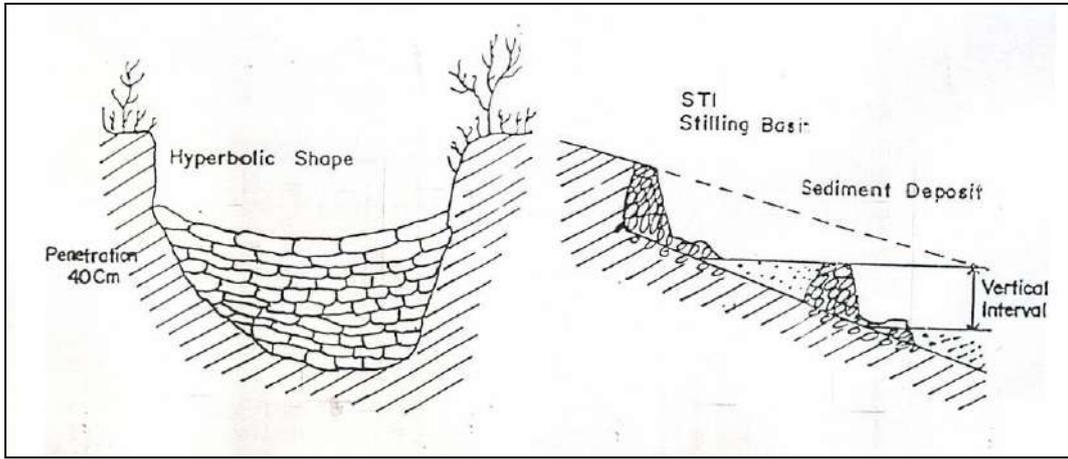


- **Dry Stone Masonry Check Dam**

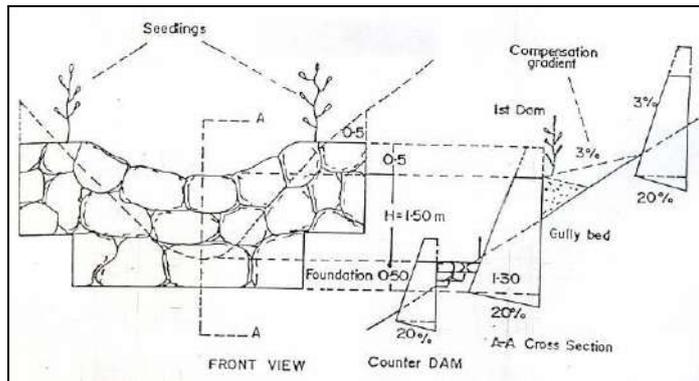
Larger gullies have to be treated to prevent further deepening and widening. The purpose of a check dam is to reduce the gradient and reduce the flow velocity. The water is guided safely from a higher elevation to a lower elevation without causing erosion at the gully/nala bed and banks. The water pools behind the dam promotes the percolation into the soils.

The ideal spacing of check dam should be such that the bottom of the upper check dam is in the level with the top of the next lower one. In steep areas, this is difficult to achieve as it may require too many check dams. Check dam must be well anchored to prevent underscouring and scouring between the dam and the banks. The flow is directed through a water or water spill in the centre of the dam, at the point of impact of the bed, a protective apron must be constructed to dissipate the energy.

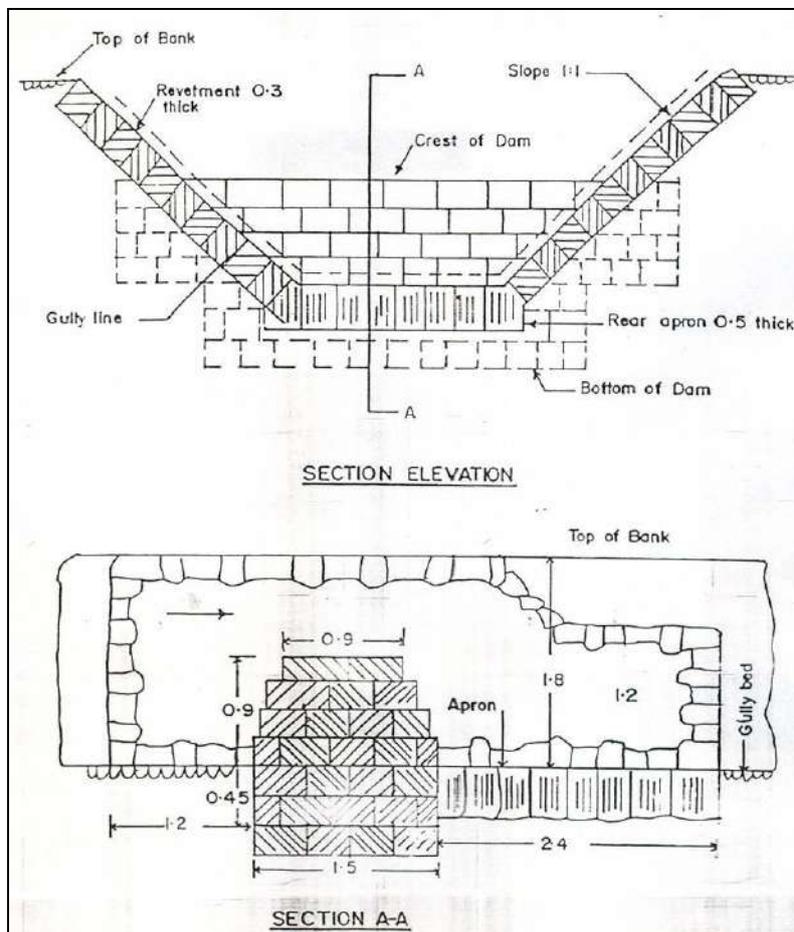
Masonry Check Dams are the most commonly used structures both in case of larger gullies and small nalas/ stream. These are generally constructed in upper reaches of eroding nallahs to reduce the bed slope, stabilize the grade and check the bed scouring and retain silt, sand and pebbles. The depth of the foundation may vary from 30-60 cm. Foundation should be dug across the nala width extending well into the banks. The larger stones are placed in bottom layers. In every of stones, a step of 15 to 20 cm is left on the downstream side, so that the width is reduced from base to top. Two wing walls with appropriate foundations are often constructed at the upper side to force the flow into the water spills or notch and to prevent it from damaging the banks. The wing walls should form an angle of about 30 degree with the banks. Below the dam an apron has to be constructed with stones. On the upstream side, the dam has to get an earth fill for greater strength. The structure is supplemented by planting seedlings and cutting of suitable species along the banks on the upstream side.



Layout of Typical Check Dam



Layout of Loose Stone Check Dam

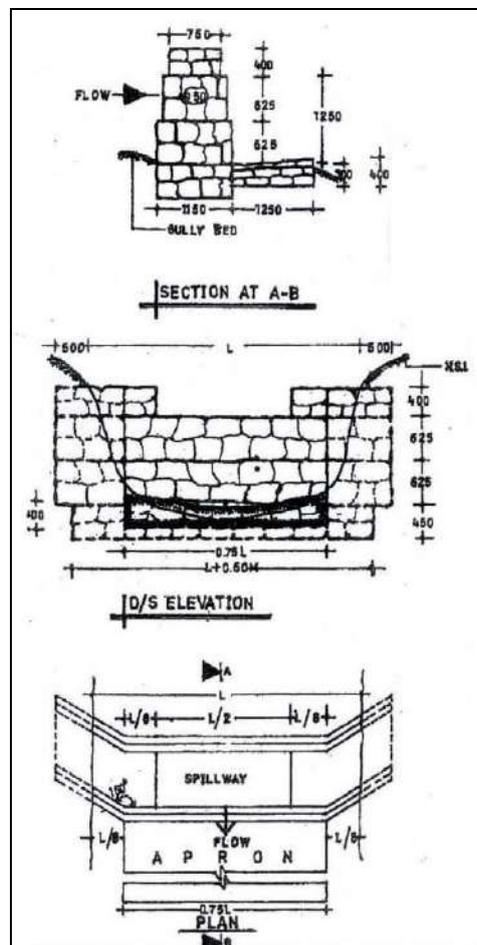


Layout of Dry Stone Check Dam

• **Wire Crate Check Dams**

Wire crate check dams are used for retention of debris in the main nalas and are constructed by filling of stones in wire mesh cage. The size of the wire mesh is generally kept 15cm x 15 cm and the wire used for these cages is galvanized iron wire of 8 - 7 gauge (4 - 4.5 mm). These structures are widely adopted for the treatment of drainage lines because they are flexible (bend without breaking), porous (water can seep through them) and are economical as compared to masonry structures. Wire crate check dams are used in the main drainage channels receiving relatively large quantities of runoff and debris. These structures are constructed up to a height of about 1- 3 m.

Since such check dams do not attempt to pond back water therefore complete stopping of seepage is not important; however, the stability of the structure against overturning and being washed away by flowing water must be ensured. The foundation of these check dams should be dug out from 0.3 m - 0.5 m and the keying into stable portion of banks is also kept from 0.3 m - 0.6 m. Top of the check dam is kept 1 m wide and its height can vary from 1-3 m. Wire mesh of size 15 cm x 15 cm to 20 cm x 20 cm depending upon the size of stones is used. The wire used for the mesh is hot dipped zinc coated GI wire of thickness 8-7 gauge (4-4.5 mm).



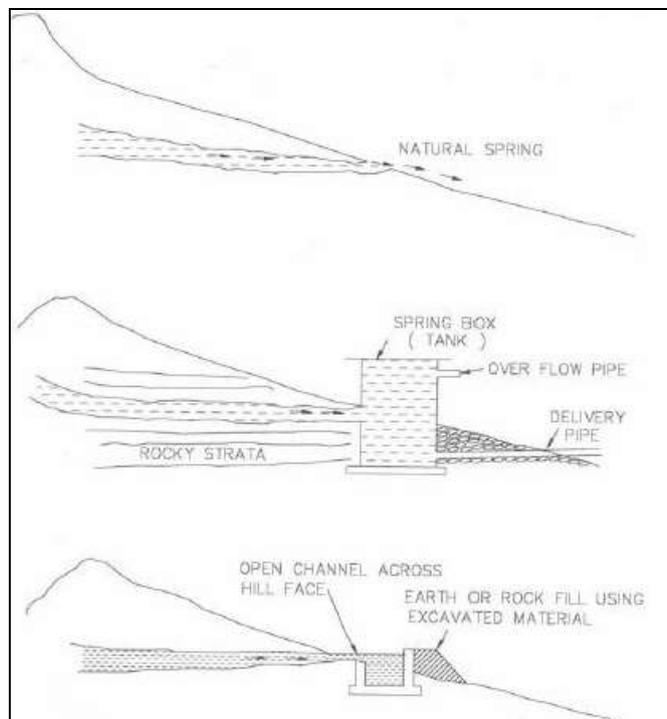
**Layout of Crate Wire Check Dam**

- **Water Harvesting Structures**

The demand on the water resources of the state has been increasing with every passing year. The state is faced with a situation of water stress i.e. manifested by apparent moisture stress in vegetation and forest. Keeping in view of these facts water harvesting structures are proposed in the present CAT Plan to conserve and augment water resources. The basic idea is to trap rain water on hill sides, increase percolation and to build water retaining structures to store the excess water runoff in streams. If runoff is collected locally at appropriate locations in water harvesting structures, not only it can be gainfully utilized subsequently, but it will also help in reducing the volume of runoff in streams during monsoon and subsequently reduce the soil erosion. Types of water harvesting structures are illustrated below. However, component and design is to be followed as direction given by the department from time to time and as per availability and requirement of the site.

- a. Spring Water Harvesting**

Lined channels are built across the hill slopes to intercept rain water. These channels convey water for irrigation terraced agricultural fields. The water is also used to fill small ponds for domestic use and the cattle. Generally, water from hill streams are diverted through small excavated channels, called kuhl. A typical spring water harvesting system is shown in Figure below:



**Typical Spring Water Harvesting System**

One relatively easy means of storing and distributing spring water is through a device known as a spring box. Built usually into a hillside and deep enough to access the spring-water source, this device allows water to enter from the bottom (as depicted in Figure above) and fill upto a level established by an

overflow or vent pipe. Hydraulic pressure then maintains the level in the spring box. The outflow pipe near the base of the device may be connected via pipe to a larger storage system (such as a tank) closer to the point of use or tapped directly at the location of the box. This device can be constructed using local materials. Depending on local water requirements and conditions, a number of these spring boxes may be constructed to provide year-round supply or used to recharge other community water storage systems.

#### **b. Polylined Tanks**

Polylined tanks suggested for the free draining catchment area are trapezoidal shaped having depth of 1.5 m, length of 10 m and width of 6 m at bottom each and side slopes of 1:1. For lining the tank, a blue colored UV stabilized, multi-layered cross-laminated sheets may be used. The construction activities involve digging the tank in trapezoidal shape, smoothening and levelling the four walls as well as base of the tank, spraying of weedicide, sheet laying and brick lining (completely loose, without any cementing material). If small pebbles are present on the walls and bottom, try to remove them completely, else there are chances of the sheet getting damaged. If the need be, the walls and the base may be levelled by spreading the fine screened soil. The size of the sheet should be obtained by actually measuring the cross dimensions i.e. length and width of the already dug out tank including 85 cm of sheet which needs to be buried at the top outer ends of the tanks. Normally the storage capacity of a tank with this dimension is between 70000 – 75000 litre. A typical polylined tank is shown in Figure below:



**Preparation of polylined tank**

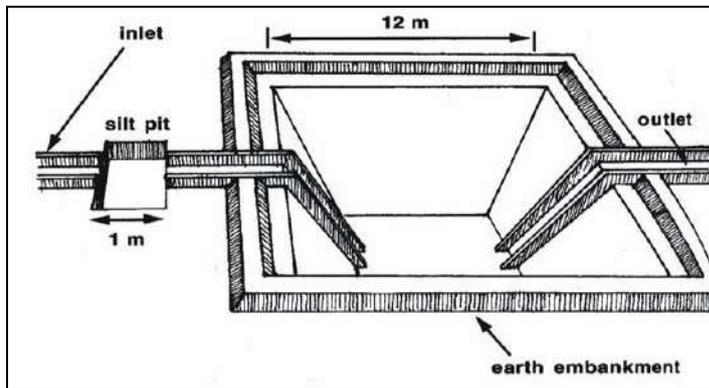


**Rain water harvested in polylined tank**

- **Farm Ponds**

The ideal farm pond should be dug into the ground in a naturally low-lying area. Some of the soil that is removed can be used to construct an earthen berm around the pond, which should be planted with trees and grasses for stability. The shade and wind protection provided by the raised mound and vegetation will reduce evaporative losses. Greater depth of the pond and less surface area will also reduce evaporative losses. However, digging deeper than 5 meters will

increase the expense of the digging, and increase seepage loss due to increased water pressure on the ground. The pond should have an inlet and an outlet lined with rock to prevent erosion. These features will need to be linked into a larger drainage plan which directs water into the pond, and receives any overflow water. A small settling pit at the inlet will help remove silt, and can be more easily cleaned than the whole pond. The sides of the pond should be sloped for stability.



Excavated/dugout Farm Pond



Typical Farm Pond in Hilly Areas

### iii) Stabilization of Landslides/ Landslips

Severely eroded areas were identified in the free draining catchment area which needs to be stabilized. Some of the sites are under the active process of the slides and are rapidly extending to engulf forest land. Stabilization measures like check walls, protection/ retaining walls in wire crate will be undertaken in such areas. Besides these engineering measures, wherever required, grasses and shrubs will be planted. A total of 15 sites requiring stabilization have been identified to be treated under the CAT plan. Out of these, 12 sites fall in Karsog Forest Division and 3 sites fall in Kotgarh Forest Division. Dimensions of various engineering measures along with their cost to be implemented for stabilization of landslides/ landslips are given in **Table 6.2**.

### iv) Silt Monitoring Stations

For regular monitoring of silt load coming from nalas, one silt monitoring station has been suggested in Karsog forest division. Similarly, for monitoring of silt load coming from khads/ nalas, it is suggested to establish one silt monitoring lab. This would ensure monitoring efficacy of implementation various treatments measures suggested as in CAT plan. Monitoring would be undertaken for a period of 10 years. Cost towards this should be kept in project estimates and could be taken as below:

One hut at site @ Rs. 1,00,000/- – Rs. 1.00 lakh

Cost for hiring services of person (Average salary- Rs. 10,000/- per month for 10 years) = Rs. 12.00 lakh

Consumables for the measurement Rs. 0.20 lakh per year for next 10 years = 2.00 lakh

Total cost = **Rs. 15.00 lakh**

Some monitoring stations/ labs/ G&D stations of SJVN Ltd. and Bhakra Beas Management Board are available in the area, their service would be utilized for monitoring of silt load in river Satluj.

**Table 6.2: Description of Engineering Treatment Measures**

S. No.	Treatment Measure	Kind of Work	Length (m)	Width (m)	Height (m)	Unit	Rate (Rs)
1	Treatment of Nalas	Dry Stone Check Dams & Check Walls	3	1.5	1.5	Cum	7,700
			4	1.5	1.5	Cum	10,270
			5	1.5	1.5	Cum	12,290
			6	1.5	1.5	Cum	15,090
			7	1.5	1.5	Cum	17,420
		Wire Crate Check Dams & Check Walls	4	1.5	1.5	Cum	16,980
			5	1.5	1.5	Cum	20,130
			5	2	2.5	Cum	42,290
			6	1.5	1.5	Cum	23,840
			7	1.5	1.5	Cum	27,780
			7	2	2.5	Cum	57,150
			8	1.5	1.5	Cum	31,170
			10	1.5	1.5	Cum	38,580
			12	1.5	1.5	Cum	46,000
		15	1.5	1.5	Cum	57,040	
		20	1.5	1.5	Cum	75,480	
		Water Harvesting Structures	LS				
Farm Pond Big	LS					25,000	
Farm Pond Small	LS					10,000	
2	Landslides/ Landslips	Wire Crate Check Walls	4	1.5	1.5	Cum	16,980
			5	1.5	1.5	Cum	20,130
			10	1.5	1.5	Cum	38,580
			20	1.5	1.5	Cum	75,480
			30	2	2.5	Cum	2,29,550
		Wire Crate Retaining/ Protection Wall	6	1.5	1.5	Cum	52,950
			8	1.5	1.5	Cum	80,860
			10	1.5	2.5	Cum	85,380
			10	2	2.5	Cum	1,71,660
			12	2	2.5	Cum	2,04,080
			20	2	2.5	Cum	3,33,770

### 6.2.3 Specific treatment measures at different locations

Specific treatment measures at different locations in the Micro-Watershed have been described forest division wise. This includes general description of the area, activities proposed as treatment measures which include biological as well as engineering solutions. To aid visual observations, site photographs have been placed at relevant paragraphs.

## 6.3 KARSOG FOREST DIVISION

Free draining catchment area on the right bank of Satluj river falls under the jurisdiction of Karsog forest division. The area is covered by 20 beats (18 completely and 3 partially i.e. Telehan, Dhamun and Nanj) falling under 5 blocks of 3 ranges. The

geographical limit of division in the free draining catchment area is the right bank catchment area of Satluj river between the proposed dam site of Sunni Dam HEP i.e. near Marola village and proposed dam site of Luhri HEP Stage-II i.e. near Nanj village. The total free draining catchment area falling under Karsog forest division is **23,909.33 ha**. List of micro-watershed falling under different administrative unit of Karsog forest division is given at **Table 6.3**. A map showing micro-watershed falling under different administrative unit of Karsog forest division is given at **Figure 6.1**.

**Table 6.3: List of Micro-Watersheds in the CAT Plan area under Karsog Forest Division**

S. No.	Micro-Watershed	Micro-Watershed (as per CCP SRB)	Area (ha)	Name of Range	Name of Block	Name of Beat
1	1A2B1q3	Si1d	707.16	Pangna	Tattapani	Telehan
				Karsog	Bagsad	Parlog
2	1A2B1q4	Si1d	1099.94	Pangna	Tattapani	Telehan
				Karsog	Bagsad	Parlog, Mahunag
3	1A2B1q5	Si1e	965.78	Pangna	Tattapani	Telehan
				Karsog	Bagsad	Bagsad, Dharmour
4	1A2B1q6	Si1e	709.33	Karsog	Bagsad	Bagsad, Dharmour
5	1A2B1q7	Si1f	866.96	Karsog	Bagsad	Parlog
6	1A2B1q8	Si1f	599.75	Karsog	Bagsad	Parlog
7	1A2B1r1	Si2b	607.68	Karsog	Bagsad	Parlog, Mahunag
8	1A2B1r2	Si2b	760.94	Karsog	Bagsad	Mahunag
9	1A2B1r3	Si2c	900.51	Karsog	Bagsad	Mahunag, Sapnaut
10	1A2B1r4	Si2c	1067.33	Karsog	Bagsad	Sapnaut
				Karsog	Karsog	Kamand
11	1A2B1r5	Si2c	684.47	Karsog	Karsog	Kamand, Kakahan
12	1A2B1s1	Si2a	679.70	Seri	Seri	Niharinal
13	1A2B1s2	Si2a	806.77	Karsog	Mamail	Mehandi
				Seri	Seri	Niharinal
14	1A2B1s3	Si2d	1101.29	Karsog	Mamail	Mehandi, Kashol
15	1A2B1s4	Si2e	654.16	Karsog	Karsog	Kamand, Kakahan
16	1A2B1s5	Si2d	665.08	Karsog	Mamail	Banera, Kashol
17	1A2B1s6	Si2d	956.23	Karsog	Mamail	Banera, Kashol
18	1A2B1s7	Si2e	801.70	Karsog	Karsog	Kamand, Kakahan, Sanarli
19	1A2B1s8	Si2e	845.07	Karsog	Karsog	Kakahan, Sanarli
20	1A2B1t1	Si2g	689.90	Karsog	Karsog	Sanarli
21	1A2B1t2	Si2f	852.58	Karsog	Mamail	Mamail, Galiach
22	1A2B1t3	Si2h	731.42	Karsog	Mamail	Galiach
				Karsog	Karsog	Dofa
23	1A2B1t4	Si2h	1229.77	Karsog	Mamail	Galiach
				Karsog	Karsog	Dofa
24	1A2B1t5	Si2g	761.93	Karsog	Karsog	Sanarli, Dofa, Kanukhli
25	1A2B1t6*	Si2g	965.60	Karsog	Karsog	Kanukhli
26	1A2B1t7*	Si2g	785.70	Karsog	Karsog	Kanukhli, Shakar Dehra
27	1A2B1u1	Si3a	501.73	Seri	Seri	Niharinal
28	1A2B1u2	Si3a	728.89	Seri	Seri	Niharinal
29	1A2B1u3	Si3a	1074.68	Seri	Seri	Niharinal, Nanj, Dhamun
30	1A2B1u4	Si3b	704.37	Seri	Seri	Nanj, Dhamun

**\*Note: Part of Micro-Watersheds 1A2B1t6 and 1A2B1t7 falls in WL Kullu forest division also.**



Figure 6.1: Map Showing Micro-Watersheds and Forest Administrative Boundaries in the Karsog Forest Division under Free Draining Catchment Area

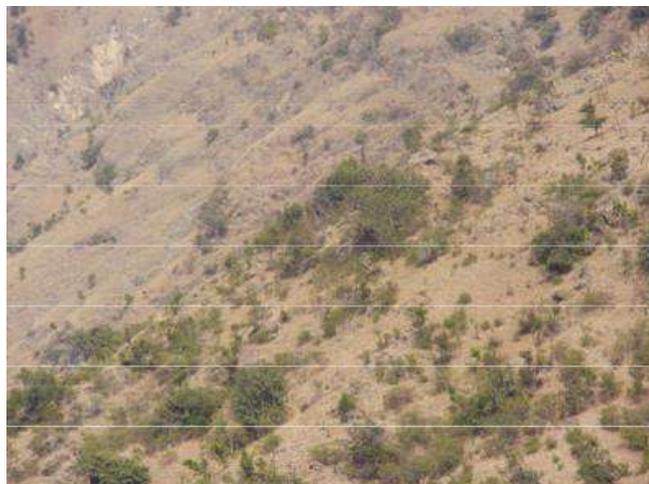
### 6.3.1 1A2B1q3 Micro-Watershed (Si1d as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
707.16	31°14'55.29" to 31°17'05.59"	77°11'12.42" to 77°13'13.48"	Southern	695 to 1870	Very High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Energy Plantation	Parlog	Parnot	31°16'44.54", 77°12'41.53"	1	1,20,690	1,20,690
<b>TOTAL</b>					<b>1</b>		<b>1,20,690</b>

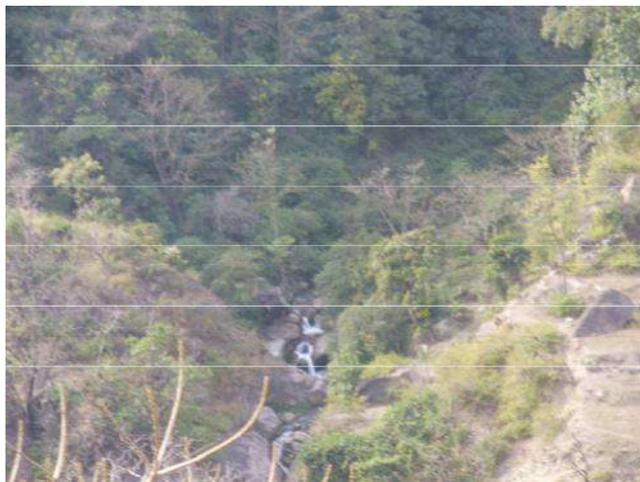


Parnot

#### II. Soil & Water Conservation Measures:

##### a) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Parlog	Chaklin Nala	31°15'22.93", 77°12'36.07"	Brushwood	Rmt	125	130	16,250
				Live Hedge	Rmt	750	20	15,000
				Check Dam Crate Wire	5x2x2.5m	2	42,290	84,580
				Check Dam Crate Wire	7x2x2.5m	2	57,150	1,14,300
2	Telehan	Guma Khad	31°15'24.97", 77°12'58.56"	Brushwood	Rmt	300	130	39,000
				Live Hedge	Rmt	1500	20	30,000
				Check Dam Crate Wire	5x2x2.5m	2	42,290	84,580
				Check Dam Crate Wire	7x2x2.5m	3	57,150	1,71,450
3	Telehan	Guma Nala		Water Harvesting Structure		1	LS	3,00,000
<b>TOTAL</b>								<b>8,55,160</b>



Guma Khad

## b) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Telehan	D-110 Ghawala	Farm Pond (Big)	No.	3	25,000	75,000
2	Telehan	D-106 Bhoura	Farm Pond (Small)	No.	1	10,000	10,000
3	Parlog	Dudhali	Farm Pond (Small)	No.	10	10,000	1,00,000
<b>TOTAL</b>							<b>1,85,000</b>

## SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	1,20,690.00
Soil & Water Conservation Measures	10,40,160.00
<b>TOTAL COST</b>	<b>11,60,850.00</b>

## 6.3.2 1A2B1q4 Micro-Watershed (Si1d as per CCP SRB)

## Location &amp; Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
1099.94	31°16'37.86" to 31°18'50.74"	77°10'26.88" to 77°13'31.51"	South East	1051 to 2185	High

## I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Mahunag	D124 Kalotha	31°18'4.04", 77°12'37.89"	3	1,41,740	4,25,220
2	Planting of Tall Plants	Telehan	D-106 Bhoura		3	1,21,860	3,65,580
<b>TOTAL</b>					<b>6</b>		<b>7,90,800</b>

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Mahunag	D124 Kalota	31°18'4.04", 77°12'37.89"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>				<b>3</b>			<b>600</b>		<b>37,200</b>

### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Telehan	D110 Ghavla Nala	31°17'17.44", 77°11'55.35"	Live Hedge	Rmt	950	20	19,000
				Brushwood	Rmt	150	130	19,500
				DRSM Check Dam	3x1.5x1.5m	15	7,700	1,15,500
				Check Dam Crate Wire	5x1.5x1.5m	10	20,130	2,01,300
				Check Dam Crate Wire	7x1.5x1.5m	3	27,780	83,340
2	Mahunag	Mahunag Nala	31°18'26.79", 77°12'46.84"	Live Hedge	Rmt	550	20	11,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	3x1.5x1.5m	6	7,700	46,200
3	Mahunag	Kalota Nala I	31°18'21.47", 77°12'27.70"	Live Hedge	Rmt	750	20	15,000
				Brushwood	Rmt	90	130	11,700
4	Mahunag	Kalota Nala II	31°18'24.79", 77°12'0.34"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	125	130	16,250
				DRSM Check Dam	3x1.5x1.5m	7	7,700	53,900
				Check Dam Crate Wire	5x1.5x1.5m	3	20,130	60,390
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
<b>TOTAL</b>								<b>7,05,860</b>

### c) Landslide and Slip Control Measures

S. No.	Name of Beat	Name of Location	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Mahunag	Road from Mahunag to Sartayala (1000 m)	Retaining Wall	10x1.5x1.5m	4	85,380	3,41,520
<b>TOTAL</b>							<b>3,41,520</b>



**Mahunag Nala**



**Kalota Nala**



**Road from Mahunag to Sartayala (1000 m)**

**c) Other Interventions**

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Mahunag	Kaloutha	Farm Pond (Small)	No.	2	10,000	20,000
<b>TOTAL</b>							<b>20,000</b>

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	7,90,800.00
Soil & Water Conservation Measures	11,04,580.00
<b>TOTAL COST</b>	<b>18,95,380.00</b>

### 6.3.3 1A2B1q5 Micro-Watershed (Site as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
965.78	31°17'11.85" to 31°19'43.75"	77°09'16.33" to 77°12'12.98"	South East	1381 to 1947	Low

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Bagsad	D111 Bagsad	31°17'54.63", 77°9'27.03"	10	93,650	9,36,500
2	Planting of Tall Plants	Bagsad	D113 Bagsad		2	1,21,860	2,43,720
<b>TOTAL</b>					<b>12</b>		<b>11,80,220</b>



D111 Bagsad

#### II. Soil & Water Conservation Measures:

##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Bagsad	D111 Bagsad	31°17'54.63", 77°9'27.03"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400
<b>TOTAL</b>				<b>10</b>			<b>1,200</b>		<b>74,400</b>

##### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Bagsad	D111 Bagsad-I Nala	31°17'55.93", 77°9'37.61"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	3x1.5x1.5m	5	7,700	38,500

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
2	Bagsad	Marol Nala	31°17'55.80", 77°9'49.79"	Live Hedge	Rmt	850	20	17,000
				Brushwood	Rmt	140	130	18,200
3	Bagsad	Gehra Nala	31°17'42.53", 77°9'58.58"	Live Hedge	Rmt	570	20	11,400
				Brushwood	Rmt	90	130	11,700
<b>TOTAL</b>								<b>1,21,800</b>



**D111 Bagsad-I Nala**



**Marol Nala**



**Gehra Nala**

**c) Other Interventions**

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Dharmour	Meharan	Farm Pond (Small)	No.	1	10,000	10,000
2	Bagsad	Bagsad	Farm Pond (Small)	No.	1	10,000	10,000
3	Bagsad	Shaungi	Farm Pond (Small)	No.	1	10,000	10,000
4	Bagsad	Sanogra	Farm Pond (Small)	No.	1	10,000	10,000
5	Bagsad	Timer	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>50,000</b>

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	11,80,220.00
Soil & Water Conservation Measures	2,46,200.00
<b>TOTAL COST</b>	<b>14,26,420.00</b>

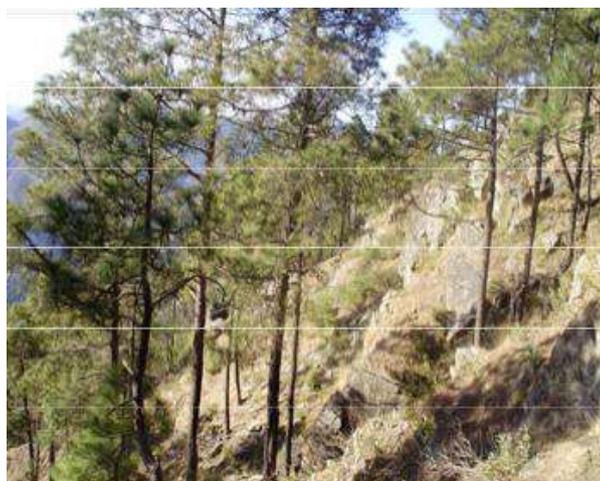
### 6.3.4 1A2B1q6 Micro-Watershed (Site as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
709.33	31°18'12.99" to 31°20'04.98"	77°08'42.65" to 77°10'38.50"	South East	1466 to 2003	Very Low

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Dharmour	Mehran	31°19'33.58", 77°10'29.62"	10	1,41,740	14,17,400
2	Planting of Tall Plants	Dharmour	D-118 Kot		2	1,21,860	2,43,720
3		Dharmour	D-119 Mehran		2	1,21,860	2,43,720
<b>TOTAL</b>					<b>14</b>		<b>19,04,840</b>



Mehran

#### II. Soil & Water Conservation Measures:

##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Dharmour	Mehran	31°19'33.58", 77°10'29.62"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400
<b>TOTAL</b>				<b>10</b>			<b>1,200</b>		<b>74,400</b>

##### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Bagsad	Ashwani Nala	31°18'42.10", 77°10'12.88"	Live Hedge	Rmt	900	20	18,000
				Brushwood	Rmt	150	130	19,500

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
				DRSM Check Dam	3x1.5x1.5m	5	7,700	38,500
				Check Dam Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
2	Bagsad	Khamaroo Nala (D112 Tholtu)	31°18'35.95", 77°9'57.67"	Live Hedge	Rmt	550	20	11,000
				Brushwood	Rmt	90	130	11,700
				DRSM Check Dam	3x1.5x1.5m	4	7,700	30,800
3	Dharmour	Mehran Nala	31°19'50.58", 77°10'2.32"	Live Hedge	Rmt	450	20	9,000
				Brushwood	Rmt	75	130	9,750
				DRSM Check Dam	3x1.5x1.5m	10	7,700	77,000
				Check Dam Crate Wire	5x1.5x1.5m	3	20,130	60,390
				Check Dam Crate Wire	7x1.5x1.5m	2	27,780	55,560
4	Dharmour	Shoja Nala	31°19'46.91", 77°9'37.38"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	100	130	13,000
				Check Dam Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
5	Dharmour	D116 Dharmour Nala	31°19'42.69", 77°9'15.29"	Live Hedge	Rmt	550	20	11,000
				Brushwood	Rmt	90	130	11,700
				DRSM Check Dam	3x1.5x1.5m	5	7,700	38,500
				Check Dam Crate Wire	5x1.5x1.5m	2	20,130	40,260
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
6	Dharmour	D117 Aliad Dharmour Nala	31°19'34.65", 77°8'54.57"	Live Hedge	Rmt	550	20	11,000
				Brushwood	Rmt	90	130	11,700
7	Dharmour	Kot Nala (D118 Kot)	31°19'48.13", 77°10'5.95"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	3x1.5x1.5m	2	7,700	15,400
				Check Dam Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
8	Dharmour	Thach Nala		Farm Pond (Small)		1	10,000	10,000
<b>TOTAL</b>								<b>7,12,270</b>



**Ashwani Nala**



**Khamaroo Nala (D112 Tholtu)**



**Mehran Nala**



**Shoja Nala**



**Kot Nala (D118 Kot)**



**D116 Dharmour Nala**



**D117 Aliad Dharmour Nala**

## c) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Dharmour	Thara	Farm Pond (Small)	No.	1	10,000	10,000
2	Dharmour	Chabera	Farm Pond (Small)	No.	1	10,000	10,000
3	Dharmour	Sojha	Farm Pond (Small)	No.	1	10,000	10,000
4	Dharmour	Kot	Farm Pond (Small)	No.	1	10,000	10,000
5	Dharmour	Near Temple Mashanu	Farm Pond (Small)	No.	1	10,000	10,000
6	Bagshad	Marol	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>60,000</b>

## SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	19,04,840.00
Soil & Water Conservation Measures	8,46,670.00
<b>TOTAL COST</b>	<b>27,51,510.00</b>

## 6.3.5 1A2B1q7 Micro-Watershed (Si1f as per CCP SRB)

## Location &amp; Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
866.96	31°14'59.10" to 31°17'45.87"	77°12'53.65" to 77°14'45.76"	Southern	696 to 2254	Very High

## I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Parlog	D130 Manju	31°16'47.58", 77°13'32.11"	7	1,41,740	9,92,180
2			D131 Parnaut	31°16'49.72", 77°13'18.87"	3	1,41,740	4,25,220
3			D132 Manju	31°16'16.97", 77°13'23.98"	3	1,41,740	4,25,220
4	Grazing Land Development	Parlog	D 131 Parnaut		3	1,20,690	3,62,070
<b>TOTAL</b>					<b>16</b>		<b>22,04,690</b>

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Parlog	D130 Manju	31°16'47.58", 77°13'32.11"	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
2		D131 Parnaut	31°16'49.72", 77°13'18.87"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
3		D132 Manju	31°16'16.97", 77°13'23.98"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>				<b>13</b>			<b>2,200</b>		<b>1,36,400</b>

### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Parlog	Manju Nala	31°16'59.05", 77°13'37.26"	Live Hedge	Rmt	200	20	4,000
				Brushwood	Rmt	75	130	9,750
				DRSM Check Dam	3x1.5x1.5m	3	7,700	23,100
				Check Dam Crate Wire	5x1.5x1.5m	2	20,130	40,260
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
				Water Harvesting Structure		1	3,00,000	3,00,000
2	Parlog	Balu Nala		Farm Pond (Small)		1	10,000	10,000
<b>TOTAL</b>								<b>4,14,890</b>

### c) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Parlog	Parnot	Water Harvesting Structure	No.	1	3,00,000	3,00,000
2	Parlog	Manju	Farm Pond (Big)	No.	1	25,000	25,000
3	Parlog	Kashout	Farm Pond (Small)	No.	1	10,000	10,000
4	Parlog	Duru	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>3,45,000</b>

## SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	22,04,690.00
Soil & Water Conservation Measures	8,96,290.00
<b>TOTAL COST</b>	<b>31,00,980.00</b>

**6.3.6 1A2B1q8 Micro-Watershed (Si1f as per CCP SRB)**

**Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
599.75	31°15'3.08" to 31°17'3.36"	77°14'33.83" to 77°17'10.21"	South to South East	696 to 1879	Very High

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Parlog	D135 Phaphan	31°16'12.39", 77°15'43.10"	7	1,41,740	9,92,180
2			D134 Magan	31°15'51.07", 77°15'21.66"	3	1,41,740	4,25,220
3			D126 Kashaut	31°16'24.21", 77°14'46.66"	7	1,41,740	9,92,180
4			Parlog	31°16'6.64", 77°16'57.75"	10	1,41,740	14,17,400
<b>TOTAL</b>					<b>27</b>		<b>38,26,980</b>



**Phaphan D135**



**D134 Magan**



**D126 Kashaut**

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Parlog	D135 Phaphan	31°16'12.39", 77°15'43.10"	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
2		D134 Magan	31°15'51.07", 77°15'21.66"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
3		D126 Kashaut	31°16'24.21", 77°14'46.66"	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
4		Parlog	31°16'6.64", 77°16'57.75"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400
<b>TOTAL</b>				<b>27</b>			<b>3,800</b>		<b>2,35,600</b>

### b) Drainage Line Treatment

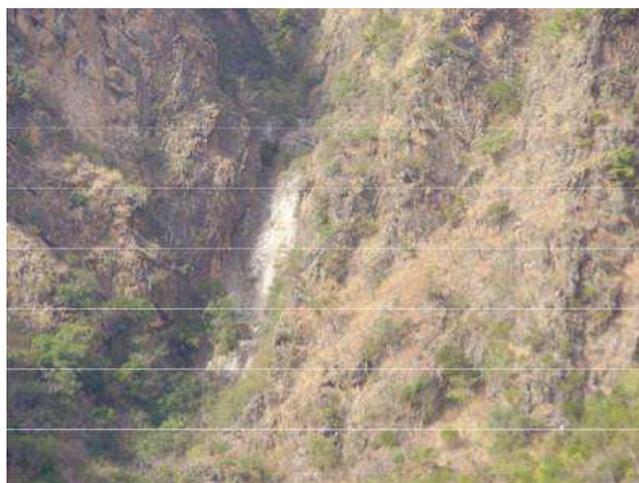
S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Parlog	Magan Nala	31°15'48.64", 77°15'12.48"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	3x1.5x1.5m	4	7,700	30,800
				Check Dam Crate Wire	5x1.5x1.5m	2	20,130	40,260
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
2	Parlog	Phapan Nala	31°16'9.98", 77°15'58.07"	Live Hedge	Rmt	200	20	4,000
				Brushwood	Rmt	40	130	5,200
				DRSM Check Dam	3x1.5x1.5m	5	7,700	38,500
				Check Dam Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
3	Parlog	Parlog Nala	31°16'22.05", 77°16'27.94"	Live Hedge	Rmt	400	20	8,000
				Brushwood	Rmt	75	130	9,750
				DRSM Check Dam	3x1.5x1.5m	5	7,700	38,500
				Check Dam Crate Wire	5x1.5x1.5m	2	20,130	40,260
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
4	Parlog	Glade Nala	31°15'54.93", 77°15'28.85"	Live Hedge	Rmt	400	20	8,000
				Brushwood	Rmt	75	130	9,750
				DRSM Check Dam	3x1.5x1.5m	2	7,700	15,400
				Check Dam Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
<b>TOTAL</b>								<b>4,24,800</b>



**Parlog Nala**



**Phaphan Nala**



**Glade Nala**

**c) Other Interventions**

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Parlog	Magan	Farm Pond (Big)	No.	1	25,000	25,000
2	Parlog	Fafan	Farm Pond (Big)	No.	1	25,000	25,000
3	Parlog	Galeda	Farm Pond (Small)	No.	1	10,000	10,000
4	Parlog	Hiru	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>70,000</b>

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	38,26,980.00
Soil & Water Conservation Measures	7,30,400.00
<b>TOTAL COST</b>	<b>45,57,380.00</b>

### 6.3.7 1A2B1r1 Micro-Watershed (Si2b as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
607.68	31°15'53.48" to 31°18'11.56"	77°14'16.43" to 77°17'7.93"	North East to Eastern	698 to 2242	High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

#### II. Soil & Water Conservation Measures:

##### a) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Mahunag	Chaloni Nala	31°17'16.11", 77°14'39.72"	Live Hedge	Rmt	550	20	11,000
				Brushwood	Rmt	90	130	11,700
				DRSM Check Dam	3x1.5x1.5m	3	7,700	23,100
				Check Dam	5x1.5x1.5m	1	20,130	20,130
				Crate Wire	7x1.5x1.5m	1	27,780	27,780
<b>TOTAL</b>								<b>93,710</b>



Chaloni Nala

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	93,710.00
<b>TOTAL COST</b>	<b>93,710.00</b>

**6.3.8 1A2B1r2 Micro-Watershed (Si2b as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
760.94	31°17'21.85" to 31°19'18.60"	77°12'59.94" to 77°15'40.28"	North East	995 to 2251	Medium

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Mahunag	Bagh Bakri	31°18'18.25", 77°13'15.24"	10	93,650	9,36,500
2			Nagaltha	31°18'12.85", 77°13'25.28"	10	93,650	9,36,500
3	Planting of Tall Plants	Mahunag	Bagh Bakri C1c		2	1,21,860	2,43,720
<b>TOTAL</b>					<b>22</b>		<b>21,16,720</b>



Bag Bakhri



Nagaltha

**II. Soil & Water Conservation Measures:****a) Moisture Retention Measures**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Mahunag	Bagh Bakri	31°18'18.25", 77°13'15.24"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
2		Nagaltha	31°18'12.85", 77°13'25.28"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400
<b>TOTAL</b>				<b>20</b>			<b>2,400</b>		<b>1,48,800</b>

### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Mahunag	Sartayala Nala	31°18'13.29", 77°13'17.90"	Live Hedge	Rmt	550	20	11,000
				Brushwood	Rmt	90	130	11,700
				Check Dam Crate Wire	5x1.5x1.5m	5	20,130	1,00,650
2	Mahunag	Tatmo Nala	31°18'29.09", 77°13'30.43"	Live Hedge	Rmt	550	20	11,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	3x1.5x1.5m	5	7,700	38,500
				Check Dam Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
3	Mahunag	Nagaltha Nala	31°18'1.19", 77°13'25.01"	Live Hedge	Rmt	750	20	15,000
				Brushwood	Rmt	125	130	16,250
				DRSM Check Dam	3x1.5x1.5m	4	7,700	30,800
				Check Dam Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
<b>TOTAL</b>								<b>3,43,720</b>



**Tatmo Nala**



**Nagaltha Nala**

## c) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Mahunag	Nagaltha	Farm Pond (Small)	No.	2	10,000	20,000
2	Mahunag	Bag Bakhari	Farm Pond (Small)	No.	2	10,000	20,000
<b>TOTAL</b>							<b>40,000</b>

## SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	21,16,720.00
Soil & Water Conservation Measures	5,32,520.00
<b>TOTAL COST</b>	<b>26,49,240.00</b>

## 6.3.9 1A2B1r3 Micro-Watershed (Si2c as per CCP SRB)

## Location &amp; Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
900.51	31°18'20.25" to 31°20'25.02"	77°11'33.61" to 77°14'37.64"	North to North East	1042 to 1914	Low

## I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Sapnot	Odda	31°19'1.31", 77°12'15.57"	3	93,650	2,80,950
2	Planting of Tall Plants	Sapnot	D139 Odda		2	1,21,860	2,43,720
<b>TOTAL</b>					<b>5</b>		<b>5,24,670</b>



Odda

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Sapnot	Odda	31°19'1.31", 77°12'15.57"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>				<b>3</b>			<b>600</b>		<b>37,200</b>

### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Sapnaut	Kaitho Nala	31°19'14.19", 77°12'12.74"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	3x1.5x1.5m	8	7,700	61,600
				Check Dam Crate Wire	5x1.5x1.5m	3	20,130	60,390
				Check Dam Crate Wire	7x1.5x1.5m	2	27,780	55,560
2	Mahunag	Shaindhel Nala	31°18'51.44", 77°13'21.75"	Live Hedge	Rmt	500	20	11,000
				Brushwood	Rmt	90	130	11,700
				DRSM Check Dam	3x1.5x1.5m	5	7,700	38,500
				Check Dam Crate Wire	5x1.5x1.5m	2	20,130	40,260
				Check Dam Crate Wire	7x1.5x1.5m	2	27,780	55,560
<b>TOTAL</b>								<b>3,58,570</b>



Shaindhel Nala

## c) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Sapnot	Balaso	Farm Pond (Small)	No.	1	10,000	10,000
2	Sapnot	Thangar	Farm Pond (Small)	No.	2	10,000	20,000
3	Sapnot	Odda	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>40,000</b>

## SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	5,24,670.00
Soil & Water Conservation Measures	4,35,770.00
<b>TOTAL COST</b>	<b>9,60,440.00</b>

## 6.3.10 1A2B1r4 Micro-Watershed (Si2c as per CCP SRB)

## Location &amp; Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
1067.33	31°19'14.12" to 31°21'49.20"	77°09'30.93" to 77°11'58.70"	South East	1313 to 1974	Low

## I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Kamand	D149 Chandu	31°20'51.45", 77°9'41.53"	3	1,41,740	4,25,220
2		Kamand	D150 Jhaoparala	31°21'38.38", 77°9'43.32"	3	1,41,740	4,25,220
<b>TOTAL</b>					<b>6</b>		<b>8,50,440</b>



D149 Chandu



D150 Jhaoparala

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Kamand	D149 Chandu	31°20'51.45", 77°9'41.53"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
2	Kamand	D150 Jhaoparala	31°21'38.38", 77°9'43.32"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>				<b>6</b>			<b>1,200</b>		<b>74,400</b>

### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Sapnaut	Dech Nala	31°19'48.87", 77°10'50.90"	Live Hedge	Rmt	550	20	11,000
				Brushwood	Rmt	90	130	11,700
				DRSM Check Dam	3x1.5x1.5m	4	7,700	30,800
				Check Dam Crate Wire	5x1.5x1.5m	2	20,130	40,260
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
2	Sapnaut	Bilaso Nala	31°19'40.93", 77°11'24.42"	Live Hedge	Rmt	750	20	15,000
				Brushwood	Rmt	125	130	16,250
				DRSM Check Dam	3x1.5x1.5m	2	7,700	15,400
				Check Dam Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
3	Sapnaut	Jagodi Nala	31°19'57.28", 77°11'23.42"	Live Hedge	Rmt	400	20	8,000
				Brushwood	Rmt	70	130	9,100
				DRSM Check Dam	3x1.5x1.5m	3	7,700	23,100
				Check Dam Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
4	Sapnaut	Kashmir Nala	31°20'1.85", 77°10'48.67"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	125	130	16,250
				DRSM Check Dam	3x1.5x1.5m	5	7,700	38,500
				Check Dam Crate Wire	5x1.5x1.5m	2	20,130	40,260
5	Kamand	Patlu Nala		Live Hedge	Rmt	700	20	14,000
				Brushwood	Rmt	120	130	15,600
				DRSM Check Dam	5x1.5x1.5m	5	12,290	61,450
6	Kamand	Chandu Nala		DRSM Check Dam	10x1.5x1.5m	5	12,290	61,450
<b>TOTAL</b>								<b>5,61,720</b>



**Dech Nala**



**Bilaso Nala**



**Jagodi Nala**



**Kashmir Nala**



**Patlu Nala**

**c) Other Interventions**

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Kamand	D150 Jhaoparala	Farm Pond (Big)	No.	1	25,000	25,000

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
2	Sapnot	Kandlu	Farm Pond (Small)	No.	1	10,000	10,000
3	Sapnot	Kashmir	Farm Pond (Small)	No.	1	10,000	10,000
4	Kamand	Marandi	Farm Pond (Small)	No.	1	10,000	10,000
5	Kamand	Kanda	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>65,000</b>

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	8,50,440.00
Soil & Water Conservation Measures	7,01,120.00
<b>TOTAL COST</b>	<b>15,51,560.00</b>

**6.3.11 1A2B1r5 Micro-Watershed (Si2c as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
684.47	31°19'9.77" to 31°22'18.16"	77°10'41.11" to 77°14'31.13"	South to South West	1045 to 2013	Medium

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Kamand	D152 Marandi Kamand	31°21'14.78", 77°11'28.73"	3	1,41,740	4,25,220
2		Kamand	D153 Dhanout	31°21'4.67", 77°11'55.84"	2	1,41,740	2,83,480
3		Kamand	D155 Batahali	31°19'49.43", 77°13'14.72"	2	1,41,740	2,83,480
4		Kamand	D156 Kanda	31°19'38.67", 77°14'7.42"	3	1,41,740	4,25,220
5		Kamand	D157 Kanda	31°19'39.27", 77°13'59.99"	5	1,41,740	7,08,700
<b>TOTAL</b>					<b>15</b>		<b>21,26,100</b>



**D152 Marandi**



**D153 Dhanout**



**D155 Batahali**



**D156 Kanda**



**D157 Kanda**

**II. Soil & Water Conservation Measures:**

**a) Moisture Retention Measures**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Kamand	D152 Marandi Kamand	31°21'14.78", 77°11'28.73"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
2	Kamand	D153 Dhanout	31°21'4.67", 77°11'55.84"	2	Staggered Trenches	1x0.3x0.3	400	62	24,800
3	Kamand	D155 Batahali	31°19'49.43", 77°13'14.72"	2	Staggered Trenches	1x0.3x0.3	400	62	24,800
4	Kamand	D156 Kanda	31°19'38.67", 77°14'7.42"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
5	Kamand	D157 Kanda	31°19'39.27", 77°13'59.99"	5	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
<b>TOTAL</b>				<b>15</b>			<b>3,000</b>		<b>1,86,000</b>

## b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Kakahana	Kangar Nala	31°21'42.67", 77°11'5.82"	Live Hedge	Rmt	500	20	10,000
				DRSM Check Dam	3x1.5x1.5m	2	7,700	15,400
				Check Dam Crate Wire	5x1.5x1.5m	3	20,130	60,390
2	Kamand	Jhunjhroo Nala	31°19'40.49", 77°13'49.63"	Live Hedge	Rmt	1000	20	20,000
				Brushwood	Rmt	250	130	32,500
				DRSM Check Dam	5x1.5x1.5m	5	12,290	61,450
3	Kamand	Shenash Nala	31°19'46.98", 77°13'27.44"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	250	130	32,500
				DRSM Check Dam	5x1.5x1.5m	5	12,290	61,450
4	Kamand	Batali Nala	31°19'50.62", 77°13'16.98"	Live Hedge	Rmt	400	20	8,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	5x1.5x1.5m	4	12,290	49,160
5	Kamand	Dharta Nala	31°18'35.95", 77°9'57.67"	Live Hedge	Rmt	350	20	7,000
				Brushwood	Rmt	120	130	15,600
				DRSM Check Dam	5x1.5x1.5m	4	12,290	49,160
6	Kamand	Ghaned Nala	31°21'16.98", 77°11'31.89"	Live Hedge	Rmt	400	20	8,000
				Brushwood	Rmt	120	130	15,600
				Check Dam Crate Wire	5x1.5x1.5m	3	20,130	60,390
				Check Wall Crate Wire	7x1.5x1.5m	3	27,780	83,340
								<b>6,14,940</b>



Kangar Nala



Jhunjhroo Nala



Shenash Nala



Batali Nala



Ghaned Nala

### c) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Kamand	Kufridhar	Farm Pond (Small)	No.	1	10,000	10,000
2	Kamand	Chalouni	Farm Pond (Small)	No.	1	10,000	10,000
3	Kamand	Kot	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>30,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	21,26,100.00
Soil & Water Conservation Measures	8,30,940.00
<b>TOTAL COST</b>	<b>29,57,040.00</b>

### 6.3.12 1A2B1s1 Micro-Watershed (Si2a as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
679.70	31°15'57.70" to 31°18'06.16"	77°15'38.86" to 77°17'49.77"	Western	711 to 2077	Very High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Grazing Land Development	Niharinal	Baraula	31°16'11.05", 77°17'12.98"	2	1,20,690	2,41,380
<b>TOTAL</b>					<b>2</b>		<b>2,41,380</b>



Baraula

#### II. Soil & Water Conservation Measures:

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
NIL									

#### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	2,41,380.00
Soil & Water Conservation Measures	0.00
<b>TOTAL COST</b>	<b>2,41,380.00</b>

### 6.3.13 1A2B1s2 Micro-Watershed (Si2a as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
806.77	31°17'51.10" to 31°19'55.82"	77°14'41.18" to 77°17'40.27"	Western	995 to 2520	High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

#### II. Soil & Water Conservation Measures:

##### a) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Niharinal	Sinhaj Nala	31°19'27.79", 77°16'57.44"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	300	130	39,000
				DRSM Check Dam	5x1.5x1.5m	11	12290	1,35,190
				Check Dam Crate Wire	6x1.5x1.5m	9	23840	2,14,560
2	Mehandi	Bakhroh Nala		Water Harvesting Structure		1	3,00,000	3,00,000
<b>TOTAL</b>								<b>7,00,750</b>



Sinhaj Nala

**SUMMARY OF COST:**

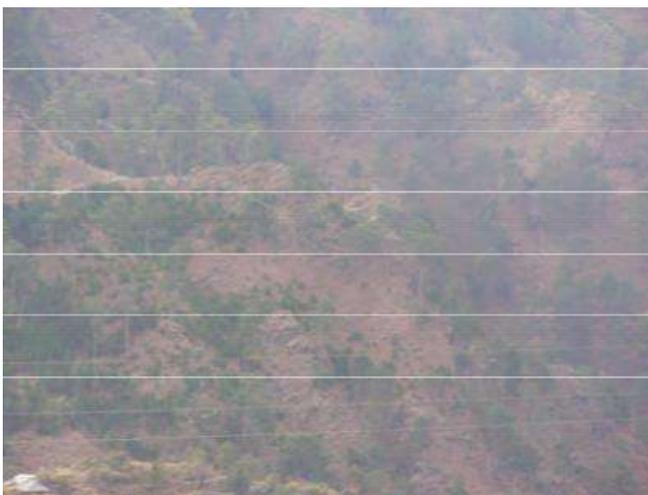
Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	7,00,750.00
<b>TOTAL COST</b>	<b>7,00,750.00</b>

**6.3.14 1A2B1s3 Micro-Watershed (Si2d as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
1101.29	31°18'51.10" to 31°19'55.82"	77°14'41.18" to 77°17'40.27"	Western	1045 to 2516	High

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Mehandi	Majuhad	31°19'22.63", 77°15'28.43"	7	93,650	6,55,550
2		Mehandi	Thach	31°20'8.67", 77°16'7.76"	7	93,650	6,55,550
3	Energy Plantation	Mehandi	Mehandi		1	1,20,690	1,20,690
4	Planting of Tall Plants	Mehandi	D202 Prala Dharthu		2	1,21,860	2,43,720
5		Mehandi	D204 Shanahu		2	1,21,860	2,43,720
<b>TOTAL</b>					<b>19</b>		<b>19,19,230</b>

**Majuhad****Thach**

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Mehandi	Majuhad	31°19'22.63", 77°15'28.43"	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
2	Mehandi	Thach	31°20'8.67", 77°16'7.76"	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
<b>TOTAL</b>				<b>14</b>			<b>2,000</b>		<b>1,24,000</b>

### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Kashol	Banach Nala	31°20'26.97", 77°16'3.47"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	175	130	22,750
				DRSM Check Wall	4x1.5x1.5m	3	10,270	30,810
				Check Wall Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
2	Kashol	Kandi Nala	31°20'43.04", 77°16'14.82"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	160	130	20,800
				DRSM Check Wall	4x1.5x1.5m	3	10,270	30,810
				Check Wall Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
3	Kashol	Rasog Nala	31°20'37.06", 77°16'21.39"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	100	130	13,000
4	Mehandi	Tharmi Nala	31°16'38.97", 77°19'52.13"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	250	130	32,500
				DRSM Check Wall	4x1.5x1.5m	4	10,270	41,080
				Check Wall Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
				Water Harvesting Structure		1	3,00,000	3,00,000
				Farm Pond (Small)		1	10,000	10,000
5	Mehandi	Gajiya Nala	31°19'41.32", 77°16'9.83"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				DRSM Check Wall	4x1.5x1.5m	2	10,270	20,540

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
				Check Wall Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
<b>TOTAL</b>								<b>7,54,670</b>



Gajiya Nala



Banach Nala



Kandi Nala



Rasog Nala

### c) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Mehandi	Majhod	Farm Pond (Big)	No.	1	25,000	25,000
2	Kashol	Batoni	Farm Pond (Small)	No.	1	10,000	10,000
3	Kashol	Thanda Pani	Farm Pond (Small)	No.	1	10,000	10,000
4	Kashol	Kelobir	Farm Pond (Small)	No.	1	10,000	10,000
5	Kashol	Satarthani	Farm Pond (Small)	No.	1	10,000	10,000
6	Mehandi	Ghandhoi	Farm Pond (Small)	No.	1	10,000	10,000
7	Mehandi	Majhod	Farm Pond (Small)	No.	2	10,000	20,000
8	Mehandi	Serti	Farm Pond (Small)	No.	1	10,000	10,000
9	Mehandi	Parala Dharthu	Farm Pond (Small)	No.	1	10,000	10,000
10	Mehandi	Mehandi	Farm Pond (Small)	No.	1	10,000	10,000
11	Mehandi	Shanahu	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>1,35,000</b>

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	19,19,230.00
Soil & Water Conservation Measures	10,13,670.00
<b>TOTAL COST</b>	<b>29,32,900.00</b>

**6.3.15 1A2B1s4 Micro-Watershed (Size as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
654.16	31°19'12.78" to 31°21'31.44"	77°11'57.15" to 77°14'48.86"	North East to East	1045 to 1687	Medium

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Kamand	D148 Karyani	31°19'59.76", 77°13'56.21"	6	1,41,740	8,50,440
2		Kamand	D158 Kufri Dhar	31°20'21.60", 77°13'53.40"	3	1,41,740	4,25,220
<b>TOTAL</b>					<b>9</b>		<b>12,75,660</b>



D148 Karyani



D158 Kufri Dhar

**II. Soil & Water Conservation Measures:****a) Moisture Retention Measures**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Kamand	D148 Karyani	31°19'59.76", 77°13'56.21"	6	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
2	Kamand	D158 Kufri Dhar	31°20'21.60", 77°13'53.40"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>				<b>9</b>			<b>1,600</b>		<b>99,200</b>

**b) Drainage Line Treatment**

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Kamand	Dugha Nala	31°20'5.46", 77°14'4.2"	Live Hedge	Rmt	450	20	9,000
				Brushwood	Rmt	120	130	15,600
				DRSM Check Dam	5x1.5x1.5m	5	12,290	61,450
				Water Harvesting Structure		1	3,00,000	3,00,000
								<b>3,86,050</b>

**Dugha Nala****c) Other Interventions**

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Kamand	Karyani	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>10,000</b>

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	12,75,660.00
Soil & Water Conservation Measures	4,95,250.00
<b>TOTAL COST</b>	<b>17,70,910.00</b>

### 6.3.16 1A2B1s5 Micro-Watershed (Si2d as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
665.08	31°20'3.50" to 31°21'50.40"	77°13'55.50" to 77°16'7.71"	Northern to Western	1138 to 2078	High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Energy Plantation	Kashol	Kashol	1	1,20,690	1,20,690
<b>TOTAL</b>				<b>1</b>		<b>1,20,690</b>

#### II. Soil & Water Conservation Measures:

##### a) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Kashol	Kundli Nala	31°21'14.45", 77°15'35.06"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				Check Wall Crate Wire	5x1.5x1.5m	2	20,130	40,260
				Check Wall Crate Wire	6x1.5x1.5m	3	23,840	71,520
								<b>1,24,280</b>

##### b) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Kashol	Jabla	Farm Pond Big)	No.	1	25,000	25,000
2	Kashol	Bajh	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>35,000</b>

#### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	1,20,690.00
Soil & Water Conservation Measures	1,59,280.00
<b>TOTAL COST</b>	<b>2,79,970.00</b>

**6.3.17 1A2B1s6 Micro-Watershed (Si2d as per CCP SRB)**

**Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
956.23	31°20'45.86" to 31°22'51.72"	77°13'12.99" to 77°16'38.11"	West to Southern	1201 to 2289	Medium

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Banera	Kelodhar	31°22'13.02", 77°16'1.62"	10	93,650	9,36,500
2		Kashol	Kandi-I	31°21'21.32", 77°16'22.16"	3	93,650	2,80,950
3		Kashol	Kandi-II	31°21'6.11", 77°16'19.80"	3	93,650	2,80,950
4		Kashol	Kandi-III	31°20'56.36", 77°16'17.75"	3	93,650	2,80,950
5	Grazing Land Development	Banera	Banera	31°16'8.37", 77°16'50.35"	2	1,20,690	2,41,380
6	Energy Plantation	Banera	Banera		1	1,20,690	1,20,690
<b>TOTAL</b>					<b>22</b>		<b>21,41,420</b>



**Kelodhar**



**Kandi-I**



**Kandi-II**



**Kandi-III**



Banera

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Banera	Kelodhar	31°22'13.02", 77°16'1.62"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400
2	Kashol	Kandi-I	31°21'21.32", 77°16'22.16"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
3	Kashol	Kandi-II	31°21'6.11", 77°16'19.80"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
4	Kashol	Kandi-III	31°20'56.36", 77°16'17.75"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>				<b>19</b>			<b>3,000</b>		<b>1,86,000</b>

### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Banera	Halni Nala	31°22'16.78", 77°14'59.86"	Live Hedge	Rmt	400	20	8,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Wall	4x1.5x1.5m	5	10,270	51,350
				Check Wall Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
2	Banera	Kotlu Nala	31°22'11.74", 77°15'3.23"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	90	130	11,700
				DRSM Check Wall	4x1.5x1.5m	3	10,270	30,810
				Check Wall Crate Wire	5x1.5x1.5m	1	20,130	20,130
3	Banera	Shao Nala	31°21'41.96", 77°15'39.51"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				DRSM	3x1.5x1.5m	4	7,700	30,800

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
				Check Dam				
				Check Wall Crate Wire	4x1.5x1.5m	1	16,980	16,980
4	Banera	Narayanabali Nala	31°22'24.10", 77°14'19.81"	Live Hedge	Rmt	450	20	9,000
				Brushwood	Rmt	50	130	6,500
				Check Wall Crate Wire	5x1.5x1.5m	2	20,130	40,260
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
5	Banera	Saranda Nala	31°21'50.35", 77°16'16.20"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	75	130	9,750
				Check Wall Crate Wire	4x1.5x1.5m	5	16,980	51,350
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
6	Banera	Kubshan Nala		Check Wall Crate Wire	4x1.5x1.5m	3	16,980	50,940
				Check Wall Crate Wire	6x1.5x1.5m	2	23,840	47,680
<b>TOTAL</b>								<b>5,18,400</b>



Halni Nala



Kotlu Nala



Shao Nala



Narayanabali Nala



Saranda Nala



Kubshan Nala

### c) Landslide and Slip Control Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Banera	Kotlu Village (100 m)	31°22'18.13", 77°15'41.4"	Check Wall Crate Wire	4x1.5x1.5m	12	16,980	2,03,760
				Check Wall Crate Wire	5x1.5x1.5m	10	20,130	2,01,300
<b>TOTAL</b>						<b>22</b>		<b>4,05,060</b>

### d) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Banera	Bagain	Farm Pond (Big)	No.	1	25,000	25,000
2	Banera	Bagain	Farm Pond (Small)	No.	1	10,000	10,000
3	Banera	Ghdhel	Farm Pond (Small)	No.	1	10,000	10,000
4	Banera	Shao	Farm Pond (Small)	No.	2	10,000	20,000
5	Banera	Kotlu	Farm Pond (Small)	No.	1	10,000	10,000
6	Banera	Chalog	Farm Pond (Small)	No.	1	10,000	10,000
7	Banera	Khaduna	Farm Pond (Small)	No.	2	10,000	20,000
<b>TOTAL</b>							<b>1,05,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	21,41,420.00
Soil & Water Conservation Measures	12,14,460.00
<b>TOTAL COST</b>	<b>33,55,880.00</b>

**6.3.18 1A2B1s7 Micro-Watershed (Si2e as per CCP SRB)**

**Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
801.70	31°21'11.11" to 31°23'15.27"	77°11'11.53" to 77°13'37.03"	North East	1218 to 1814	Low

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Kakahan	Kanjol	31°21'52.17", 77°11'40.81"	2	1,41,740	2,83,480
2	Enrichment	Kakahan	Kalanhi	31°22'27.07", 77°11'52.69"	3	93,650	2,80,950
3		Kakahan	Kanjol-I	31°22'9.65", 77°11'52.81"	3	93,650	2,80,950
4		Kakahan	Kanjol-II	31°21'59.63", 77°12'5.89"	3	93,650	2,80,950
5	Energy Plantation	Kakahan	Kakahan		1	1,20,690	1,20,690
<b>TOTAL</b>					<b>12</b>		<b>12,47,020</b>



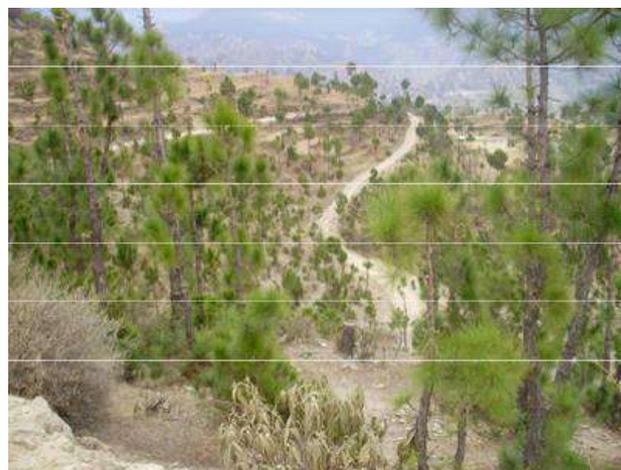
**Kanjol**



**Kalanhi**



**Kanjol - I**



**Kanjol - II**

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Kakahān	Kanjol	31°21'52.17", 77°11'40.81"	2	Staggered Trenches	1x0.3x0.3	400	62	24,800
2	Kakahān	Kalanhi	31°22'27.07", 77°11'52.69"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
3	Kakahān	Kanjol-I	31°22'9.65", 77°11'52.81"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
4	Kakahān	Kanjol-II	31°21'59.63", 77°12'5.89"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>				<b>11</b>			<b>2,200</b>		<b>1,36,400</b>

### b) Landslide and Slip Control Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Kakahān	Shalag Road (30 m)		Retaining Wall	10x2x2.5m	1	1,71,660	1,71,660
				Retaining Wall	20x2x2.5m	1	3,33,770	3,33,770
2	Kakahān	Kakahān (10x3 m)	31°22'34.55", 77°12'6.96"	Check Wall Crate Wire	5x1.5x1.5m	2	20,130	40,260
3	Kakahān	Chaloug (30x10 m)	31°22'19.46", 77°12'0.30"	Check Wall Crate Wire	30x2x2.5m	1	2,29,550	2,29,550
<b>TOTAL</b>						<b>4</b>		<b>7,75,240</b>

### c) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Kakahān	Chakranth	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>10,000</b>

## SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	12,47,020.00
Soil & Water Conservation Measures	9,21,640.00
<b>TOTAL COST</b>	<b>21,68,660.00</b>

### 6.3.19 1A2B1s8 Micro-Watershed (Si2e as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
845.07	31°22'1.98" to 31°24'52.20"	77°10'27.05" to 77°12'7.05"	South East	1376 to 2343	Medium

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Sanarli	D167 Baju	31°24'14.70", 77°10'40.79"	7	93,650	6,55,550
<b>TOTAL</b>					<b>7</b>		<b>6,55,550</b>



D167 Baju

#### II. Soil & Water Conservation Measures:

##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Sanarli	D167 Baju	31°24'14.70", 77°10'40.79"	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
<b>TOTAL</b>				<b>7</b>			<b>1,000</b>		<b>62,000</b>

##### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Sanarli	Kanshali Nala	31°24'1.30", 77°10'41.68"	Live Hedge	Rmt	700	20	14,000
				Brushwood	Rmt	500	130	65,000
				DRSM Check Wall	5x1.5x1.5m	4	12,290	49,160
				Check Wall Crate Wire	6x1.5x1.5m	3	23,840	71,520

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
2	Sanarli	Sharkol Nala	31°24'5.78", 77°11'3.21"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	150	130	19,500
				DRSM Check Dam	5x1.5x1.5m	5	12,290	61,450
				Check Dam Crate Wire	6x1.5x1.5m	3	23,840	71,520
				Check Dam Crate Wire	8x1.5x1.5m	1	31,170	31,170
3	Kakahan	Maing Nala	31°22'40.59", 77°11'6.67"	Live Hedge	Rmt	1,000	20	20,000
				Brushwood	Rmt	300	130	39,000
				DRSM Check Dam	3x1.5x1.5m	2	7,700	15,400
				Check Dam Crate Wire	5x1.5x1.5m	4	20,130	80,520
4	Kakahan	Badaila Nala	31°22'47.28", 77°11'5.50"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	350	130	45,500
				DRSM Check Dam	3x1.5x1.5m	2	7,700	15,400
				Check Dam Crate Wire	5x1.5x1.5m	3	20,130	60,390
5	Kakahan	Majhar Nala	31°22'21.69", 77°10'59.77"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	250	130	32,500
				DRSM Check Dam	3x1.5x1.5m	3	7,700	23,100
				Check Dam Crate Wire	5x1.5x1.5m	2	20,130	40,260
6	Kakahan	Khaneri Nala	31°22'53.48", 77°10'52.68"	Live Hedge	Rmt	400	20	8,000
				Brushwood	Rmt	150	130	19,500
				DRSM Check Dam	3x1.5x1.5m	3	7,700	23,100
				Check Dam Crate Wire	5x1.5x1.5m	2	20,130	40,260
<b>TOTAL</b>								<b>8,82,250</b>



Kanshali Nala



Sharkol Nala



Maing Nala

Badaila Nala

Majhar Nala

Khaneri Nala

### c) Landslide and Slip Control Measures

S. No.	Name of Beat	Name of Location	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Kakahan	Karsog to Chindi Road	Retaining Wall	8x1.5x1.5m	2	80,860	1,61,720
			Retaining Wall	10x2x2.5m	2	1,71,660	3,43,320
			Retaining Wall	12x2x2.5m	2	2,04,080	4,08,160
<b>TOTAL</b>					<b>6</b>		<b>9,13,200</b>

### d) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Kakahan	Kanjol C3	Farm Pond (Big)	No.	1	25,000	25,000
2	Kakahan	Kanjol	Farm Pond (Small)	No.	1	10,000	10,000
3	Kakahan	Dumehal	Farm Pond (Small)	No.	1	10,000	10,000
4	Kakahan	Kanjol C1	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>55,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	6,55,550.00
Soil & Water Conservation Measures	19,12,450.00
<b>TOTAL COST</b>	<b>25,68,000.00</b>

### 6.3.20 1A2B1t1 Micro-Watershed (Si2g as per CCP SRB)

#### Location & Introduction:

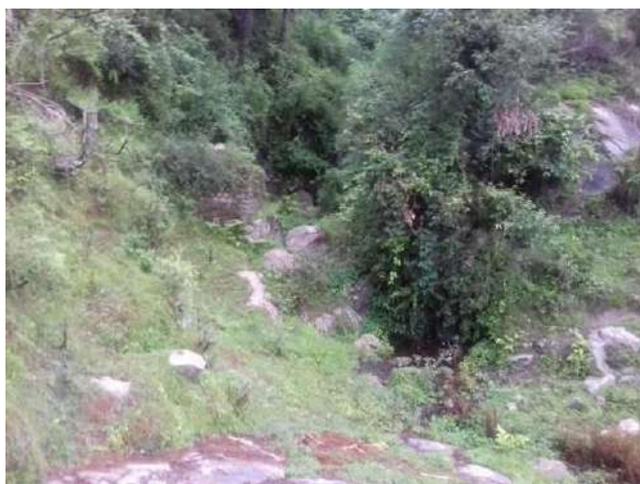
Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
689.90	31°22'19.42" to 31°25'26.60"	77°10'47.55" to 77°13'2.13"	South to South East	1287 to 2466	Low

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (Ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

**II. Soil & Water Conservation Measures:****a) Drainage Line Treatment**

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Sanarli	Chanot Nala	31°24'53.89", 77°11'26.16"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	200	130	26,000
				DRSM Check Dam	5x1.5x1.5m	7	12,290	86,030
				Check Dam Crate Wire	6x1.5x1.5m	3	23,840	71,520
<b>TOTAL</b>								<b>1,93,550</b>



Chanot Nala

**b) Landslide and Slip Control Measures**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Sanarli	Tikar (15x15m)	31°24'45.25", 77°12'6.43"	Check Wall Crate Wire	10x1.5x1.5m	2	38,580	77,160
<b>TOTAL</b>						<b>2</b>		<b>77,160</b>

**c) Other Interventions**

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Sanarli	Sareogi	Farm Pond (Small)	No.	1	10,000	10,000
2	Sanarli	Jhour	Farm Pond (Small)	No.	1	10,000	10,000
3	Sanarli	Chanount	Farm Pond (Small)	No.	1	10,000	10,000
4	Sanarli	Bajhu	Farm Pond (Small)	No.	2	10,000	20,000

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
5	Sanarli	Khalach	Farm Pond (Small)	No.	1	10,000	10,000
6	Sanarli	Pathron	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>60,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	3,30,710.00
<b>TOTAL COST</b>	<b>3,30,710.00</b>

### 6.3.21 1A2B1t2 Micro-Watershed (Si2f as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
852.58	31°22'18.75" to 31°24'33.20"	77°13'3.77" to 77°14'57.59"	South West	1291 to 2271	Low

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Galiach	D175 Pehran	31°23'53.87", 77°13'44.63"	7	93,650	6,55,550
2		Galiach	D176 Galiach	31°24'9.88", 77°14'23.95"	7	93,650	6,55,550
<b>TOTAL</b>					<b>14</b>		<b>13,11,100</b>



D176 Galaich

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Galiach	D175 Pehran	31°23'53.87", 77°13'44.63"	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
2	Galiach	D176 Galaich	31°24'9.88", 77°14'23.95"	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
<b>TOTAL</b>				<b>14</b>			<b>2,000</b>		<b>1,24,000</b>

### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Galiach	Judli Nala	31°23'53.39", 77°13'45.11"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				DRSM Check Wall	4x1.5x1.5m	3	10,270	30,810
				Check Wall Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
2	Mamail	Gagon Nala	31°23'50.29", 77°14'5.21"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	150	130	19,500
				DRSM Check Wall	4x1.5x1.5m	2	10,270	20,540
				Check Wall Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
3	Mamail	Sanana Nala	31°22'43.43", 77°13'58.66"	Live Hedge	Rmt	700	20	14,000
				Brushwood	Rmt	200	130	26,000
				DRSM Check Wall	4x1.5x1.5m	2	10,270	20,540
				Check Wall Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
4	Mamail	Tikri Dhar Nala	31°23'32.57", 77°13'23.08"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				Check Wall Crate Wire	4x1.5x1.5m	2	16,980	33,960
				Check Wall Crate Wire	5x1.5x1.5m	2	20,130	40,260
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
<b>TOTAL</b>								<b>3,98,360</b>



Gagon Nala



Sanana Nala



Judli Nala

### c) Landslide and Slip Control Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Mamail	D182 Sheel (Udman) 20 m	31°23'7.26", 77°14'28.78"	Check Wall Crate Wire	4x1.5x1.5m	5	16,980	84,900
<b>TOTAL</b>						<b>5</b>		<b>84,900</b>

### d) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Mamail	Daludhar	Farm Pond (Big)	No.	1	25,000	25,000
2	Mamail	Lol	Farm Pond (Small)	No.	1	10,000	10,000
3	Mamail	Hola	Farm Pond (Small)	No.	1	10,000	10,000
4	Mamail	Dhalog	Farm Pond (Small)	No.	1	10,000	10,000
5	Mamail	Surshi	Farm Pond (Small)	No.	1	10,000	10,000
6	Mamail	Chatrela	Farm Pond (Small)	No.	1	10,000	10,000
7	Mamail	Shanahar	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>85,000</b>

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	13,11,100.00
Soil & Water Conservation Measures	6,92,260.00
<b>TOTAL COST</b>	<b>20,03,360.00</b>

**6.3.22 1A2B1t3 Micro-Watershed (Si2h as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
731.42	31°22'23.80" to 31°25'40.44"	77°12'33.04" to 77°14'39.29"	South West	1293 to 2432	Low

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Grazing Land Development	Dofa	D172 Dofa	31°24'30.75", 77°13'7.11"	2	1,20,690	2,41,380
<b>TOTAL</b>					<b>2</b>		<b>2,41,380</b>

**II. Soil & Water Conservation Measures:****a) Drainage Line Treatment**

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Galiach	Harmora Nala	31°24'33.32", 77°14'9.52"	DRSM Check Wall	4x1.5x1.5m	3	10,270	30,810
				Check Wall Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
2	Dofa	Gothara Nala	31°24'58.58", 77°13'47.26"	Live Hedge	Rmt	400	20	8,000
				Brushwood	Rmt	250	130	32,500
				DRSM Check Wall	5x1.5x1.5m	2	12,290	24,580
				Check Wall Crate Wire	6x1.5x1.5m	2	23,840	47,680
3	Dofa	Bomna Nala	31°24'32.13", 77°13'10.71"	Live Hedge	Rmt	700	20	14,000
				Brushwood	Rmt	175	130	22,750
				Check Wall Crate Wire	20x1.5x1.5m	7	75,480	5,28,360
<b>TOTAL</b>								<b>7,52,650</b>



Harmora Nala



Gothara Nala



Bomna Nala

### b) Landslide and Slip Control Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Dofa	Bangidhiman (200 x 1200 m)	31°25'18.02", 77°13'10.56"	Check Wall Crate Wire	20x1.5x1.5m	10	75,480	7,54,800
2	Dofa	Naswar Nala		Check Wall Crate Wire	10x1.5x1.5m	5	38,580	1,92,900
<b>TOTAL</b>						<b>15</b>		<b>9,47,700</b>

### c) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Galiach	Dhara Seri	Farm Pond (Big)	No.	1	25,000	25,000
2	Galiach	Latheri	Farm Pond (Small)	No.	2	10,000	20,000
3	Galiach	Bhalog	Farm Pond (Small)	No.	2	10,000	20,000
4	Galiach	Dhara Seri	Farm Pond (Small)	No.	2	10,000	20,000
5	Galiach	Bauri	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>95,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	2,41,380.00
Soil & Water Conservation Measures	17,95,350.00
<b>TOTAL COST</b>	<b>20,36,730.00</b>

### 6.3.23 1A2B1t4 Micro-Watershed (Si2h as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
1229.77	31°24'28.56" to 31°27'17.11"	77°13'9.54" to 77°15'39.01"	South West	1738 to 3087	Low

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Dofa	D173 Jarashi	31°25'49.69", 77°14'14.34"	10	93,650	9,36,500
2		Dofa	D172 Dophia	31°25'39.87", 77°13'14.50"	7	93,650	6,55,550
3	Planting of Tall Plants	Dofa	D171 Dophia C-6		2	1,21,860	2,43,720
<b>TOTAL</b>					<b>19</b>		<b>18,35,770</b>



D173 Jarashi



D172 Dophia

#### II. Soil & Water Conservation Measures:

##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Dofa	D173 Jarashi	31°25'49.69", 77°14'14.34"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400
2		D172 Dophia	31°25'39.87", 77°13'14.50"	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
<b>TOTAL</b>				<b>17</b>			<b>2,200</b>		<b>1,36,400</b>

## b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Galiach	Jude Nala	31°24'52.59", 77°14'3.46"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				Check Dam Crate Wire	6x1.5x1.5m	2	23,840	47,680
2	Dofa	Puni Khad	31°25'13.72", 77°14'2.52"	Live Hedge	Rmt	1000	20	20,000
				Brushwood	Rmt	600	130	78,000
				Check Wall Crate Wire	20x1.5x1.5m	4	75,480	3,01,920
3	Dofa	Harnala Nala	31°24'40.85", 77°14'13.81"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	6x1.5x1.5m	5	15,090	75,450
				Check Dam Crate Wire	8x1.5x1.5m	2	31,170	62,340
4	Dofa	Kamlu Nala	31°25'13.59", 77°14'49.20"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	90	130	11,700
				DRSM Check Dam	6x1.5x1.5m	3	15,090	45,270
				Check Dam Crate Wire	8x1.5x1.5m	1	31,170	31,170
5	Dofa	Smutla Nala	31°25'57.45", 77°13'59.62"	Live Hedge	Rmt	450	20	9,000
				Brushwood	Rmt	75	130	9,750
				DRSM Check Dam	5x1.5x1.5m	5	12,290	61,450
				Check Dam Crate Wire	8x1.5x1.5m	2	31,170	62,340
<b>TOTAL</b>								<b>8,61,570</b>



Jude Nala



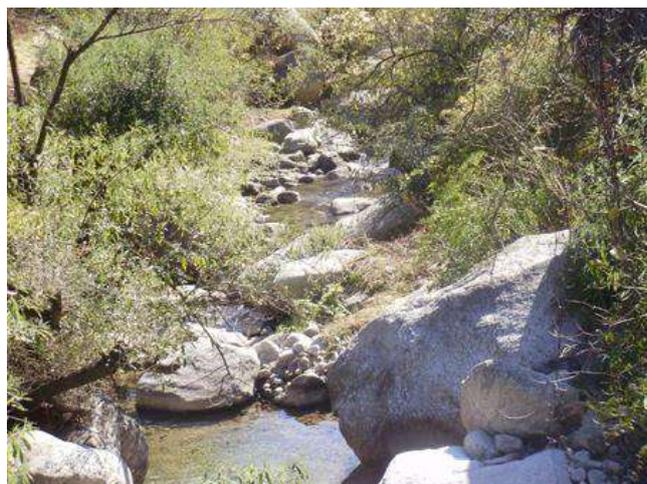
Harnala Nala



Kamlu Nala



Smutla Nala



Puni Khad

### c) Landslide and Slip Control Measures

S. No.	Name of Beat	Name of Location	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Dofa	Hanrnala Nala	Check Wall Crate Wire	210x1.5x1.5m	3	38,580	1,15,740
<b>TOTAL</b>					<b>3</b>		<b>1,15,740</b>

### d) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Dofa	Punni	Water Harvesting Structure	No.	1	3,00,000	3,00,000
2	Dofa	Damakpur	Farm Pond (Big)	No.	1	25,000	25,000
3	Dofa	Bajarana	Farm Pond (Small)	No.	1	10,000	10,000
4	Dofa	Kelti	Farm Pond (Small)	No.	1	10,000	10,000
5	Dofa	Chmaira	Farm Pond (Small)	No.	1	10,000	10,000
6	Dofa	Gothara	Farm Pond (Small)	No.	1	10,000	10,000
7	Dofa	Kawan	Farm Pond (Small)	No.	1	10,000	10,000
8	Dofa	Gad	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>3,85,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	18,35,770.00
Soil & Water Conservation Measures	14,98,710.00
<b>TOTAL COST</b>	<b>33,34,480.00</b>

### 6.3.24 1A2B1t5 Micro-Watershed (Si2g as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
761.93	31°24'24.78" to 31°26'18.05"	77°10'27.53" to 77°13'19.16"	Southern	1546 to 2631	Low

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Dofa	D171 Dophia	31°25'43.79", 77°12'24.15"	6	93,650	5,61,900
2		Sanarli	D170 Tikkar Karsog	31°25'22.18", 77°11'42.76"	10	93,650	9,36,500
3	Energy Plantation	Sanarli	Tikkar Karsog		1	1,20,690	1,20,690
4	Planting of Tall Plants	Dofa	D171 Dophia C-3		2	1,21,860	2,43,720
<b>TOTAL</b>					<b>19</b>		<b>18,62,810</b>



D171 Dophia



D170 Tikkar Karsog

#### II. Soil & Water Conservation Measures:

##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Dofa	D171 Dophia	31°25'43.79", 77°12'24.15"	6	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
2	Sanarli	D170 Tikkar Karsog	31°25'22.18", 77°11'42.76"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400
<b>TOTAL</b>				<b>16</b>			<b>2,200</b>		<b>1,36,400</b>

**b) Drainage Line Treatment**

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Dofa	D171 Khalti Nala	31°26'2.78", 77°12'41.76"	Live Hedge	Rmt	600	20	15,000
				Brushwood	Rmt	125	130	16,250
				DRSM Check Dam	5x1.5x1.5m	3	12,290	36,870
				Check Dam Crate Wire	6x1.5x1.5m	2	23,840	47,680
2	Khanukhli	D190 Deoparala Khad	31°25'46.74", 77°11'0.93"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	90	130	11,700
				DRSM Check Dam	4x1.5x1.5m	5	10,270	51,350
				DRSM Check Wall	6x1.5x1.5m	1	15,090	15,090
				Check Wall Crate Wire	8x1.5x1.5m	1	31,170	31,170
				Check Wall Crate Wire	20x1.5x1.5m	2	75,480	1,50,960
3	Sanarli	Kadon Nala	31°25'34.75", 77°11'41.28"	Live Hedge	Rmt	700	20	14,000
				Brushwood	Rmt	600	130	78,000
				DRSM Check Dam	5x1.5x1.5m	4	12,290	49,160
				Check Dam Crate Wire	6x1.5x1.5m	3	23,840	71,520
<b>TOTAL</b>								<b>5,95,750</b>

**Khalti Nala****Kadon Nala****c) Landslide and Slip Control Measures**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Dofa	Kelti D171 (50 x 400 m)	31°26'6.91", 77°12'42.09"	Check Wall Crate Wire	10x1.5x1.5m	5	38,580	1,92,900
<b>TOTAL</b>							<b>5</b>	<b>1,92,900</b>

## d) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Dofa	Dophagarh	Farm Pond (Big)	No.	1	25,000	25,000
2	Sanarli	Tikkar	Farm Pond (Big)	No.	1	25,000	25,000
3	Sanarli	Madhag	Farm Pond (Big)	No.	1	25,000	25,000
4	Dofa	Rikki	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>85,000</b>

## SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	18,62,810.00
Soil & Water Conservation Measures	10,10,050.00
<b>TOTAL COST</b>	<b>28,72,860.00</b>

## 6.3.25 1A2B1t6 Micro-Watershed (Si2g as per CCP SRB)

## Location &amp; Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
965.60	31°25'46.44" to 31°28'13.16"	77°10'13.76" to 77°12'05.97"	Southern	1779 to 3128	High

## I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Khanukhli	DPF 200 Thanti Sheel	31°27'1.48", 77°11'35.49"	3	93,650	2,80,950
2		Khanukhli	D192 Piplu Panihar	31°26'22.38", 77°11'41.18"	7	93,650	6,55,550
<b>TOTAL</b>					<b>10</b>		<b>9,36,500</b>



DPF 200 Thanti Sheel



D192 Piplu Panihar

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Khanukhli	DPF 200 Thanti Sheel	31°27'1.48", 77°11'35.49"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
2	Khanukhli	D192 Piplu Panihar	31°26'22.38", 77°11'41.18"	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
<b>TOTAL</b>				<b>10</b>			<b>1,600</b>		<b>99,200</b>

### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Khanukhli	Dhadwar Nala	31°27'29.50", 77°11'46.26"	Live Hedge	Rmt	450	20	9,000
				Brushwood	Rmt	75	130	9,750
				DRSM Check Dam	6x1.5x1.5m	5	15,090	75,450
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
2	Khanukhli	Thanti Sheel Khad	31°27'9.91", 77°11'36.84"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	150	130	19,500
				DRSM Check Dam	6x1.5x1.5m	8	15,090	1,20,720
				Check Wall Crate Wire	6x1.5x1.5m	2	23,840	47,680
3	Khanukhli	Saini Ka Dhank Nala	31°27'20.66", 77°11'45.73"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	125	130	16,250
				DRSM Check Dam	6x1.5x1.5m	5	15,090	75,450
				Check Wall Crate Wire	6x1.5x1.5m	3	23,840	71,520
4	Khanukhli	Thanar Nala	31°26'48.81", 77°11'39.20"	Live Hedge	Rmt	400	20	8,000
				Brushwood	Rmt	70	130	9,100
				DRSM Check Dam	4x1.5x1.5m	4	10,270	41,080
				DRSM Check Wall	5x1.5x1.5m	1	12,290	12,290
				Check Wall Crate Wire	8x1.5x1.5m	1	31,170	31,170
5	Khanukhli	D192 Piplu Panihar Nala	31°26'28.62", 77°11'42.70"	Live Hedge	Rmt	400	20	8,000
				Brushwood	Rmt	70	130	9,100
				DRSM Check Dam	4x1.5x1.5m	3	10,270	30,810
				DRSM Check Wall	6x1.5x1.5m	2	15,090	30,180
				Check Wall Crate Wire	8x1.5x1.5m	1	31,170	31,170
6	Khanukhli	D106 Kandi	31°26'13.75", 77°11'48.70"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	90	130	11,700

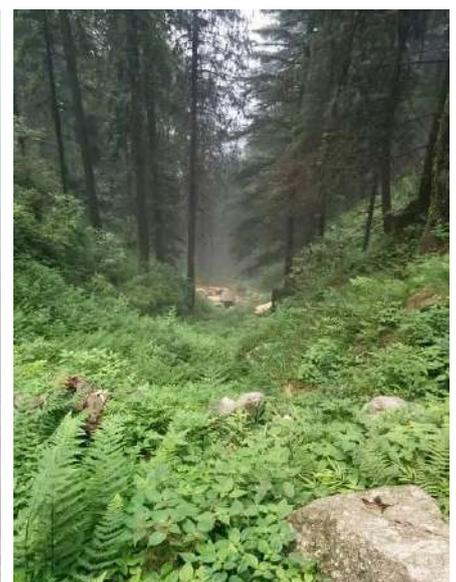
S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
		Dhar Nala		DRSM Check Dam	4x1.5x1.5m	3	10,270	30,810
				DRSM Check Wall	5x1.5x1.5m	2	12,290	24,580
				Check Wall Crate Wire	7x1.5x1.5m	1	27,780	27,780
7	Khanukhli	DPF Bhalon Nala	31°26'41.15", 77°11'30.37"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	3x1.5x1.5m	5	7,700	38,500
				DRSM Check Wall	5x1.5x1.5m	2	12,290	24,580
				Check Wall Crate Wire	6x1.5x1.5m	2	23,840	47,680
8	Khanukhli	Barsoa Nala	31°26'21.16", 77°11'18.42"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	90	130	11,700
				DRSM Check Dam	3x1.5x1.5m	3	7,700	23,100
				DRSM Check Wall	5x1.5x1.5m	1	12,290	12,290
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
9	Khanukhli	D199 DPF Dhamadi Nala	31°26'59.49", 77°11'16.02"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				DRSM Check Dam	4x1.5x1.5m	3	10,270	30,810
				DRSM Check Wall	5x1.5x1.5m	1	12,290	12,290
				Check Wall Crate Wire	7x1.5x1.5m	1	27,780	27,780
<b>TOTAL</b>								<b>11,03,000</b>



Dhadwar Nala



Thanti Sheel Khad



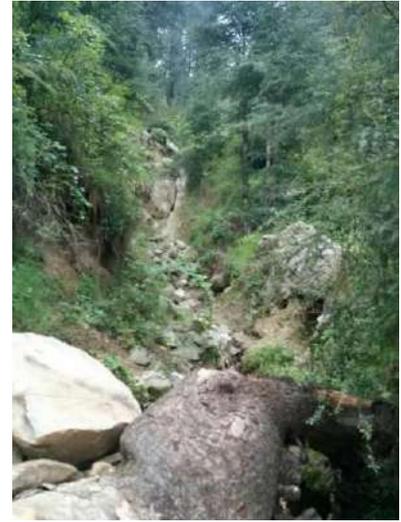
Saini Ka Dhank Nala



Thanar Nala



D192 Piplu Panihar Nala



D106 Kandi Dhar Nala



D199 DPF Dhamadi Nala

### c) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Khanukhli	Kalidoghari	Farm Pond (Big)	No.	1	25,000	25,000
2	Khanukhli	Raigarh	Farm Pond (Big)	No.	1	25,000	25,000
3	Khanukhli	Narathi	Farm Pond (Small)	No.	1	10,000	10,000
4	Khanukhli	Barshoa	Farm Pond (Small)	No.	1	10,000	10,000
5	Khanukhli	Dharwar	Farm Pond (Small)	No.	1	10,000	10,000
6	Khanukhli	Dhawara	Farm Pond (Small)	No.	1	10,000	10,000
7	Khanukhli	Braind	Farm Pond (Small)	No.	1	10,000	10,000
8	Khanukhli	Bhaloan	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>1,10,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	8,53,500.00
Soil & Water Conservation Measures	13,12,200.00
<b>TOTAL COST</b>	<b>22,48,700.00</b>

### 6.3.26 1A2B1t7 Micro-Watershed (Si2g as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
785.70	31°25'54.88" to 31°27'53.42"	77°11'51.23" to 77°13'53.14"	South West	1803 to 3110	High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Shakar Dehra	D207 Lambidhar	31°26'36.07", 77°12'45.97"	3	93,650	2,80,950
2		Shakar Dehra	Devkidhar	31°26'55.72", 77°12'38.28"	3	93,650	2,80,950
<b>TOTAL</b>					<b>6</b>		<b>5,61,900</b>



D207 Lambidhar



Devkidhar

#### II. Soil & Water Conservation Measures:

##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Shakar Dehra	D207 Lambidhar	31°26'36.07", 77°12'45.97"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
2	Shakar Dehra	Devkidhar	31°26'55.72", 77°12'38.28"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>				<b>6</b>			<b>1,200</b>		<b>74,400</b>

##### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Khanukhli	Dhwara Nala	31°26'43.29", 77°12'11.41"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	75	130	9,750
				DRSM Check Dam	3x1.5x1.5m	3	7,700	23,100

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
				DRSM Check Wall	4x1.5x1.5m	2	10,270	20,540
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
2	Khanukhli	Dhot Nala	31°26'33.06", 77°12'3.64"	Live Hedge	Rmt	450	20	9,000
				Brushwood	Rmt	75	130	9,750
				DRSM Check Dam	3x1.5x1.5m	3	7,700	23,100
				DRSM Check Wall	4x1.5x1.5m	2	10,270	20,540
				Check Wall Crate Wire	6x1.5x1.5m	1	23,840	23,840
3	Khanukhli	D194 DPF Dhwarl Nala	31°26'56.03", 77°13'1.31"	Live Hedge	Rmt	700	20	14,000
				Brushwood	Rmt	125	130	16,250
				DRSM Check Dam	4x1.5x1.5m	5	10,270	51,350
				DRSM Check Wall	5x1.5x1.5m	1	12,290	12,290
				Check Wall Crate Wire	8x1.5x1.5m	1	31,170	31,170
4	Shakar Dehra	D203 Safri Nala	31°26'55.03", 77°12'6.23"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				Check Dam Crate Wire	5x1.5x1.5m	4	20,130	80,520
5	Shakar Dehra	D203 Seri Khad	31°27'1.95", 77°12'13.92"	Check Wall Crate Wire	10x1.5x1.5m	1	38,580	38,580
6	Shakar Dehra	D203 Kathaila Nala	31°27'12.82", 77°12'21.03"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				Check Dam Crate Wire	5x1.5x1.5m	4	20,130	80,520
7	Shakar Dehra	D204 Bur Nala	31°27'11.09", 77°12'19.06"	Live Hedge	Rmt	450	20	9,000
				Brushwood	Rmt	75	130	9,750
				Check Dam Crate Wire	5x1.5x1.5m	4	20,130	80,520
8	Shakar Dehra	Lohari Nala	31°26'55.14", 77°12'31.35"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				DRSM Check Wall	5x1.5x1.5m	3	12,290	36,870
9	Shakar Dehra	DD Nala	31°26'49.56", 77°12'42.21"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				DRSM Check Dam	5x1.5x1.5m	3	12,290	36,870
10	Shakar Dehra	Gharta Dhank Nala	31°26'47.28", 77°12'53.99"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				Check Dam Crate Wire	5x1.5x1.5m	3	20,130	60,390
11	Shakar Dehra	Chhoi Batal Nala	31°26'40.65", 77°12'43.41"	Live Hedge	Rmt	30	20	600
12	Shakar Dehra	Lambidhar Nala	31°26'40.36", 77°12'58.85"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				Check Dam	5x1.5x1.5m	3	20,130	60,390

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
				Crate Wire	5m			
13	Shakar Dehra	Lingdu Nala	31°26'35.14", 77°12'20.42"	Live Hedge	Rmt	450	20	9,000
				Brushwood	Rmt	75	130	9,750
				Check Dam	5x1.5x1.5m	2	20,130	40,260
				Crate Wire	5m			
<b>TOTAL</b>								<b>9,22,540</b>



**Dhwara Nala**



**Dhot Nala**



**D203 Safri Nala**



**D203 Seri Khad**



**Kathaila Nala**



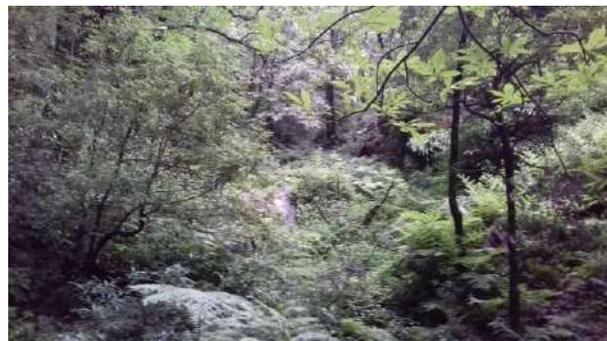
**Bur Nala**



**DD Nala**



Chhoi Batal Nala



Lingdu Nala

### c) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Shankar Dehra	Jagatkhana	Farm Pond (Big)	No.	1	25,000	25,000
2	Shankar Dehra	Jhaljaru	Farm Pond (Big)	No.	1	25,000	25,000
3	Shankar Dehra	Lambidhar	Farm Pond (Small)	No.	1	10,000	10,000
4	Shankar Dehra	Khalyach	Farm Pond (Small)	No.	1	10,000	10,000
5	Shankar Dehra	Pakrar	Farm Pond (Small)	No.	1	10,000	10,000
6	Shankar Dehra	Barshoa	Farm Pond (Small)	No.	1	10,000	10,000
7	Shankar Dehra	Raigarh	Farm Pond (Small)	No.	1	10,000	10,000
8	Shankar Dehra	Samutla	Farm Pond (Small)	No.	1	10,000	10,000
9	Shankar Dehra	Devkidhar	Farm Pond (Small)	No.	1	10,000	10,000
<b>TOTAL</b>							<b>1,20,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	5,61,900.00
Soil & Water Conservation Measures	11,16,940.00
<b>TOTAL COST</b>	<b>16,78,840.00</b>

### 6.3.27 1A2B1u1 Micro-Watershed (Si3a as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
501.73	31°15'58.80" to 31°17'43.04"	77°17'11.57" to 77°19'14.72"	South to South East	698 to 2062	Very High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Grazing Land Development	Niharinal	Shatora	31°16'45.18", 77°18'25.62"	2	1,20,690	2,41,380
<b>TOTAL</b>					<b>2</b>		<b>2,41,380</b>



Shatora

## II. Soil & Water Conservation Measures:

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
NIL									

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	2,41,380.00
Soil & Water Conservation Measures	0.00
<b>TOTAL COST</b>	<b>2,41,380.00</b>

### 6.3.28 1A2B1u2 Micro-Watershed (Si3a as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
728.89	31°17'8.10" to 31°18'50.54"	77°17'40.23" to 77°20'19.13"	South East	707 to 2057	Very High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Niharinal	Ganai	31°17'16.97", 77°19'14.03	5	1,41,740	7,08,700
2		Niharinal	Jhunjan	31°17'16.97", 77°19'14.03"	3	1,41,740	4,25,220
3	Enrichment	Niharinal	Ganai	31°18'16.79", 77°18'42.37"	2	93,650	1,87,300
4		Niharinal	Nehri Nal	31°18'7.49", 77°17'56.88"	10	93,650	9,36,500
5	Grazing Land Development	Niharinal	Jhunjan	31°17'16.97", 77°19'14.03"	2	1,20,690	2,41,380
6	Planting of Tall Plants	Niharinal	D-213 Nehri Nala		3	1,21,860	3,65,580
<b>TOTAL</b>					<b>25</b>		<b>28,64,680</b>



**Ganai (Normal Afforestation)**



**Jhunjan (Normal Afforestation)**



**Ganai (Enrichment)**



**Nehri Nal**



**Jhunjan (Grazing Land Development)**

**II. Soil & Water Conservation Measures:**

**a) Moisture Retention Measures**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Niharinal	Ganai	31°17'16.97", 77°19'14.03	5	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
2	Niharinal	Jhunjan	31°17'16.97", 77°19'14.03"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
3	Niharinal	Ganai	31°18'16.79", 77°18'42.37"	2	Staggered Trenches	1x0.3x0.3	400	62	24,800
4	Niharinal	Nehri Nal	31°18'7.49", 77°17'56.88"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400
<b>TOTAL</b>				<b>20</b>			<b>3,200</b>		<b>1,98,400</b>

**b) Drainage Line Treatment**

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Niharinal	Khaneol Nala	31°18'9.66", 77°18'41.09"	Live Hedge	Rmt	420	20	8,400
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	5x1.5x1.5m	6	12,290	73,740
				Check Dam Crate Wire	6x1.5x1.5m	5	23,840	1,19,200
2	Niharinal	Choa Nala	31°18'32.48", 77°19'11.16"	Live Hedge	Rmt	800	20	16,000
				Brushwood	Rmt	200	130	26,000
				DRSM Check Dam	5x1.5x1.5m	7	12,290	86,030
				Check Dam Crate Wire	6x1.5x1.5m	5	23,840	1,19,200
3	Niharinal	Nehri Nala		Farm Pond (Small)		2	10,000	20,000
<b>TOTAL</b>								<b>4,81,570</b>



Choa Nala



Khaneol Nala

**d) Other Interventions**

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Niharinal	D-213 Niharinal	Farm Pond (Big)	No.	3	25,000	75,000
2	Niharinal	Ganai	Farm Pond (Small)	No.	2	10,000	20,000
3	Niharinal	Jhunjhan	Farm Pond (Small)	No.	8	10,000	80,000
4	Niharinal	Ganai	Farm Pond (Small)	No.	3	10,000	30,000
<b>TOTAL</b>							<b>2,05,000</b>

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	28,64,680.00
Soil & Water Conservation Measures	8,84,970.00
<b>TOTAL COST</b>	<b>37,49,650.00</b>

### 6.3.29 1A2B1u3 Micro-Watershed (Si3a as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
1074.68	31°18'17.02" to 31°20'3.18"	77°17'21.82" to 77°20'46.51"	Eastern	812 to 2436	High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Nanj	Paro	31°19'4.96", 77°19'31.00"	5	1,41,740	7,08,700
2		Nanj	Tundalbal	31°19'46.98", 77°20'36.23"	3	1,41,740	4,25,220
3		Niharinal	Sirni	31°18'51.81", 77°19'2.13"	3	1,41,740	4,25,220
4	Enrichment	Nanj	Pog-II	31°19'48.10", 77°20'19.29"	10	93,650	9,36,500
5		Niharinal	Sihnag	31°18'59.33", 77°17'32.22"	10	93,650	9,36,500
6	Energy Plantation	Dhamun	Ganu	31°19'21.09", 77°19'12.06"	1	1,20,690	1,20,690
7		Dhamun	Noga	31°19'17.48", 77°18'49.39"	1	1,20,690	1,20,690
8		Nanj	Kehu	31°19'3.35", 77°19'42.51"	1	1,20,690	1,20,690
9		Niharinal	Sanjali	31°19'17.30", 77°18'21.32"	1	1,20,690	1,20,690
10	Planting of Tall Plants	Niharinal	Sihang		3	1,21,860	3,65,580
<b>TOTAL</b>					<b>38</b>		<b>42,80,480</b>



Paro



Tundal Bal



Sirni



Sihnag



Pog-II



Sainjali



Ganu (Energy Plantation)



Noga

**II. Soil & Water Conservation Measures:**

**a) Moisture Retention Measures**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Nanj	Paro	31°19'4.96", 77°19'31.00"	5	Staggered Trenches	1x0.3x0.3	1,000	62	62,000

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
2	Nanj	Tundalbal	31°19'46.98", 77°20'36.23"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
3	Nanj	Pog-II	31°19'48.10", 77°20'19.29"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400
4	Niharinal	Sirni	31°18'51.81", 77°19'2.13"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
5	Niharinal	Sihnag	31°18'59.33", 77°17'32.22"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400
				<b>31</b>			<b>4,600</b>		<b>2,85,200</b>

## b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Nanj	Choa Nala	31°19'40.74", 77°20'9.40"	Live Hedge	Rmt	250	20	5,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	5x1.5x1.5m	5	12,290	61,450
				Check Dam Crate Wire	6x1.5x1.5m	3	23,840	71,520
2	Nanj	Kamand Nala	31°19'9.81", 77°19'47.35"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				DRSM Check Dam	5x1.5x1.5m	2	12,290	24,580
				Check Dam Crate Wire	6x1.5x1.5m	1	23,840	23,840
3	Niharinal	Dawhal Nala	31°18'45.66", 77°18'26.45"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	200	130	26,000
				DRSM Check Dam	5x1.5x1.5m	7	12,290	86,030
				Check Dam Crate Wire	6x1.5x1.5m	5	23,840	1,19,200
4	Niharinal	Sanjali Nala	31°19'17.52", 77°18'27.45"	Live Hedge	Rmt	1000	20	20,000
				Brushwood	Rmt	300	130	39,000
				DRSM Check Dam	5x1.5x1.5m	10	12,290	1,22,900
				Check Dam Crate Wire	6x1.5x1.5m	8	23,840	1,90,720
<b>TOTAL</b>								<b>8,25,740</b>



**Choa Nala**



**Kamand Nala**



**Dawhal Nala**



**Sanjali Nala**

**c) Other Interventions**

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Niharinal	Sihang	Water Harvesting Structure	No.	1	3,00,000	3,00,000
2	Nanj	Paro	Farm Pond (Small)	No.	4	10,000	40,000
3	Nanj	Tundalbal	Farm Pond (Small)	No.	4	10,000	40,000
4	Nanj	Pog-II	Farm Pond (Small)	No.	3	10,000	30,000
<b>TOTAL</b>							<b>4,10,000</b>

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	42,80,480.00
Soil & Water Conservation Measures	15,20,940.00
<b>TOTAL COST</b>	<b>58,01,420.00</b>

### 6.3.30 1A2B1u4 Micro-Watershed (Si3b as per CCP SRB)

#### Location & Introduction:

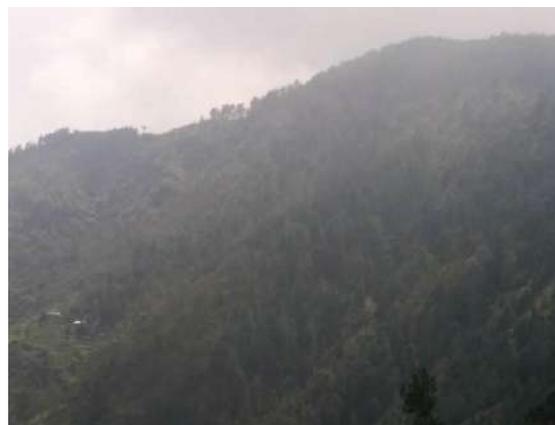
Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
704.37	31°19'28.21" to 31°20'57.63"	77°18'15.44" to 77°20'57.01"	Eastern	812 to 2274	High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Dhamun	Ganu	31°19'21.09", 77°19'12.06"	5	1,41,740	7,08,700
2		Dhamun	Kajiuni	31°20'3.35", 77°19'52.82"	3	1,41,740	4,25,220
3		Nanj	Pog	31°20'32.64", 77°20'27.36"	2	1,41,740	2,83,480
4	Enrichment	Dhamun	Dhamun	31°20'7.71", 77°19'7.96"	7	93,650	6,55,550
5		Nanj	Pog-I	31°19'58.51", 77°20'18.17"	10	93,650	9,36,500
6	Planting of Tall Plants	Dhamun	D-225 Dhamun		5	1,21,860	6,09,300
7		Nanj	D-222 Pog-I		3	1,21,860	3,65,580
<b>TOTAL</b>					<b>35</b>		<b>39,84,330</b>



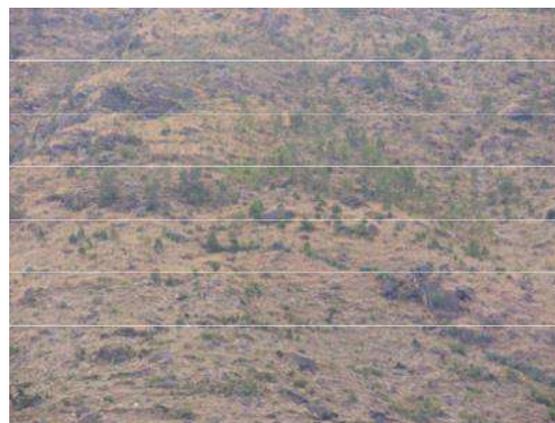
Ganu (Normal Afforestation)



Kajiuni



Dhamun



Pog-I

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Dhamun	Ganu	31°19'21.09", 77°19'12.06"	5	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
2	Dhamun	Kajiuni	31°20'3.35", 77°19'52.82"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
3	Dhamun	Dhamun	31°20'32.64", 77°20'27.36"	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
4	Nanj	Pog	31°20'7.71", 77°19'7.96"	2	Staggered Trenches	1x0.3x0.3	400	62	24,800
5	Nanj	Pog-I	31°19'58.51", 77°20'18.17"	10	Staggered Trenches	1x0.3x0.3	1,200	62	74,400
<b>TOTAL</b>				<b>27</b>			<b>4,200</b>		<b>2,60,400</b>

### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Dhamun	Kajiuni Nala	31°20'9.11", 77°19'22.65"	Live Hedge	Rmt	400	20	8,000
				Brushwood	Rmt	150	130	19,500
				DRSM Check Dam	5x1.5x1.5m	4	12,290	49,160
				Check Dam Crate Wire	6x1.5x1.5m	2	23,840	47,680
2	Nanj	Pog Nala	31°20'2.17", 77°20'8.50"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	150	130	19,500
				Check Dam Crate Wire	7x1.5x1.5m	3	27,780	83,340
				Check Dam Crate Wire	10x1.5x1.5m	2	38,580	77,160
				Check Dam Crate Wire	15x1.5x1.5m	2	57,040	1,14,080
				Check Wall Crate Wire	20x1.5x1.5m	1	75,480	75,480
3	Nanj	Noda Nala	31°19'57.09", 77°19'55.50"	Live Hedge	Rmt	500	20	10,000
				Brushwood	Rmt	300	130	39,000
				DRSM Check Dam	5x1.5x1.5m	7	12,290	86,030
				Check Dam Crate Wire	6x1.5x1.5m	6	23,840	1,43,040
<b>TOTAL</b>								<b>7,77,970</b>



Kajiuni Nala



Pog Nala



Noda Nala

### c) Other Interventions

S. No.	Name of Beat	Name of Location	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Dhamun	Dhamun	Water Harvesting Structure	No.	1	3,00,000	3,00,000
2	Nanj	Pog	Water Harvesting Structure	No.	1	3,00,000	3,00,000
3	Dhamun	D-225 Dhamun	Farm Pond (Big)	No.	3	25,000	75,000
4	Nanj	D-222 Pog	Farm Pond (Big)	No.	3	25,000	75,000
5	Dhamun	Ganu	Farm Pond (Small)	No.	4	10,000	40,000
6	Dhamun	Kajiuni	Farm Pond (Small)	No.	3	10,000	30,000
7	Dhamun	Dhamun	Farm Pond (Small)	No.	4	10,000	40,000
8	Nanj	Pog	Farm Pond (Small)	No.	3	10,000	30,000
<b>TOTAL</b>							<b>8,90,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	39,84,330.00
Soil & Water Conservation Measures	19,28,370.00
<b>TOTAL COST</b>	<b>59,12,700.00</b>

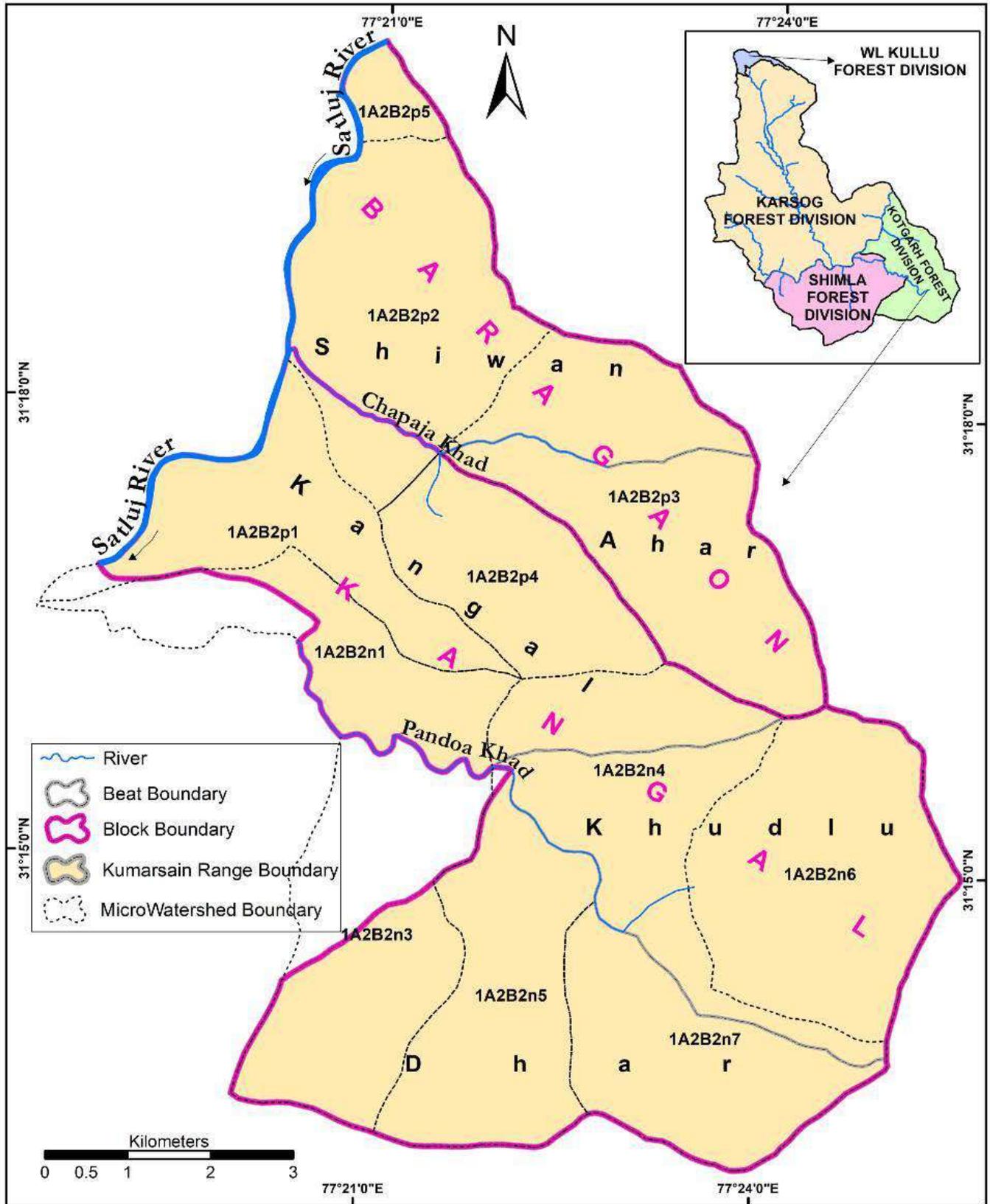
## 6.4 KOTGARH FOREST DIVISION

Part of free draining catchment area on the left bank of Satluj river falls under the jurisdiction of Kotgarh forest division. The area is covered by 5 beats (4 completely and 1 partially i.e. Shiwan) falling under Baragaon and Kangal blocks of Kumarsain range. The geographical limit of division in the free draining catchment area is the left bank catchment area of Satluj river between the proposed dam site of Luhri HEP Stage-II i.e. near Nanj village and tehsil boundary of Kumarsain and Theog tehsils. The total free draining catchment area falling under Kotgarh forest division is **6,939.72 ha**. List of micro-watershed falling under different administrative unit of Kotgarh forest division is given at **Table 6.4**. A map showing micro-watershed falling under different administrative unit of Kotgarh forest division is given at **Figure 6.2**.

**Table 6.4: List of Micro-Watersheds in the CAT Plan area under Kotgarh Forest Division**

S. No.	Micro-Watershed	Micro-Watershed (as per CCP SRB)	Area (ha)	Name of Range	Name of Block	Name of Beat
1	1A2B2n1*	Sj2e	527.19	Kumarsain	Kangal	Kangal
2	1A2B2n3*	Sj2e	849.67	Kumarsain	Kangal	Dhar
3	1A2B2n4	Sj2f	666.60	Kumarsain	Kangal	Khudlu, Kangal
4	1A2B2n5	Sj2f	684.63	Kumarsain	Kangal	Dhar
5	1A2B2n6	Sj2f	925.45	Kumarsain	Kangal	Khudlu
6	1A2B2n7	Sj2f	742.37	Kumarsain	Kangal	Dhar, Khudlu
7	1A2B2p1*	Sj2g	583.17	Kumarsain	Kangal	Kangal
8	1A2B2p2	Sj2h	910.54	Kumarsain	Kangal	Kangal
				Kumarsain	Baragaon	Shiwan
9	1A2B2p3	Sj2h	1045.33	Kumarsain	Baragaon	Shiwan, Ahar
10	1A2B2p4	Sj2h	509.17	Kumarsain	Kangal	Kangal
11	1A2B2p5	Sj2h	96.13	Kumarsain	Baragaon	Shiwan

**\*Note: Part of Micro-Watersheds 1A2B2n1, 1A2B2n3 and 1A2B2p1 falls in Shimla forest division also.**



**Figure 6.2: Map Showing Micro-Watersheds and Forest Administrative Boundaries in the Kotgarh Forest Division under Free Draining Catchment Area**

### 6.4.1 1A2B2n1 Micro-Watershed (Sj2e as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
527.19	31°15'27.68" to 31°17'07.34"	77°18'28.40" to 77°22'07.27"	Southern	703 to 1995	Medium

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

#### II. Soil & Water Conservation Measures:

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (Ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
NIL									

#### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	0.00
<b>TOTAL COST</b>	<b>0.00</b>

### 6.4.2 1A2B2n3 Micro-Watershed (Sj2e as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
849.67	31°13'10.74" to 31°15'52.67"	77°20'02.38" to 77°21'57.26"	Northern	1116 to 2770	Low

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

#### II. Soil & Water Conservation Measures:

##### a) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Dhar	Khandal Nala	31°14'4.68", 77°21'24.84"	Live Hedge	Rmt	900	20	18,000
				Brushwood	Rmt	150	130	19,500

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
				DRSM Check Dam	7x1.5x1.5m	15	17,420	2,61,300
				Check Dam Crate Wire	10x1.5x1.5m	6	38,580	2,31,480
				Check Dam Crate Wire	15x1.5x1.5m	3	57,040	1,71,120
<b>TOTAL</b>								<b>7,01,400</b>



Khandal Nala

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	7,01,400.00
<b>TOTAL COST</b>	<b>7,01,400.00</b>

**6.4.3 1A2B2n4 Micro-Watershed (Sj2f as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
666.60	31°14'32.81" to 31°16'23.43"	77°21'56.93" to 77°24'08.84"	South West	1332 to 2923	High

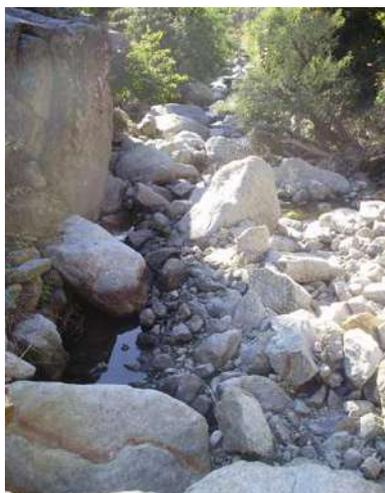
**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

## II. Soil & Water Conservation Measures:

### a) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Khudlu	Thantal Nala	31°14'51.78", 77°23'21.38"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	7x1.5x1.5m	10	17,420	1,74,200
				Check Dam Crate Wire	10x1.5x1.5m	5	38,580	1,92,900
				Check Dam Crate Wire	15x1.5x1.5m	3	57,040	1,71,120
2	Khudlu	Ropdi Nala	31°15'44.74", 77°23'4.87"	Live Hedge	Rmt	1,200	20	24,000
				Brushwood	Rmt	200	130	26,000
				DRSM Check Dam	7x1.5x1.5m	15	17,420	2,61,300
				Check Dam Crate Wire	10x1.5x1.5m	5	38,580	1,92,900
				Check Dam Crate Wire	15x1.5x1.5m	3	57,040	1,71,120
<b>TOTAL</b>								<b>12,38,540</b>



Thantal Nala



Ropdi Nala

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	12,38,540.00
<b>TOTAL COST</b>	<b>12,38,540.00</b>

### 6.4.4 1A2B2n5 Micro-Watershed (Sj2f as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
684.63	31°13'06.42" to 31°15'40.33"	77°21'07.89" to 77°22'46.72"	Northern	1315 to 2726	Very Low

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Dhar	Narenti	31°14'2.04", 77°21'41.02"	3	93,650	2,80,950
2	Energy Plantation	Dhar	Overall Micro-Watershed		2	1,20,690	2,41,380
<b>TOTAL</b>					<b>5</b>		<b>5,22,330</b>



Narenti

#### II. Soil & Water Conservation Measures:

##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Dhar	Narenti	31°14'2.04", 77°21'41.02"	5	Staggered Trenches	1x0.3x0.3	1,100	62	68,200
<b>TOTAL</b>				<b>5</b>			<b>1,100</b>		<b>68,200</b>

##### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Dhar	Kayana Nala	31°14'14.17", 77°22'18.36"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	100	130	13,000

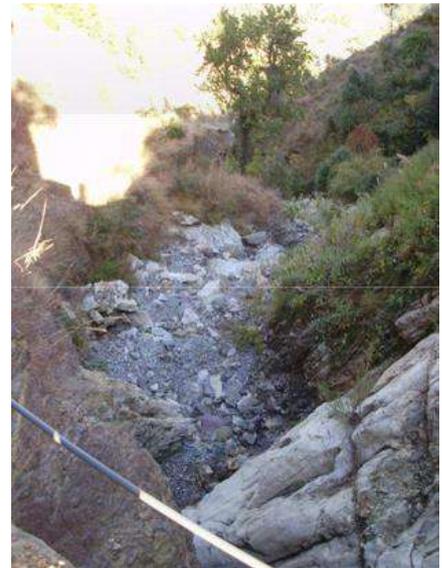
S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
				Check Dam Crate Wire	10x1.5x1.5m	6	38,580	2,31,480
				Check Dam Crate Wire	12x1.5x1.5m	5	46,000	2,30,000
2	Dhar	Koftu Nala	31°14'21.52", 77°22'32.08"	Live Hedge	Rmt	750	20	15,000
				Brushwood	Rmt	125	130	16,250
				DRSM Check Dam	7x1.5x1.5m	15	17,420	2,61,300
				Check Dam Crate Wire	15x1.5x1.5m	3	57,040	1,71,120
3	Dhar	Nevali Nala	31°14'24.67", 77°22'0.42"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	7x1.5x1.5m	10	17,420	1,74,200
				Check Dam Crate Wire	10x1.5x1.5m	3	38,580	1,15,740
				Check Dam Crate Wire	15x1.5x1.5m	3	57,040	1,71,120
<b>TOTAL</b>								<b>14,36,210</b>



Kayana Nala



Koftu Nala



Nevali Nala

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	5,22,330.00
Soil & Water Conservation Measures	15,04,410.00
<b>TOTAL COST</b>	<b>20,26,740.00</b>

### 6.4.5 1A2B2n6 Micro-Watershed (Sj2f as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
925.45	31°13'51.68" to 31°16'09.56"	77°23'28.04" to 77°25'30.24"	Western	1795 to 3068	Low

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

#### II. Soil & Water Conservation Measures:

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
NIL									

#### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	0.00
<b>TOTAL COST</b>	<b>0.00</b>

### 6.4.6 1A2B2n7 Micro-Watershed (Sj2f as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
742.37	31°13'0.02" to 31°14'56.34"	77°22'35.50" to 77°24'58.57"	Northern & Southern	1566 to 3106	Very Low

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Dhar	UPF Deha	3	93,650	2,80,950
<b>TOTAL</b>				<b>3</b>		<b>2,80,950</b>

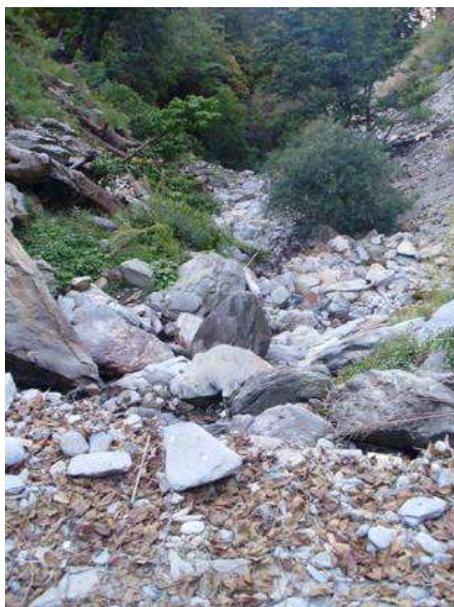
#### II. Soil & Water Conservation Measures:

##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Dhar	UPF Deha	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>			<b>3</b>			<b>600</b>		<b>37,200</b>

**b) Drainage Line Treatment**

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Khudlu	Khalantu Nala	31°14'18.92", 77°23'20.70"	Live Hedge	Rmt	1,500	20	30,000
				Brushwood	Rmt	150	130	19,500
				DRSM Check Dam	7x1.5x1.5m	10	17,420	1,74,200
				Check Dam Crate Wire	10x1.5x1.5m	2	38,580	77,160
				Check Dam Crate Wire	15x1.5x1.5m	3	57,040	1,71,120
<b>TOTAL</b>								<b>4,71,980</b>

**Khalantu Nala****SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	2,80,950.00
Soil & Water Conservation Measures	5,09,180.00
<b>TOTAL COST</b>	<b>7,90,130.00</b>

**6.4.7 1A2B2p1 Micro-Watershed (Sj2g as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
583.17	31°16'06.48" to 31°18'20.60"	77°18'28.09" to 77°22'04.86"	North West	703 to 1987	High

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Kangal	UPF Khlantu	3	93,650	2,80,950
<b>TOTAL</b>				<b>3</b>		<b>2,80,950</b>

**II. Soil & Water Conservation Measures:****a) Moisture Retention Measures**

S. No.	Name of Beat	Name of Location	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Kangal	UPF Khlantu	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>			<b>3</b>			<b>600</b>		<b>37,200</b>

**b) Drainage Line Treatment**

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Kangal	Chopri Nala	31°17'25.56", 77°20'21.12"	Live Hedge	Rmt	1800	20	36,000
				Brushwood	Rmt	300	130	39,000
				DRSM Check Dam	7x1.5x1.5m	15	17,420	2,61,300
				Check Dam Crate Wire	10x1.5x1.5m	6	38,580	2,31,480
				Check Dam Crate Wire	15x1.5x1.5m	4	57,040	2,28,160
2	Kangal	Majrog Nala	31°17'9.9", 77°19'49.77"	Live Hedge	Rmt	1800	20	36,000
				Brushwood	Rmt	300	130	39,000
				DRSM Check Dam	7x1.5x1.5m	15	17,420	2,61,300
				Check Dam Crate Wire	10x1.5x1.5m	6	38,580	2,31,480
				Check Dam Crate Wire	15x1.5x1.5m	4	57,040	2,28,160
<b>TOTAL</b>								<b>15,91,880</b>



**Chopri Nala**



**Majrog Nala**

**a) Landslide and Slip Control Measures**

S. No.	Name of Beat	Name of Location	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Kangal	Road from Kangal to Mogra (100 m)	Retaining Wall Crate Wire	10x2x2.5m	3	1,71,660	5,14,980
<b>TOTAL</b>					<b>3</b>		<b>5,14,980</b>

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	2,80,950.00
Soil & Water Conservation Measures	21,44,060.00
<b>TOTAL COST</b>	<b>24,25,010.00</b>

**6.4.8 1A2B2p2 Micro-Watershed (Sj2h as per CCP SRB)**

**Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
910.54	31°17'16.87" to 31°19'48.59"	77°20'18.95" to 77°22'16.70"	Western	752 to 2057	Very High

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Shiwan	UPF Lang	31°18'41.35", 77°21'28.99"	3	1,41,740	4,25,220
2	Enrichment	Shiwan	Banawan-I	31°18'51.34", 77°21'46.56"	3	93,650	2,80,950
3		Shiwan	Banawan-II	31°18'20.93", 77°21'7.93"	3	93,650	2,80,950

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
4		Shiwan	Banar Kanda	31°19'8.31", 77°21'26.97"	3	93,650	2,80,950
5		Shiwan	Langla	31°18'53.11", 77°21'40.51"	3	93,650	2,80,950
6		Shiwan	DPF Kufer Jubber		5	93,650	4,68,250
7	Energy Plantation	Shiwan	UPF Paresh	31°18'15.64", 77°21'19.45"	3	1,20,690	3,62,070
<b>TOTAL</b>					<b>23</b>		<b>23,79,340</b>



**Banawan-I**



**Banawan-II**



**Banar Kanda**



**Langla**



**UPF Paresh**

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Shiwan	Banawan-I	31°18'51.34", 77°21'46.56"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
2	Shiwan	Banawan-II	31°18'20.93", 77°21'7.93"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
3	Shiwan	Banar Kanda	31°19'8.31", 77°21'26.97"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
4	Shiwan	Langla	31°18'53.11", 77°21'40.51"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
5	Shiwan	UPF Lang	31°18'15.64", 77°21'19.45"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
6	Shiwan	DPF Kufer Jubber		5	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>				<b>20</b>			<b>3,600</b>		<b>2,23,200</b>

### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Shiwan	Dharval Nala	31°19'7.71", 77°21'26.56"	Live Hedge	Rmt	750	20	15,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	7x1.5x1.5m	9	17,420	1,56,780
				Check Dam Crate Wire	10x1.5x1.5m	4	38,580	1,54,320
				Check Dam Crate Wire	15x1.5x1.5m	3	57,040	1,71,120
2	Shiwan	Bhutkanda Nala	31°18'44.81", 77°21'20.67"	Live Hedge	Rmt	600	20	12,000
				Brushwood	Rmt	100	130	13,000
				DRSM Check Dam	7x1.5x1.5m	6	17,420	1,04,520
				Check Dam Crate Wire	10x1.5x1.5m	3	38,580	1,15,740
				Check Dam Crate Wire	15x1.5x1.5m	2	57,040	1,14,080
								<b>8,69,560</b>



Dharval Nala



Bhutkanda Nala

### c) Landslide and Slip Control Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Shiwan	Kopri Jubbal (50 x 30 m)	31°18'51.18", 77°21'48.26"	Retaining Wall Crate Wire	6x1.5x1.5m	4	52,950	2,11,800
				Retaining Wall Crate Wire	10x2x2.5m	3	1,71,660	5,14,980
2	Shiwan	Road from Kanda to Bagh (50 m)		Retaining Wall Crate Wire	10x2x2.5m	3	1,71,660	5,14,980
<b>TOTAL</b>						<b>10</b>		<b>12,41,760</b>



Kopri Jubbal

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	23,79,340.00
Soil & Water Conservation Measures	23,34,520.00
<b>TOTAL COST</b>	<b>47,13,860.00</b>

### 6.4.9 1A2B2p3 Micro-Watershed (Sj2h as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
1045.33	31°15'56.12" to 31°18'36.62"	77°21'31.87" to 77°24'22.50"	Nort West	1068 to 2938	High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Normal Afforestation	Ahar	DPF RC 32 (Derthu)	31°16'5.66", 77°24'11.77"	3	1,41,740	4,25,220
2	Enrichment	Ahar	DPF Ahar		3	93,650	2,80,950
<b>TOTAL</b>					<b>6</b>		<b>7,06,170</b>



DPF RC 32 (Derthu)

#### II. Soil & Water Conservation Measures:

##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Ahar	DPF RC 32 (Derthu)	31°16'5.66", 77°24'11.77"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
2	Ahar	DPF Ahar		3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>				<b>6</b>			<b>1,200</b>		<b>74,400</b>

##### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Shiwan	Chamola	31°17'34.77"	Live Hedge	Rmt	2400	20	48,000

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
		Nala	77°22'36.13"	Brushwood	Rmt	400	130	52,000
				DRSM Check Dam	7x1.5x1.5m	15	17,420	2,61,300
				Check Dam Crate Wire	10x1.5x1.5m	5	38,580	1,92,900
				Check Dam Crate Wire	15x1.5x1.5m	4	57,040	2,28,160
<b>TOTAL</b>								<b>7,82,360</b>



Chamola Nala

### c) Landslide and Slip Control Measures

S. No.	Name of Beat	Name of Location	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Ahar	Road from Chamola Khad to Jhanjeli (400 m)	Retaining Wall Crate Wire	20x2x2.5m	10	3,33,770	33,37,700
<b>TOTAL</b>					<b>10</b>		<b>33,37,700</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	7,06,170.00
Soil & Water Conservation Measures	41,94,460.00
<b>TOTAL COST</b>	<b>49,00,630.00</b>

### 6.4.10 1A2B2p4 Micro-Watershed (Sj2h as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
509.17	31°16'11.58" to 31°17'45.02"	77°21'03.54" to 77°23'11.72"	Nort West	1054 to 2488	Medium

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

#### II. Soil & Water Conservation Measures:

##### a) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Kangal	Savera Khad	31°17'13.41", 77°21'18.95"	Live Hedge	Rmt	1,800	20	36,000
				Brushwood	Rmt	300	130	39,000
				DRSM Check Dam	7x1.5x1.5m	15	17,420	2,61,300
				Check Dam Crate Wire	10x1.5x1.5m	5	38,580	1,92,900
				Check Dam Crate Wire	15x1.5x1.5m	3	57,040	1,71,120
<b>TOTAL</b>								<b>7,00,320</b>



Savera Khad

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	7,00,320.00
<b>TOTAL COST</b>	<b>7,00,320.00</b>

**6.4.11 1A2B2p5 Micro-Watershed (Sj2h as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
96.13	31°19'42.90" to 31°20'24.57"	77°20'39.15" to 77°21'26.20"	Western	812 to 1481	Medium

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

**II. Soil & Water Conservation Measures:**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (Ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
NIL									

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	0.00
<b>TOTAL COST</b>	<b>0.00</b>

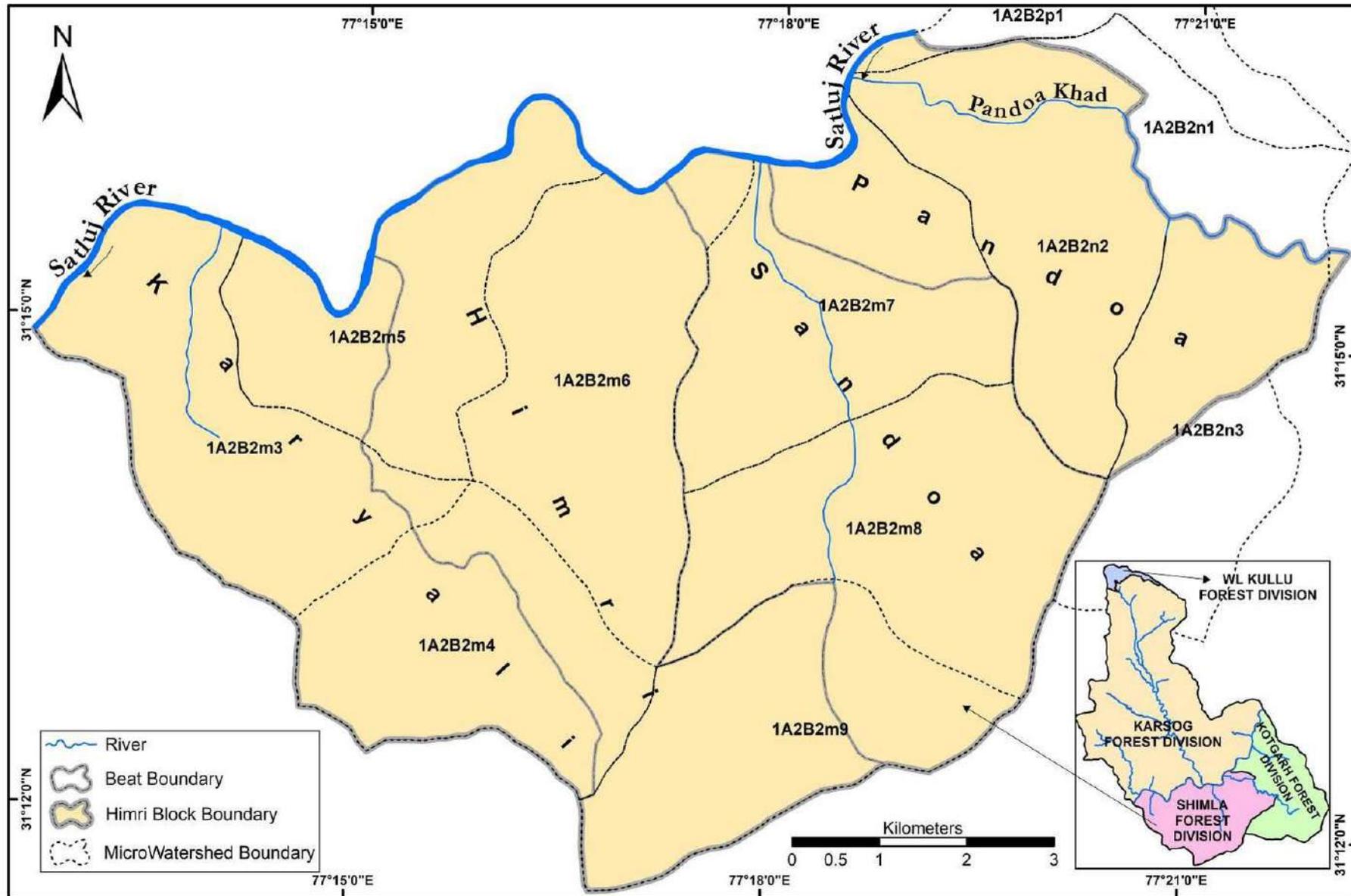
## 6.5 SHIMLA FOREST DIVISION

Part of free draining catchment area on the left bank of Satluj river falls under the jurisdiction of Shimla forest division. The area is covered by 4 beats (3 completely and 1 partially i.e. Karyali) falling under Himri block of Bhajji range. The geographical limit of division in the free draining catchment area is the left bank catchment area of Satluj river between the proposed dam site of Sunni Dam HEP i.e. near Marola village and tehsil boundary of Kumarsain and Theog tehsils. The total free draining catchment area falling under Shimla forest division is **7,990.36 ha**. List of micro-watershed falling under different administrative unit of Shimla forest division is given at **Table 6.5**. A map showing micro-watershed falling under different administrative unit of Shimla forest division is given at **Figure 6.3**.

**Table 6.5: List of Micro-Watersheds in the CAT Plan area under Shimla Forest Division**

S. No.	Micro-Watershed	Micro-Watershed (as per CCP SRB)	Area (ha)	Name of Range	Name of Block	Name of Beat
1	1A2B2m3	Sj2b	956.65	Bhajji	Himri	Himri, Karyali
2	1A2B2m4	Sj2b	851.39	Bhajji	Himri	Himri, Karyali
3	1A2B2m5	Sj2c	804.63	Bhajji	Himri	Himri, Karyali
4	1A2B2m6	Sj2c	1083.26	Bhajji	Himri	Himri, Sandoa
5	1A2B2m7	Sj2d	1006.55	Bhajji	Himri	Sandoa, Pandoa
6	1A2B2m8	Sj2d	1046.82	Bhajji	Himri	Sandoa
7	1A2B2m9	Sj2d	895.93	Bhajji	Himri	Himri, Sandoa
8	1A2B2n1*	Sj2e	527.19	Bhajji	Himri	Pandoa
9	1A2B2n2	Sj2e	744.41	Bhajji	Himri	Pandoa
10	1A2B2n3*	Sj2e	849.67	Bhajji	Himri	Pandoa
11	1A2B2p1*	Sj2g	583.17	Bhajji	Himri	Pandoa

**\*Note: Part of Micro-Watersheds 1A2B2n1, 1A2B2n3 and 1A2B2p1 falls in Kotgarh forest division also.**



**Figure 6.3: Map Showing Micro-Watersheds and Forest Administrative Boundaries in the Shimla Forest Division under Free Draining Catchment Area**

### 6.5.1 1A2B2m3 Micro-Watershed (Sj2b as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
956.65	31°13'06.04" to 31°15'45.97"	77°12'42.27" to 77°15'45.78"	Northern	695 to 2166	High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Karyali	U-14 Bhaara Drabla	13	93,650	12,17,450
2			U-19 Graon Jaishi	13	93,650	12,17,450
<b>Total</b>				<b>26</b>		<b>24,34,900</b>



U-14 Bhaara Drabla



U-19 Graon Jaishi

#### II. Soil & Water Conservation Measures:

##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Karyali	U-14 Bhaara Drabla	13	Staggered Trenches	1x0.3x0.3	2,035	62	1,26,170
2		U-19 Graon Jaishi	13	Staggered Trenches	1x0.3x0.3	2,000	62	1,24,000
<b>TOTAL</b>			<b>26</b>			<b>4,035</b>		<b>2,50,170</b>

##### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Karyali	Jaishi Nala	Live Hedge	Rmt	1,000	20	20,000
			Brushwood	Rmt	100	130	13,000
			Water Pond (Big)	No.	1	25,000	25,000
			Water Pond (Small)	No.	10	10,000	1,00,000
			DRSM Check Dam	No.	15	25,000	3,75,000
2	Karyali	Nagoli Nala	Live Hedge	Rmt	700	20	14,000

S. No.	Name of Beat	Name of Nala	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
			Brushwood	Rmt	100	130	13,000
			Water Pond (Big)	No.	1	25,000	25,000
			Water Pond (Small)	No.	10	10,000	1,00,000
3	Karyali	Drabla Nala	Live Hedge	Rmt	800	20	16,000
			Brushwood	Rmt	200	130	26,000
			Water Pond (Big)	No.	1	25,000	25,000
			Water Pond (Small)	No.	6	10,000	60,000
			DRSM Check Dam	No.	21	25,000	5,25,000
<b>TOTAL</b>							<b>13,37,000</b>



Jaishi Nala



Nagoli Nala

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	24,34,900.00
Soil & Water Conservation Measures	15,87,170.00
<b>TOTAL COST</b>	<b>40,22,070.00</b>

### 6.5.2 1A2B2m4 Micro-Watershed (Sj2b as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
851.39	31°13'06.04" to 31°15'45.97"	77°12'42.27" to 77°15'45.97"	North West	1420 to 2594	Medium

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Planting of Tall Plants	Karyali	U-18 Chaprani	20	1,21,860	24,37,200
2			D-10 Malgi	10	1,21,860	12,18,600

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
3	Assisted Natural Regeneration	Karyali	D-23 Chaprani	7	44,310	3,10,170
4			D-22 Himari	3	44,310	1,32,930
5			D-19 Dabka	3	44,310	1,32,930
6	Medicinal Plants/ NTFP	Karyali	D-23 Chaprani	6	1,12,820	6,76,920
7			D-22 Himari	3	1,12,820	3,38,460
8			D-19 Dabka	3	1,12,820	3,38,460
<b>Total</b>				<b>55</b>		<b>55,85,670</b>

## II. Soil & Water Conservation Measures:

### a) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Karyali	Shada Nala	Live Hedge	Rmt	1,000	20	20,000
			Brushwood	Rmt	100	130	13,000
			Water Pond (Big)	No.	1	25,000	25,000
			Water Pond (Small)	No.	6	10,000	60,000
			DRSM Check Dam	No.	10	25,000	2,50,000
			Water Harvesting Structure	No.	2	3,00,000	6,00,000
<b>TOTAL</b>							<b>9,68,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	55,85,670.00
Soil & Water Conservation Measures	9,68,000.00
<b>TOTAL COST</b>	<b>65,53,670.00</b>

### 6.5.3 1A2B2m5 Micro-Watershed (Sj2c as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
804.63	31°13'59.71" to 31°16'26.97"	77°13'59.74" to 77°16'42.21"	Northern	696 to 2149	Medium

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Himri	U-13 Ogli Suma	7	93,650	6,55,550
2	Planting of Tall Plants	Himri	U-13 Ogli Suma	3	121,860	3,65,580
<b>Total</b>				<b>10</b>		<b>10,21,130</b>



Suma Ogli

**II. Soil & Water Conservation Measures:**

**a) Moisture Retention Measures**

S. No.	Name of Beat	Name of Location	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Himri	U-13 Ogli Suma	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
<b>TOTAL</b>			<b>7</b>			<b>1,000</b>		<b>62,000</b>

**b) Drainage Line Treatment**

S. No.	Name of Beat	Name of Nala	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Himri	Chamba Nala	Live Hedge	Rmt	800	20	16,000
			Brushwood	Rmt	175	130	22,750
			Water Pond (Small)	No.	8	10,000	80,000
			DRSM Check Dam	No.	20	25,000	5,00,000
<b>TOTAL</b>							<b>6,18,750</b>



Chambu Nala

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	10,21,130.00
Soil & Water Conservation Measures	6,80,750.00
<b>TOTAL COST</b>	<b>17,01,880.00</b>

**6.5.4 1A2B2m6 Micro-Watershed (Sj2c as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
1083.26	31°12'54.44" to 31°16'09.31"	77°15'45.12" to 77°17'47.36"	Northern	696 to 2408	Medium

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Himri	U-10 Malgi Kothi	3	93,650	2,80,950
2		Himri	U-11 Bagdi Banuna	7	93,650	6,55,550
3	Planting of Tall Plants	Himri	U-12 Gadahu	7	1,21,860	8,53,020
4		Himri	U-11 Bagdi Banuna	3	1,21,860	36,5,580
<b>Total</b>				<b>20</b>		<b>21,55,100</b>



U-10 Malgi Kothi



U-11 Bagdi Banuna

**II. Soil & Water Conservation Measures:****a) Moisture Retention Measures**

S. No.	Name of Beat	Name of Location	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Himri	U-10 Malgi Kothi	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
2		U-11 Bagdi Banuna	7	Staggered Trenches	1x0.3x0.3	1,000	62	62,000
<b>TOTAL</b>			<b>10</b>			<b>1,600</b>		<b>99,200</b>

**b) Drainage Line Treatment**

S. No.	Name of Beat	Name of Nala	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Himri	Gadahu Nala	Live Hedge	Rmt	1,600	20	32,000
			Brushwood	Rmt	350	130	45,500
			Water Pond (Big)	No.	1	25,000	25,000
			Water Pond (Small)	No.	10	10,000	1,00,000
			DRSM Check Dam	No.	20	25,000	5,00,000
2	Himri	Khanor Nala	Live Hedge	Rmt	1,600	20	32,000
			Brushwood	Rmt	300	130	39,000
			Water Pond (Big)	No.	3	25,000	75,000
			Water Pond (Small)	No.	22	10,000	2,20,000
			DRSM Check Dam	No.	10	25,000	2,50,000
			Water Harvesting Structure	No.	2	3,00,000	6,00,000
<b>TOTAL</b>							<b>19,18,500</b>



Gadhu Nala

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	21,55,100.00
Soil & Water Conservation Measures	20,17,700.00
<b>TOTAL COST</b>	<b>41,72,800.00</b>

**6.5.5 1A2B2m7 Micro-Watershed (Sj2d as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
1006.55	31°14'01.20" to 31°16'32.39"	77°17'16.95" to 77°19'40.21"	Northern	703 to 2030	High

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Sandoa	U-6 Dharogra	5	93,650	4,68,250
2		Sandoa	U-9 Gadheri	2	93,650	1,87,300
3		Sandoa	D-20 Lambidhar	3	93,650	2,80,950
4		Sandoa	D-10 Malgi	2	93,650	1,87,300
<b>Total</b>				<b>12</b>		<b>11,23,800</b>



U-6 Dharogra



D-10 Malgi

**II. Soil & Water Conservation Measures:****a) Moisture Retention Measures**

S. No.	Name of Beat	Name of Location	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Sandoa	U-6 Dharogra	5	Staggered Trenches	1x0.3x0.3	1,100	62	68,200
2		U-9 Gadheri	2	Staggered Trenches	1x0.3x0.3	400	62	24,800
3		D-20 Lambidhar	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
4		D-10 Malgi	2	Staggered Trenches	1x0.3x0.3	400	62	24,800
<b>TOTAL</b>			<b>18</b>			<b>2,500</b>		<b>1,55,000</b>

**b) Drainage Line Treatment**

S. No.	Name of Beat	Name of Nala	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Pandoa	San Bagh Nala	Live Hedge	Rmt	800	20	16,000
			Brushwood	Rmt	80	130	10,400
			Water Pond (Small)	No.	5	10,000	50,000
			DRSM Check Dam	No.	8	25,000	2,00,000
			Water Harvesting Structure	No.	2	3,00,000	6,00,000
2	Sandoa	Malgi Nala	Live Hedge	Rmt	700	20	14,000

S. No.	Name of Beat	Name of Nala	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
			Brushwood	Rmt	100	130	13,000
			DRSM Check Dam	No.	10	25,000	2,50,000
			Water Harvesting Structure	No.	2	3,00,000	6,00,000
<b>TOTAL</b>							<b>17,53,400</b>



San Bagh Nala



Malgi Nala

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	11,23,800.00
Soil & Water Conservation Measures	19,08,400.00
<b>TOTAL COST</b>	<b>30,32,200.00</b>

### 6.5.6 1A2B2m8 Micro-Watershed (Sj2d as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
1046.82	31°12'44.98" to 31°14'50.80"	77°17'12.62" to 77°20'22.93"	Northern	1112 to 2798	Medium

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Plantation of Tall Plants	Sandoa	U-7 Sandoa	3	1,21,860	3,65,580
2		Sandoa	U-6 Dharogra	3	1,21,860	3,65,580
3	Assisted Natural Regeneration	Sandoa	D-18 Saria	5	44,310	2,21,550
4		Sandoa	D-17 Shintu	3	44,310	1,32,930
5	Medicinal Plants/	Sandoa	D-18 Saria	4	1,12,820	4,51,280

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
6	NTFP	Sandoa	D-17 Shintu	3	1,12,820	3,38,460
<b>Total</b>				<b>21</b>		<b>18,75,380</b>

## II. Soil & Water Conservation Measures:

### a) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Sandoa	Dodni Nala	Live Hedge	Rmt	800	20	16,000
			Brushwood	Rmt	100	130	13,000
			Water Pond (Big)	No.	1	25,000	25,000
			Water Pond (Small)	No.	10	10,000	1,00,000
			DRSM Check Dam	No.	15	25,000	3,75,000
2	Sandoa	Kharodi Nala	Live Hedge	Rmt	400	20	8,000
			Brushwood	Rmt	50	130	6,500
			DRSM Check Dam	No.	10	25,000	2,50,000
3	Sandoa	Luhnu Nala	Live Hedge	Rmt	400	20	8,000
			Brushwood	Rmt	50	130	6,500
			Water Pond (Small)	No.	8	10,000	80,000
			DRSM Check Dam	No.	8	25,000	2,00,000
4	Sandoa	Sarya Nala	Live Hedge	Rmt	1,000	20	20,000
			Brushwood	Rmt	300	130	39,000
			Water Pond (Big)	No.	3	25,000	75,000
			Water Pond (Small)	No.	10	10,000	1,00,000
			DRSM Check Dam	No.	10	25,000	2,50,000
5	Sandoa	Malgi Nala	Live Hedge	Rmt	1,500	20	30,000
			Brushwood	Rmt	200	130	26,000
			Water Pond (Big)	No.	2	25,000	50,000
			Water Pond (Small)	No.	10	10,000	1,00,000
			DRSM Check Dam	No.	3	25,000	75,000
<b>TOTAL</b>							<b>18,53,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	18,75,380.00
Soil & Water Conservation Measures	18,53,000.00
<b>TOTAL COST</b>	<b>37,28,380.00</b>

### 6.5.7 1A2B2m9 Micro-Watershed (Sj2d as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
895.93	31°11'33.60" to 31°13'34.36"	77°16'41.99" to 77°19'48.49"	North East	1584 to 2719	Very Low

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

**II. Soil & Water Conservation Measures:**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
NIL									

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	0.00
<b>TOTAL COST</b>	<b>0.00</b>

**6.5.8 1A2B2n1 Micro-Watershed (Sj2e as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
527.19	31°15'27.68" to 31°17'07.34"	77°18'28.40" to 77°22'07.27"	Southern	703 to 1995	Medium

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

**II. Soil & Water Conservation Measures:**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
NIL									

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	0.00
<b>TOTAL COST</b>	<b>0.00</b>

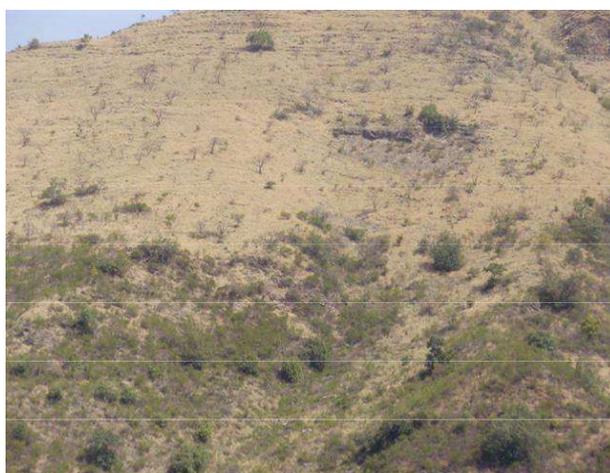
### 6.5.9 1A2B2n2 Micro-Watershed (Sj2e as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
744.41	31°14'07.86" to 31°16'40.66"	77°18'30.40" to 77°20'45.59"	North East to South East	703 to 2558	Medium

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Pandora	U-3 Bag Sainj	3	93,650	2,80,950
2		Pandora	D-10 Malgi	2	93,650	1,87,300
3	Plantation of Tall Plants	Pandora	U-5 Pandora	3	1,21,860	3,65,580
<b>Total</b>				<b>8</b>		<b>8,33,830</b>



U-3 Bag Sainj

#### II. Soil & Water Conservation Measures:

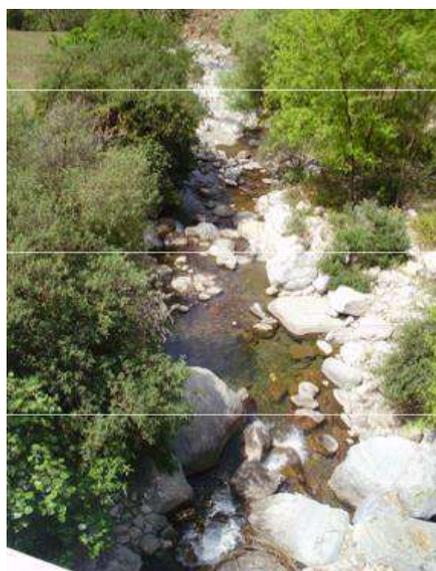
##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Pandora	U-3 Bag Sainj	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
2		D-10 Malgi	2	Staggered Trenches	1x0.3x0.3	400	62	24,800
<b>TOTAL</b>			<b>5</b>			<b>1,000</b>		<b>62,000</b>

##### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Pandora	Bara Nala	Live Hedge	Rmt	1,400	20	28,000
			Brushwood	Rmt	200	130	26,000
			Water Pond (Small)	No.	5	10,000	50,000
			DRSM Check Dam	No.	10	25,000	2,50,000

S. No.	Name of Beat	Name of Nala	Kind of Work	Unit	Quantity (No.)	Rate (Rs)	Amount (Rs.)
2	Pandoa	Pandoa Nala	Live Hedge	Rmt	400	20	8,000
			Brushwood	Rmt	80	130	10,400
			DRSM Check Dam	No.	12	25,000	3,00,000
3	Pandoa	Malawaan Nala	Live Hedge	Rmt	1,500	20	30,000
			Brushwood	Rmt	300	130	39,000
			Water Pond (Big)	No.	2	25,000	50,000
			Water Pond (Small)	No.	10	10,000	1,00,000
			DRSM Check Dam	No.	10	25,000	2,50,000
4	Pandoa	Sainj Nala	Live Hedge	Rmt	600	20	12,000
			Brushwood	Rmt	100	130	13,000
			Water Pond (Big)	No.	1	25,000	25,000
			Water Pond (Small)	No.	10	10,000	1,00,000
			DRSM Check Dam	No.	8	25,000	2,00,000
<b>TOTAL</b>							<b>14,91,400</b>



Pandoa Khad



Sainj Nala

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	8,33,830.00
Soil & Water Conservation Measures	15,53,400.00
<b>TOTAL COST</b>	<b>23,87,230.00</b>

### 6.5.10 1A2B2n3 Micro-Watershed (Sj2e as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
849.67	31°13'10.74" to 31°15'52.67"	77°20'02.38" to 77°21'57.26"	Northern	1116 to 2770	Low

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Assisted Natural Regeneration	Pandoa	D-15 Malawan	3	44,310	1,32,930
2		Pandoa	D-14 Kialu Anu	3	44,310	1,32,930
3	Medicinal Plants/ NTFP	Pandoa	D-15 Malawan	3	1,12,820	3,38,460
4		Pandoa	D-14 Kialu Anu	3	1,12,820	3,38,460
<b>Total</b>				<b>12</b>		<b>9,42,780</b>

**II. Soil & Water Conservation Measures:**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
NIL									

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	9,42,780.00
Soil & Water Conservation Measures	0.00
<b>TOTAL COST</b>	<b>9,42,780.00</b>

**6.5.11 1A2B2p1 Micro-Watershed (Sj2g as per CCP SRB)****Location & Introduction:**

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
583.17	31°16'06.48" to 31°18'20.60"	77°18'28.09" to 77°22'04.86"	North West	703 to 1987	High

**I. Afforestation Measures:**

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
NIL							

**II. Soil & Water Conservation Measures:**

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (Ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
NIL									

**SUMMARY OF COST:**

Name of Component	Amount (Rs)
Afforestation Measures	0.00
Soil & Water Conservation Measures	0.00
<b>TOTAL COST</b>	<b>0.00</b>

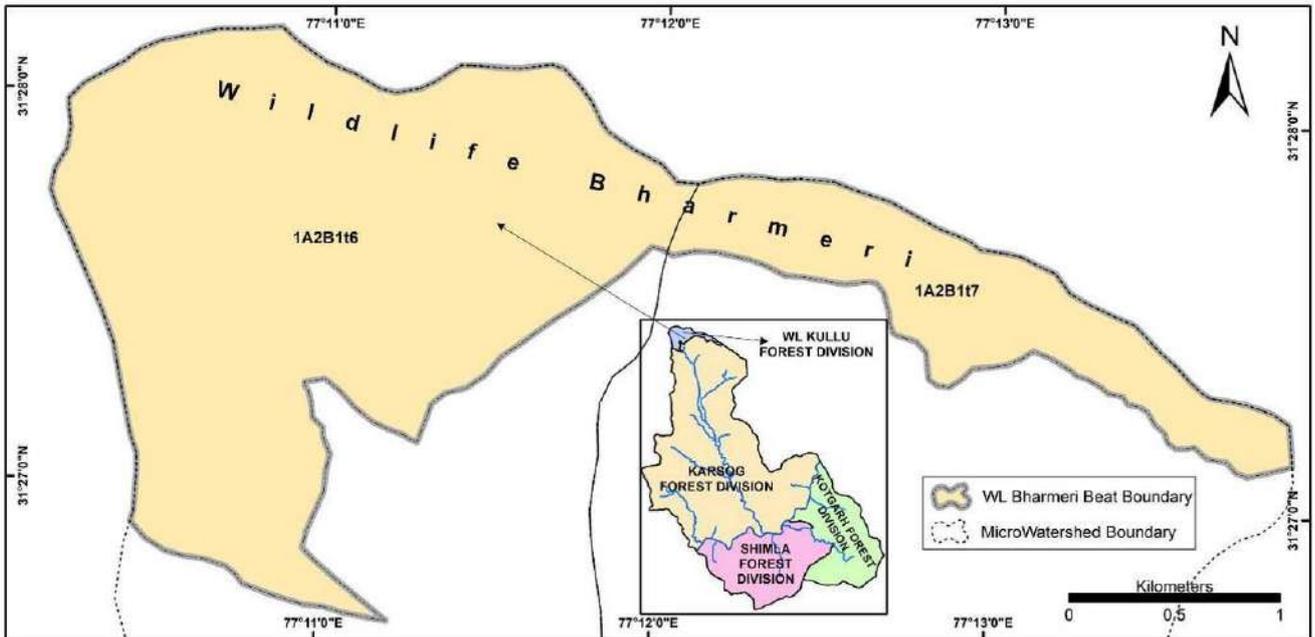
### 6.6 WILDLIFE KULLU FOREST DIVISION

Small part of free draining catchment area on the right bank of Satluj river i.e. source of Shankar Khad, which ultimately is known as Chainre Khad before joining river Satluj at its right bank falls under the jurisdiction of Wildlife Kullu forest division. The area is covered by Bharmeri beat. The total free draining catchment area falling under Wildlife Kullu forest division is **597.08 ha**. List of micro-watershed falling under different administrative unit of Wildlife Kullu forest division is given at **Table 6.6**. A map showing micro-watershed falling under different administrative unit of Wildlife Kullu forest division is given at **Figure 6.4**.

**Table 6.6: List of Micro-Watersheds in the CAT Plan area under Wildlife Kullu Forest Division**

S. No.	Micro-Watershed	Micro-Watershed (as per CCP SRB)	Area (ha)	Name of Range	Name of Block	Name of Beat
1	1A2B1t6*	Si2g	965.60	Wildlife Karsog	Wildlife Shikari Devi	Wildlife Bharmeri
2	1A2B1t7*	Si2g	785.70	Wildlife Karsog	Wildlife Shikari Devi	Wildlife Bharmeri

*\*Note: Part of Micro-Watersheds 1A2B1t6 and 1A2B1t7 falls in Karsog forest division also.*



**Figure 6.4: Map Showing Micro-Watersheds and Forest Administrative Boundaries in the Wildlife Kullu Forest Division under Free Draining Catchment Area**

### 6.6.1 1A2B1t6 Micro-Watershed (Si2g as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
965.60	31°25'46.44" to 31°28'13.16"	77°10'13.76" to 77°12'05.97"	Southern	1779 to 3128	High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Bharmeri	Chhoti Bharmeri	31°27'43.49", 77°10'31.18"	3	93,650	2,80,950
2			Tangrala	31°26'56.81", 77°10'48.14"	3	93,650	2,80,950
3			Bharmeri	31°27'46.31", 77°11'0.94"	3	93,650	2,80,950
<b>TOTAL</b>					<b>9</b>		<b>8,42,850</b>

#### II. Soil & Water Conservation Measures:

##### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Bharmeri	Chhoti Bharmeri	31°27'43.49", 77°10'31.18"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
2		Tangrala	31°26'56.81", 77°10'48.14"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
3		Bharmeri	31°27'46.31", 77°11'0.94"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
<b>TOTAL</b>				<b>15</b>			<b>1,800</b>		<b>1,11,600</b>

##### b) Drainage Line Treatment

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
1	Bharmeri	Bharmeri Nala	31°27'37.63", 77°10'47.58"	Live Hedge	Rmt	350	20	7,000
				Brushwood	Rmt	75	130	9,750
				DRSM Check Dam	5x1.5x1.5m	2	12,290	24,580
				Check Dam Crate Wire	7x1.5x1.5m	2	27,780	55,560
				Check Dam Crate Wire	8x1.5x1.5m	3	31,170	93,510
2	Bharmeri	Tangrala Nala	31°27'16.56", 77°10'52.53"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	65	130	8,450
				DRSM	5x1.5x1.5m	2	12,290	24,580

S. No.	Name of Beat	Name of Nala	Latitude/ Longitude	Kind of Work	Size	Quantity (No.)	Rate (Rs/ No.)	Amount (Rs.)
				Check Dam				
				Check Dam Crate Wire	6x1.5x1.5m	2	23,840	47,680
				Check Dam Crate Wire	8x1.5x1.5m	1	31,170	31,170
3	Bharmeri	Mohrahalla Nala	31°27'38.30", 77°11'9.66"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6500
				DRSM Check Dam	4x1.5x1.5m	2	10,270	20,540
				Check Dam Crate Wire	6x1.5x1.5m	2	23,840	47,680
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
4	Bharmeri	Dhadwar Nala	31°27'29.97", 77°11'41.49"	Live Hedge	Rmt	300	20	6,000
				Brushwood	Rmt	50	130	6,500
				DRSM Check Dam	4x1.5x1.5m	3	10,270	30,810
				Check Dam Crate Wire	5x1.5x1.5m	1	20,130	20,130
				Check Dam Crate Wire	7x1.5x1.5m	1	27,780	27,780
<b>TOTAL</b>								<b>5,08,000</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	8,42,850.00
Soil & Water Conservation Measures	6,19,600.00
<b>TOTAL COST</b>	<b>14,62,450.00</b>

### 6.6.2 1A2B1t7 Micro-Watershed (Si2g as per CCP SRB)

#### Location & Introduction:

Area (ha)	Latitude	Longitude	Aspect	Altitude (m)	Priority Category
785.70	31°25'54.88" to 31°27'53.42"	77°11'51.23" to 77°13'53.14"	South West	1803 to 3110	High

#### I. Afforestation Measures:

S. No.	Name of Sub Component	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Rate (Rs/ ha)	Total Cost (Rs)
1	Enrichment	Bharmeri	Kumarah	31°27'43.40", 77°12'24.86"	3	93,650	2,80,950
<b>TOTAL</b>						<b>3</b>	<b>2,80,950</b>

## II. Soil & Water Conservation Measures:

### a) Moisture Retention Measures

S. No.	Name of Beat	Name of Location	Latitude/ Longitude	Area (ha)	Kind of Work	Size (m)	Quantity (No.)	Rate (Rs)	Amount (Rs.)
1	Bharmeri	Kumarah	31°27'43.40", 77°12'24.86"	3	Staggered Trenches	1x0.3x0.3	600	62	37,200
				<b>3</b>			<b>600</b>		<b>37,200</b>

### SUMMARY OF COST:

Name of Component	Amount (Rs)
Afforestation Measures	2,80,950.00
Soil & Water Conservation Measures	37,200.00
<b>TOTAL COST</b>	<b>3,18,150.00</b>

## 6.7 COST ESTIMATE

The cost required for the various biological and soil & water conservation measures prescribed in the CAT Plan is **Rs 1298.52 lakh**. Out of this, **Rs 755.34 lakh** is required in Karsog Forest Division, **Rs 244.97 lakh** is required in Kotgarh Forest Division, **Rs 280.41 lakh** is required in Shimla Forest Division and **Rs 17.81 lakh** is required in Wildlife Kullu Forest Division. The details are given in **Table 6.7**.

Table 6.7: Cost Required for Treatment Measures in the CAT Plan

S. No.	Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>I</b>	<b>Afforestation Measures</b>										
1	Normal Afforestation (ha)	114	16,158,360	6	850,440	0	0	0	0	120	17,008,800
2	Enrichment Plantation (ha)	194	18,168,100	29	2,715,850	60	5,619,000	12	1,123,800	295	27,626,750
3	Energy Plantation (ha)	10	1,206,900	5	603,450	0	0	0	0	15	1,810,350
4	Grazing Land Development (ha)	13	1,568,970	0	0	0	0	0	0	13	1,568,970
5	Planting of Tall Plants (ha)	35	4,265,100	0	0	52	6,336,720	0	0	87	10,601,820
6	Assisted Natural Regeneration (ha)	0	0	0	0	27	1,196,370	0	0	27	1,196,370
7	Medicinal Plants/ NTFP (ha)	0	0	0	0	25	2,820,500	0	0	25	2,820,500
8	Creation of New Nursery	0	0	2	5,000,000	0	0	0	0	0	5,000,000
9	Upgradation of Existing Nurseries	5	6,700,000	1	2,000,000	1	1,500,000	0	0	0	10,200,000
	<b>Sub Total I</b>		<b>48,067,430</b>		<b>11,169,740</b>		<b>17,472,590</b>		<b>1,123,800</b>		<b>77,833,560</b>
<b>II</b>	<b>Soil &amp; Water Conservation Measures</b>										
10	Moisture Retention Measures (Nos)	47,200	2,926,400	7,100	440,200	10,135	628,370	2,400	148,800	66,835	4,143,770
11	Drainage Line Treatment										
i)	Brushwood (Rmt)	13,415	1,743,950	2,425	315,250	2,885	375,050	240	31,200	18,965	2,465,450
ii)	Live Hedge (Rmt)	53,220	1,064,400	15,300	306,000	17,000	340,000	1250	25,000	86,770	1,735,400
iii)	Dry Stone Check Dam/ Wall (Nos)	374	3,877,690	150	2,613,000	200	5,000,000	9	100,510	733	11,591,200
iv)	Wire Crate Check Dam/ Wall (Nos)	268	7,250,500	99	4,558,000	0	0	13	351,290	380	12,159,790
v)	Stream Channelization (Nos)	5	1,500,000	0	0	8	2,400,000	0	0	13	3,900,000
vi)	Farm Pond Big (Nos)	0	0	0	0	17	425,000	0	0	17	425,000
vii)	Farm Pond Small (Nos)	5	50,000	0	0	140	1,400,000	0	0	145	1,450,000
12	Landslide and Slip Control Measures										
i)	Wire Crate Check Wall (Nos)	55	2,093,270	0	0	0	0	0	0	55	2,093,270
ii)	Wire Crate Retaining Wall (Nos)	12	1,760,150	23	5,094,440	0	0	0	0	35	6,854,590
13	Other Interventions										
i)	Water Harvesting Structure (Nos)	5	1,500,000	0	0	0	0	0	0	5	1,500,000
ii)	Farm Pond Big (Nos)	30	750,000	0	0	0	0	0	0	30	750,000
iii)	Farm Pond Small (Nos)	145	1,450,000	0	0	0	0	0	0	145	1,450,000
14	Silt Monitoring Stations	1	1,500,000	0	0	0	0	0	0	1	1,500,000
	<b>Sub Total II</b>		<b>27,466,360</b>		<b>13,326,890</b>		<b>10,568,420</b>		<b>656,800</b>		<b>52,018,470</b>
	<b>Total Treatment Cost (Sub Total I + II)</b>		<b>75,533,790</b>		<b>24,496,630</b>		<b>28,041,010</b>		<b>1,780,600</b>		<b>129,852,030</b>



## CHAPTER 7

# CAT PLAN COMPONENTS & FINANCIAL PLAN

### 7.1 COMPONENTS OF CAT PLAN – OTHER THAN AFFORESTATION AND SOIL & WATER CONSERVATION

Apart from the afforestation and soil & water conservation measures in the free draining catchment area as discussed in previous chapter, there are other aspects of the CAT Plan to be addressed and their cost included in the overall cost estimate of the plan. The payment for environmental services, eco-tourism, monitoring & evaluation, infrastructural development, research, training and capacity building, forest protection, wildlife protection, etc. are some of the integral ingredients which have to be considered and included while formulating the CAT plans. The CAT plan has been formulated in the light of guidelines issued by the Department of Forest, Himachal Pradesh, vide Notification No. FFE-B-F-(2)-72/2004-Pt-II Shimla, dated 30-09-2009, amended vide Notification No. FFB-B-F-(5)-9/2017 dated 21.11.2019. Modifications have been made wherever necessary.

#### 7.1.1 Infrastructure Development

The component includes maintenance of departmental buildings. Various types of buildings have been constructed in the past. However, there is necessity of maintenance of these buildings. Most of the field staff huts have been damaged and needs to be repaired. The existing forest rest houses also need maintenance. It is proposed to maintain all the buildings as given below in **Table 7.1** in the first two years of the implantation of CAT Plan. The buildings to be taken up for maintenance in the first year and second year may be decided by the respective DFO/ CF/ CCF. A total provision of **Rs. 192.50 lakh** has been kept under this component. Out of this **Rs. 116.50 lakh** has been earmarked for Karsog Forest Division, **Rs. 34.00 lakh** for Kotgarh Forest Division, **Rs. 39.00 lakh** for Shimla Forest Division and **Rs. 3.00 lakh** for WL Kullu Forest Division.

**Table 7.1: List of Buildings Suggested for Maintenance**

S. No.	Name of Division	Name of Range	Name of Block	Name of Beat	Type of Building	L/S Cost (Rs.)
1	Karsog	Karsog	Bagsad	Mahunag	Renovation of F.G.H., Mahunag	200000
2	Karsog	Karsog	Bagsad	Sapnot	Repair of F.G.H., Sapnot	200000
3	Karsog	Karsog	Bagsad	Dharmour	Repair of F.G.H., Sojha	200000
4	Karsog	Karsog	Bagsad	Mahunag	Repair of outhouse at Mahunag	200000
5	Karsog	Karsog	Bagsad	Mahunag	Repair of B.O. Qtr., Mahunag	200000
6	Karsog	Karsog	Bagsad	Mahunag	Repair of FRH, Mahunag	500000
7	Karsog	Karsog	Bagsad	Bagsad	Repair of I.Hut, Bagsad	200000
8	Karsog	Karsog	Mamail	Mamail	Repair of F.G.H., Mamail	200000
9	Karsog	Karsog	Mamail	Banera	Repair of F.G.H., Banera	200000

S. No.	Name of Division	Name of Range	Name of Block	Name of Beat	Type of Building	L/S Cost (Rs.)
10	Karsog	Karsog	Mamail	Mehndi	Repair of F.G.H., Mehndi	200000
11	Karsog	Karsog	Mamail	Kashol	Repair of I.Hut, Kandi	200000
12	Karsog	Karsog	Karsog	Dofa	Maintenance of F.G.H., Nihani	200000
13	Karsog	Karsog	Karsog	Khanukhli	Major renovation F.G.H., Pakhri Dhar	300000
14	Karsog	Karsog	Karsog	Sanarli	Repair & Maintenance of B.O.Qtr., Karsog	200000
15	Karsog	Karsog	Karsog	Sanarli	Major maintenance of old building, I Hut Sanarli	300000
16	Karsog	Karsog	Karsog	Kakahan	Maintenance of Type I Qtr. - 2 sets	400000
17	Karsog	Karsog	Karsog	Kamand	New F.G.H. near Matehal village	2000000
18	Karsog	Seri	Seri	Niharinal	Repair of F.G.H. Campus at Niharinal	300000
19	Karsog	Seri	Seri	Dhamun	Repair of F.G.H., Dhamun	400000
20	Karsog	Seri	Seri	Nanj	Repair of F.G.H., Dateha	400000
21	Karsog	Karsog	Karsog	Kakahan	Major repair of DFO Residence	800000
22	Karsog	Karsog	Karsog	Kakahan	Maintenance of DFO Office	450000
23	Karsog	Karsog	Karsog	Kakahan	Major repair of approach road from bus stand to DFO residence	500000
24	Karsog	Karsog	Karsog	Kakahan	Repair of Karsog Range Compund	300000
25	Karsog	Karsog	Karsog	Kakahan	Major repair of Type II 4 Nos. qtrs. (Old building)	1500000
26	Karsog	Karsog	Karsog	Kakahan	Maintenance of Type-II 3 Nos. qtrs. (new building)	400000
27	Karsog	Karsog	Karsog	Kakahan	Maintenance of Type III Qtr. - 2 sets	700000
<b>SUB TOTAL OF KARSOG FOREST DIVISION</b>						<b>11650000</b>
28	Shimla	Bhajji	Himri	Himri	Maintenance of F.G.H., Himri	200000
29	Shimla	Bhajji	Himri	Sandoa	Maintenance of F.G.H., Sandoa	200000
30	Shimla	Bhajji	Himri	Pandoa	Maintenance of F.G.H., Pandoa	200000
31	Shimla	Bhajji	Himri	Karyali	Construction of F.G.H., Karyali	1400000
32	Shimla	Bhajji	Himri	Himri	Maintenance of B.O.Qtr, Himri	500000
33	Shimla	Bhajji			Maintenance of FRH Bhajji	700000
34	Shimla				Major maintenance of DFO residence	700000
<b>SUB TOTAL OF SHIMLA FOREST DIVISION</b>						<b>3900000</b>
35	Kotgarh	Kumarsain	Kangal		Repair of Chowkidar Qtr.	200000
36	Kotgarh	Kumarsain	Kangal		Repair of outhouse Kutdu	200000
37	Kotgarh	Kumarsain	Kangal	Kangal	Special Repair F.G.H., Kangal	250000
38	Kotgarh	Kumarsain	Kangal	Dhar	Special Repair F.G.H., Dhar	250000
39	Kotgarh	Kumarsain	Baragaon		Repair of B.O.Qtr, Baragaon	250000
40	Kotgarh	Kumarsain	Kangal	Kangal	Repair of B.O.Qtr, Kangal	250000
41	Kotgarh				Maintenance of DFO Office	500000
42	Kotgarh				Major maintenance of DFO residence outhouses	500000
43	Kotgarh				Maintenance of Type II & III Qtr.	500000
44	Kotgarh				Maintenance in Forest Colony at Circle Office Rampur	500000
<b>SUB TOTAL OF KOTGARH FOREST DIVISION</b>						<b>3400000</b>

S. No.	Name of Division	Name of Range	Name of Block	Name of Beat	Type of Building	L/S Cost (Rs.)
45	WL Kullu	WL Karsog	WL Shikari Devi	WL Bharmeri	Extension of Trekker Hut, Shakar Dehra	300000
<b>GRAND TOTAL</b>						<b>19250000</b>

### 7.1.2 Forest Protection

The need for rigorous watch and ward of the forest covered under the free draining catchment area becomes more imperative in view of proposed new plantation under the CAT plan and due to increased human activity in the form of labour, who shall be engaged for forestry works. Thus, fire protection measures including construction and maintenance of fire lines, purchase of fire fighting equipments and hiring of vehicles during fire season have to be undertaken. Besides these, construction/ repair of forest boundary pillars shall also be carried out @ Rs. 5500 per pillar. Forest roads/ paths plays a vital role in forest protection, therefore, provision for the same has also been kept under forest protection. A total provision of **Rs 580.90 lakh** has been kept for this component. Out of this **Rs 374.40 lakh** has been earmarked for Karsog Forest Division, **Rs. 79.50 lakh** for Kotgarh Forest Division, **Rs. 119.50 lakh** for Shimla Forest Division and **Rs. 7.50 lakh** for WL Kullu Forest Division. A summary of budgetary provision kept for forest protection is given in **Table 7.2**:

**Table 7.2: Summary of Budgetary Provision for Forest Protection**

S. No.	Items	Amount (Rs. in Lakh)				
		Karsog Division	Kotgarh Divison	Shimla Division	WL Kullu Divison	Total
<b>I</b>	<b>Construction of Boundary Pillars</b>	100.00	11.00	67.50	0.00	<b>178.50</b>
<b>II</b>	<b>Fire Protection</b>					
1	Purchase of fire fighting equipments	15.00	4.00	10.00	3.50	<b>32.50</b>
2	Hiring of vehicles during fire season (4 vehicles @ Rs 2.5 lakh/ year for 10 years)	50.00	25.00	25.00	0.00	<b>100.00</b>
3	Creation of fire line	35.00	2.50	0.00	0.00	<b>37.50</b>
<b>III</b>	<b>Energy Saving Devices</b>	63.00	3.00	10.00	0.00	<b>76.00</b>
<b>IV</b>	<b>Cultural Operations</b> (Contour Bunding, Tending Operation, Pruning, Bush Cutting etc.)	15.00	4.00	7.00	4.00	<b>30.00</b>
<b>V</b>	<b>Maintenance of roads/ paths</b>	96.40	30.00	0.00	0.00	<b>126.40</b>
	<b>Grand Total</b>	<b>374.40</b>	<b>79.50</b>	<b>119.50</b>	<b>7.50</b>	<b>580.90</b>

#### Fire Protection

As per the Manual of Forest Fire Prevention and Control, 2018 of Himachal Pradesh Forest Department, Karsog and Shimla forest division are highly sensitive to forest fires. To prevent and control forest fire, provision for facilitating measures in the form of fire fighting gears, tools and equipments have been kept in the CAT Plan.

- a. Proper proper fire-fighting gear including fire jacket, helmet, fire resistant back pack with water bottle, smoke masks, fire resistant shoes, fire resistant gloves, etc. for every member of the forest fire fighting crew.

- b. proper tool kit for each forest fire fighting crew including a set of pick axes, spades, shovels, axes, 'darats', jumpers, fire rakes (preferably, 'gorguis' - a multi-action tool), etc.
- c. one set of first aid kit including a compressed air cylinder with each crew.



Apart from this, provision for hiring of vehicles during fire season to control burning of Chir forests and provision for creation of fire lines has been kept.

**Energy Saving Devices**

In order to address the monitoring problem of energy scarcity and its immediate adverse fall out on the forests, the local people have to be encouraged to use energy-efficient alternatives. Under the CAT Plan, provision is being made for demonstration of energy-saving devices like Solar geysers, Solar lights, Solar water pumps, Solar power harnessing devices, etc. Under this component, energy saving devices would be installed at Office complexes, FRH’s etc. for demonstration as well as distributed to the local community. In addition, provision is being made for advanced fuel efficient crematorium in project affected villages also.

**Construction/ Maintenance of roads & paths**

List of roads/ paths suggested for maintenance in the free draining catchment area is given in **Table 7.3**.

**Table 7.3: List of Roads/ Paths Suggested for Maintenance**

S. No.	Name of Division	Name of Range	Name of Block	Name of Beat	Name of Path	Length of Path (km)	L/S Cost (Rs)
1	Karsog	Pangna	Tattapani	Telehan	Repair of Bridal Path from Marola to Chintla village	2	200000
2	Karsog	Karsog	Bagsad	Parlog	Reair of Bridal Path from Chaira to Parlog	6	400000
3	Karsog	Karsog	Bagsad	Parlog	Repair of Bridal Path from Sarthyala to	6	500000

S. No.	Name of Division	Name of Range	Name of Block	Name of Beat	Name of Path	Length of Path (km)	L/S Cost (Rs)
					Jakleen via Manju		
4	Karsog	Karsog	Bagsad	Parlog	Repair of Bridal Path from Parlog to Balau	4	200000
5	Karsog	Karsog	Bagsad	Mahunag	Repair of Bridal Path from Mahunag to Bagh	1.5	100000
6	Karsog	Karsog	Bagsad	Mahunag	Repair of Bridal Path from Tatmo to Chaira	6	400000
7	Karsog	Karsog	Bagsad	Mahunag	Repair of B/Path Mahunag to Jikhri	2	200000
8	Karsog	Karsog	Bagsad	Bagshar	Repair of Path Naroli to Jankhuni	1.5	100000
9	Karsog	Karsog	Bagsad	Bagshar	Repair of Path Bagshar to Gadari	3	200000
10	Karsog	Karsog	Mamail	Mamail	Repair of Path from Bhayal to Nag Kajouni Temple	0.5	300000
11	Karsog	Karsog	Mamail	Mamail	Repair of Path from Lashog to Dhalog village	1.5	400000
12	Karsog	Karsog	Karsog	Dofa	Repair of Village Path from Dofa to Ghanglu	4	400000
13	Karsog	Karsog	Karsog	Dofa	Repair of Village Path from Ghanglu to Smutla Dhar	3	300000
14	Karsog	Karsog	Karsog	Khanukhli	Repair of Village Path from Kothithanar to Murala	1	90000
15	Karsog	Karsog	Karsog	Khanukhli	Repair of Village Path from Narthi to Barshoa	1	150000
16	Karsog	Karsog	Karsog	Khanukhli	Repair of Village Path from Palochi to Shiva Dhera	2	400000
17	Karsog	Karsog	Karsog	Sanarli	Repair of Bridal Path from Madhag to Sainthal	1	100000
18	Karsog	Karsog	Karsog	Sanarli	Repair of Village Path from I.Hut Sanarli to Jhar via Saryogi village	2	200000
19	Karsog	Karsog	Karsog	Sanarli	Repair of approach road from main road to B.O.Qtr.Karsog	0.2	150000
20	Karsog	Karsog	Karsog	Shankar Dehra	Repair of Village Path from Safri Nala to Burnala	3	350000
21	Karsog	Karsog	Karsog	Shankar Dehra	Repair of Village Path from Raigarh to Samutla	5	500000
22	Karsog	Karsog	Karsog	Shankar Dehra	Repair of Village Path from Pukhrar to Lambidhar	4	500000
23	Karsog	Karsog	Karsog	Shankar Dehra	Repair of Village Path from Seri Khad to Samutla	3	400000
24	Karsog	Karsog	Karsog	Kakahan	Maintenance of Bridal	3	300000

S. No.	Name of Division	Name of Range	Name of Block	Name of Beat	Name of Path	Length of Path (km)	L/S Cost (Rs)
					Path from Mashogra to Judli		
25	Karsog	Karsog	Karsog	Kakahan	Maintenance of Bridal Path from Nehot to Shao	2	200000
26	Karsog	Seri	Seri	Niharinal	Repair of Bridal Path from Tanj to Beludhar	6	500000
27	Karsog	Seri	Seri	Niharinal	Repair of Bridal Path from Gadhal to Bhanag	4	400000
28	Karsog	Seri	Seri	Niharinal	Repair of Bridal Path from Beludhar to Berola	7	600000
29	Karsog	Seri	Seri	Dhamun	Repair of Bridal Path from Balidhar to Damel	3	300000
30	Karsog	Seri	Seri	Nanj	Repair of Bridal Path from Choa to Trimbli via Galu	5	400000
31	Karsog	Seri	Seri	Nanj	Repair of Bridal Path from Mamla to Paidhar	5	400000
<b>SUB TOTAL OF KARSOG FOREST DIVISION</b>							<b>9640000</b>
32	Kotgarh	Kumarsain	Baragaon	Ahar	New Bridal Path from Ghati to Derthu	7	700000
33	Kotgarh	Kumarsain	Baragaon	Ahar	New Bridal Path from Deojubbal to Derthu via Kholu Thach	9	900000
34	Kotgarh	Kumarsain	Baragaon	Ahar	Repair of Inspection Path from Narainty to Khudlu	1.5	100000
35	Kotgarh	Kumarsain	Baragaon	Ahar	Repair of Inspection Path from Narainty to Block	6	300000
36	Kotgarh	Kumarsain	Baragaon	Ahar	Repair of Bridal Path from Narkanda to Narainty	7.6	1000000
<b>SUB TOTAL OF KOTGARH FOREST DIVISION</b>							<b>3000000</b>
<b>GRAND TOTAL</b>							<b>12640000</b>

### 7.1.3 Wildlife Protection, Management and Conflict Resolution

The Himalayan region is witnessing a very high and increasing biotic pressure causing degradation and fragmentation of its fragile habitats and putting the survival of many a plant and animal species under threat. Whereas much of this biotic pressure is on account of increased incidence of grazing, both local and migratory, fuel and fodder removals, and extraction of herbs; developmental projects like construction of roads, hydroelectric projects and transmission lines are also making significant contribution to this habitat degradation.

The developmental projects also bring in an influx of outside labour that is generally not concerned about the local environmental customs and traditions, causing damage to the local ecology through various acts of omission and

commission including removal of biomass from forests and poaching. The wild animals become especially susceptible to poaching during winters when water sources tend to freeze at upper reaches and they descend to lower slopes in search of water and food.

The areas hitherto inaccessible used to provide safe heavens to a variety of Himalayan fauna. However, as more and more remote areas are getting connected with road network, even the remote habitats are coming under increased activity, causing threat to the populations of usually shy Himalayan fauna. It would need creating general awareness about conservation imperatives to ensure the long-term survival of Himalayan wildlife.

The components for wildlife protection, management and conflict resolution are based upon the discussions/meeting held with officials of forest department at various levels. The component includes, Purchase of modern tools and equipments; Support to monkey sterilization; and Help to resolve man-animal conflict with emphasis on social land environmental justice especially for farmers. A summary of budgetary provision kept under wildlife management is given in **Table 7.4**. A brief description of the modern tools and equipments suggested under present CAT Plan is given below:

#### **a. Drones**

Drones are proving extremely beneficial in places where humans cannot easily or safely reach, or where we are unable to perform functions in a timely and efficient manner. There is a growing body of literature on the use of drones for monitoring species and their habitats. Mapping habitat allows an assessment of habitat extent, condition and suitability. Under present CAT Plan, it is proposed to procure DJI Phantom 4 pro plus drones as it is easy to operate and have controlled flight manoeuvres. Once, forest staff gets used to it, drones with higher specification and for specific purposes can be purchased.

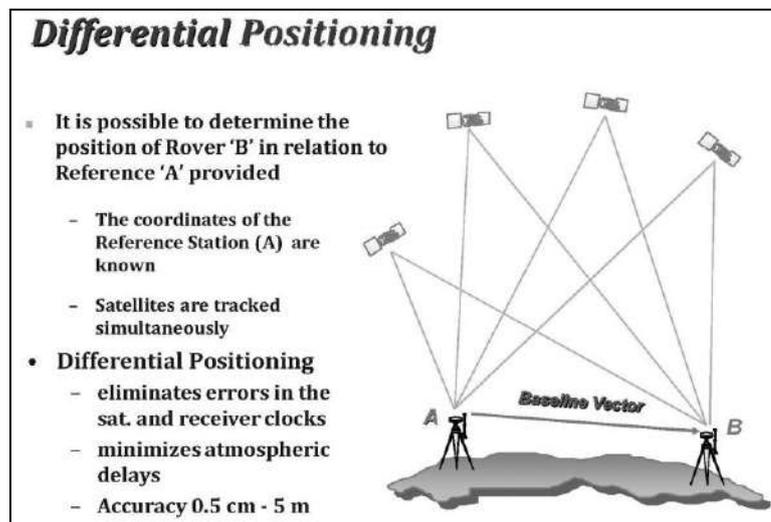
Recently, Drone Technology application and its operational Rules and guidelines were briefed to Field staff from Great Himalayan National Park (GHNP) on 8th and 15th February 2019. The demonstration was a part of an ongoing course for the GHNP at Wildlife Institute of India (WII). Under present CAT Plan it is proposed to collaborate with WII for the application of Drone, technical training and capacity building and purchase of Drones.



**DJI Phantom 4 Pro Plus Drone**

**b. DGPS**

Differential Global Positioning System (DGPS) is an enhancement to Global Positioning System (GPS) that uses a network of fixed, ground-based reference stations to broadcast the difference between the positions indicated by the satellite systems and the known fixed positions. These stations broadcast the difference between the measured satellite pseudoranges and actual (internally computed) pseudoranges, and receiver stations may correct their pseudoranges by the same amount. DGPS can be used for various purposes such as demarcation of protected/ reserved/ unprotected forests, boundary of forest land diverted for various non forestry purpose, boundary of non forest land acquired, boundary of compensatory afforestation plantations, different works carried out by department under state and centrally sponsored schemes etc. Under the present CAT Plan, if needed Trimble DGPS can be procured and used.



**c. GPS**

Global Positioning System (GPS) is a satellite navigation system used to determine the ground position of an object. The GPS system includes 24 satellites deployed in space. The satellites are evenly spread out so that four satellites are accessible via direct line-of-sight from anywhere on the globe. Each GPS satellite broadcasts a message that includes the satellite's current position,

orbit, and exact time. A GPS receiver combines the broadcasts from multiple satellites to calculate its exact position using a process called triangulation. Three satellites are required in order to determine a receiver's location, though a connection to four satellites is ideal since it provides greater accuracy. In order for a GPS device to work correctly, it must first establish a connection to the required number of satellites. This process can take anywhere from a few seconds to a few minutes, depending on the strength of the receiver.

Forest department has been using GPS since last decade or so, therefore they are well verse with the use and application of GPS. However, through this CAT Plan funding it is to ensure that each and every beat guard has a GPS.

#### **d. Cameras**

Photographs are necessary for references and monitor the changes in long period of time. Photographs helps in assessment in change in land use, survival of plantation, monitoring of illegals activities etc. in forest area. DSLR cameras are the cost effective and time saving camera. Specification of camera depends on the users. At present DSLR camera with geo-tagging are available in the market. This feature of camera helps forest managers to monitor the species specific (either flora or fauna) habitat.

#### **e. Trapping Cameras**

Camera trapping refers to the use of remotely triggered cameras. These cameras automatically take images of whatever walks in front of them during day or night time. Most camera trap models are triggered by a passive infrared sensor detecting a moving object warmer than the ambient temperature such as animals, people, or vehicles passing in front of them. Spypoint Trail Camera Model FL-8 and Browning BTC-6 are suggested for monitoring of wildlife through camera trap.

#### **f. Tranquilizer Gun**

A tranquillizer gun is a non-lethal air gun often used for incapacitating animal targets during wildlife emergency situation via anaesthetic drugs usually referred as tranquilizers. Procurement of tranquillizer guns and associated accessories depend on prices, specification and requirement of operating staff of forest department.

#### **g. Range Finder:**

A rangefinder is a device that measures distance from the observer to a target, in a process called ranging. It helps forest staff to monitor movement of wildlife from long distance as well any encroachment and illegal activities in forest area.

It also help forest managers to find actual location of activities in forest area that helps in quick response. Specification of rangefinder depends on requirement of operating staff of forest staff.

#### **h. Binoculars**

Binocular is one of the important tools required by field staff of forest department. Binocular helps in long distance monitoring in during forest trails or from Watch towers. Binoculars having specification of 8 x 40, 10 x 42 is suggested for monitoring in forest areas.”

The other tools and equipments include, Compass, which already associated with GPS, High beam torches, Sleeping bags, Tents etc.

A total provision of **Rs. 232.12 lakh** has been kept for various activities under wildlife protection, management and conflict resolution. Out of this **Rs. 102.50 lakh** has been earmarked for Karsog Forest Division, **Rs. 49.25 lakh** for Kotgarh Forest Division, **Rs. 55.50 lakh** for Shimla Forest Division and **Rs. 24.87 lakh** for WL Kullu Forest Division.

In addition, for WL Kullu forest division, components for wildlife protection, management and conflict resolution are also based upon “Standardization of norms for the Wild life component in the CAT Plans of Hydro Electric Project in the State” issued by the Department of Forest, Himachal Pradesh, vide Letter No. Ft.CAMPA/82/2011/Miyar/HEP/CP (**Annexure V**). A summary of additional budgetary provision i.e. **Rs. 2.61 lakh** is given in **Table 7.5**.

Therefore, total provision kept for various activities under wildlife protection, management and conflict resolution is **Rs 234.73 lakh**. Out of this **Rs. Rs. 102.50 lakh** has been earmarked for Karsog Forest Division, **Rs. 49.25 lakh** for Kotgarh Forest Division, **Rs. 55.50 lakh** for Shimla Forest Division and **Rs. 27.48 lakh** for WL Kullu Forest Division.

**Table 7.4: Summary of Budgetary Provision for Wildlife Protection, Management and Conflict Resolution**

S. No.	Activities	Amount (Rs. in Lakh)				
		Karsog Division	Kotgarh Divison	Shimla Division	WL Kullu Divison	Total
1	Modern tools and equipments (drone cameras, binoculars, DGPS, GPS, trapping cameras, tranquilizer gun, range finder, compass, sleeping bags, tents, high beam torches etc.)	90.00	32.15	36.13	24.58	<b>182.86</b>
2	Help resolve man-animal conflict with emphasis on social land environmental	12.50	17.10	19.37	0.29	<b>49.26</b>

S. No.	Activities	Amount (Rs. in Lakh)				
		Karsog Division	Kotgarh Divison	Shimla Division	WL Kullu Divison	Total
	justice especially for farmers					
	<b>TOTAL</b>	<b>102.50</b>	<b>49.25</b>	<b>55.50</b>	<b>24.87</b>	<b>232.12</b>

**Table 7.5: Summary of Additional Budgetary Provision for Wildlife Protection, Management and Conflict Resolution in WL Kullu Forest Division**

S. No.	Activities	Amount (Rs.)
1.1	Planning Perspective, Approach and Objectives	5,800.00
	Landscape/ an Eco regional Perspective	
	The key issues	
	Planning approach	
	Objectives	
	Working with the local communities to reduce/ mitigate their dependencies on the natural resources and focus on strategies for coexistence. (Wildlife and humans)	
1.2	Asses the strengths and assets of the natural resources dependent community members (with an emphasis on the women of poor households) to establish explicit links between the CAT plan activities and livelihood priorities of these people. Bae line surveys	8,700.00
1.3	Facilitate organizing of sustainable community based organizations, user groups of rural poor and women, preferable with strong linkages to the local village councils known as Panchayat. Establish the biodiversity conservation efforts at Panchayat level through the consultative process of micro planning.	14,500.00
	Formation of Self Help Groups	
	Preparation of CAT Plan	
2	Implementation	
2.1	Implementation of developmental or income generation programs so that they better address the livelihood priorities of the local people and facilitate conservation of the CAT Plan area biodiversity	145,000.00
	Income generation activities based on micro-planning	
	Extension activities for WL awareness	
	Energy saving devices	
	Non conventional energy such as solar	
2.2	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers	Already covered in Table 7.4
	Herd insurance scheme. L.S. funds for watchman/ compensation for animal damage to crops	
	Chemical Restrain: Traps, Cages	
2.3	WL Habitat Management: Maintain and protect the natural vegetation communities, populations of large ungulates (with emphasis on Himalayan species), carnivores and pheasants: Protection of unique WL habitats such as gorges, burrowing sites of WL, etc.	72,500.00
3	Training	
3.1	Develop competence based training programmes including Monkey & Wild Life Trapping for the Forest staff and the local community, gun licence holder, and NGOs	5,800.00
4	Research & Monitoring	
4.1	Provide facilities and opportunities in natural areas for purposes of formal and informal education, research and the study and the Long Term Ecological (LTEM)	5,800.00
5	Contingency	
5.1	Contingency, other interventions.	2,900.00
	<b>Total</b>	<b>261,000.00</b>

### 7.1.4 Operational Support

Provision has been made in the CAT Plan to provide operation support to the implementing agency in the form of vehicle; Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.; Office furniture; Maintenance of machinery and equipments; Amenities to staff etc. for better implementation of CAT Plan. A total provision of **Rs. 196.00 lakh** has been ear-marked for operation support. Out of this **Rs. 108.50 lakh** has been earmarked for Karsog Forest Division, **Rs. 32.00 lakh** for Kotgarh Forest Division, **Rs. 42.00 lakh** for Shimla Forest Division, and **Rs. 13.50 lakh** for Wildlife Kullu Forest Division. A summary of budgetary provision kept for operational support is given in **Table 7.6**.

**Table 7.6: Summary of Budgetary Provision for Operational Support**

S. No.	Activities	Amount (Rs. in Lakh)				
		Karsog Division	Kotgarh Divison	Shimla Division	WL Kullu Divison	Total
1	Hiring of vehicle for transportation support to forest staff	35.00	10.00	25.00	10.00	<b>80.00</b>
2	Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.	20.00	8.50	0.00	1.00	<b>29.50</b>
3	Misc. Office furniture Almirahs, File racks etc.	15.00	4.00	0.00	0.00	<b>19.00</b>
4	Maintenance of machinery and equipments	10.00	3.00	7.00	1.00	<b>21.00</b>
5	Inverter in offices	5.00	3.00	0.00	0.00	<b>8.00</b>
6	Amenities to staff	15.00	3.50	10.00	1.50	<b>30.00</b>
7	CCTV Cameras for all Ranges & Divisional Office in	8.50	0.00	0.00	0.00	<b>8.50</b>
	<b>TOTAL</b>	<b>108.50</b>	<b>32.00</b>	<b>42.00</b>	<b>13.50</b>	<b>196.00</b>

### 7.1.5 Payment for Environmental Services

Payment for Environmental Services (PES) is a concept of reward for good conservation behaviour to the community living in the catchment. It is a tool to incentivize the local communities for sustainable and environmentally friendly use of the catchment. The PES programs pay users to conduct environmentally friendly initiatives or to give up destructive practices. The general criteria to a successful PES includes (i) voluntary transactions, which in present case will be done by forest department for the environmental services; (ii) well-defined Environmental Service, which in present case are all the measures that will reduce soil erosion; (iii) buyer for Environmental Service, which in present case is local community; (iv) seller for Environmental Service, which in present case is forest department; and (v) payment is conditional upon receiving Environmental Service which in present case will be followed as per the norms of forest department.

The first-ever PES agreement in India between the Village Forest Development Society (VFDS) and the Palampur Municipal Council formalised in October 2010, for the conservation and recharges of Bohal spring is a classic example of rural-urban engagement model for the sustainable supply of water and protection of the catchment area.

An indicative and not exhaustive activities that can be considered under PES are distribution of GI pipes for grass stacking, incentive for freezing of land use, incentive for survival of plantation, incentive for reduction of biotic pressure, incentive for reduction of forest fire, incentive for reduction for encroachment on forest land, incentive for maintenance & improved water resources, incentive for rotational grazing, incentive for organic farming in private land, incentive for stall feeding etc.

It is suggested to form a committee under the chairmanship of respective DFO and with representations from Range Office, SJVN Ltd., Agriculture Department, Horticulture Department, Animal Husbandry Department, VFD/ Panchayat. Such a committee shall prepare a need based plan/ road map for undertaking various PES activities. This need based plan/ road map shall be approved by respective CCF/CF/Nodal Officer before being implemented. A total provision of **Rs. 408.30 lakh** has been ear-marked under PES. Out of this **Rs. 252.50 lakh** has been earmarked for Karsog Forest Division, **Rs. 70.00 lakh** for Kotgarh Forest Division, **Rs. 80.00 lakh** for Shimla Forest Division, and **Rs. 5.80 lakh** for Wildlife Kullu Forest Division.

### **7.1.6 Eco-Tourism**

‘Eco-tourism’, in a very broad sense, means venturing into and enjoying nature in such a way as to assure that negative impacts on the cultural and natural environment are minimized and mitigated. It is, therefore, ‘responsible’ tourism, which, besides being ecologically and culturally sensitive, helps the local communities in realizing social and economic benefits.

Himachal Pradesh, known for its rich natural heritage, is amongst the top tourist destinations in the country, both national as well as international visitors. However, much of the tourism related activity is concentrated in four major locations, Shimla, Manali, Dharamshala and Dalhousie. A majority of the visitors do not get an opportunity to experience the rich bio-cultural diversity contained in the many Forest areas, Sanctuaries and National Parks that comprise such a large part of Himachal Pradesh.

The Forest Department of Himachal Pradesh, realizing the potential of ecotourism in the State, has enunciated a Policy on Development of Eco-tourism in Himachal Pradesh (2005), Re-Revised in the year 2017, wherein blueprint for development of ecotourism in the State has been provided. The policy is based on the understanding that involvement of local communities in eco-tourism would support their livelihood needs and consequently create a stake for them in the conservation of local culture, ecology and environment.

### **Strategy for Developing Ecotourism**

The principles outlined in the Re-Revised Policy will be pursued through a appropriate strategy that comprise the following components:-

- A. Institutional Arrangements: Forest Department has created a Special Purpose Vehicle (SPV) in the form of 'Himachal Pradesh Ecotourism Society' (HP ECOSOC), registered vide No. 422 dated 30-06-2006 under the Registration rule of Societies Act 1860 to assist in delivering the mission and objectives of the Policy. HEP ECOSOC will work with eco-tourism Societies at Division/ Circle level.
- B. Creating awareness and capacity building of the principal stakeholders.
- C. Community involvement
- D. Coordinate with partner departments
- E. Marketing
- F. Important stakeholders and their functions, which comprises of visitors, local communities, HP ECOSOC, Division/ Circle level societies, Government departments, Concerned panchayat, BDC and Zilla Parishad and Partners managing sites
- G. Development & management of eco-tourism assets
- H. Development and management of new eco-tourism sites through departmental mode and public private partnership (PPP)
- I. Impact assessment studies, research and 'do not disturb' practices
- J. Future policy for existing sites – impact assessment studies
- K. Eco-club

### **Strategy for Developing Ecotourism in Free Draining Catchment Area**

Under the present CAT plan, it is suggested that CCF (Eco-tourism) shall prepare a comprehensive plan for eco-tourism development activities. The actual implementation of the eco-tourism activities will initiate only after approval of the plan.

Some of the eco-tourism development activities that can be included in the plan to be prepared by Circle level eco-tourism society in consultation with HP ECOSOC/ CCF (Eco-tourism) are construction of 1 km eco-trail, each at Raigarh, Behli

(Mahunag) and Dhamoon in Karsog forest division. In Kotgarh forest division, area having good potential to be developed as ecotourism sites includes, Kotgarh, Narkanda, Nankhari and 15/20 area of Shimla district.

A total provision of **Rs 52.00 lakh** has been earmarked for eco-tourism. Out of this **Rs 28.00 lakh** has been earmarked for Karsog Forest Division, **Rs. 15.00 lakh** for Kotgarh Forest Division, **Rs. 8.00 lakh** for Shimla Forest Division and **Rs. 1.00 lakh** for WL Kullu Forest Division.

### **7.1.7 Research, Training and Capacity Building**

The component includes Participatory Action Research for site/issue specific research/study/survey. Such studies shall be undertaken by either WII, HFRI/ICFRE etc. Training and Capacity building of forest staff shall be an integral part of such studies. The Nodal Officer shall submit a comprehensive plan for the whole project area to PCCF (HoFF) for prior approval. The provision for outlay of **Rs 198.50 lakh** has been allocated under the scheme.

### **7.1.8 Monitoring and Evaluation**

Monitoring and Evaluation will be carried out as per the standard procedure of monitoring and evaluation of development works in the Himachal Pradesh Forest Department (HPFD). The standard procedure of monitoring and evaluation of development works in the HPFD is given at **Annexure VI**.

For the physical monitoring, a provision of **Rs 141.85 lakh** has been made. Out of this **Rs 85.00 lakh** has been earmarked for Karsog Forest Division, **Rs. 24.50 lakh** for Kotgarh Forest Division, **Rs. 30.90 lakh** for Shimla Forest Division and **Rs. 1.45 lakh** for WL Kullu Forest Division.

Apart from physical monitoring it is essential to introduce the innovative technologies for online real time monitoring and evaluation of development works. For the online monitoring, a provision of **Rs. 96.00 lakh** has been made. Nodal Officer shall submit a plan for online monitoring of project work to PCCF (HoFF) for its approval.

### **7.1.9 Joint Forest Management & Micro Planning**

The works specified under the CAT Plan except Engineering/ Technical works shall be executed based on the model of JFM. Provisions have been made for plantations in degraded forest land, NTFP plantation and other afforestation measures. VFDs shall be formed for this specific purpose besides this the active Mahila Mandals and Yuvak Mandals and Local NGOs shall be approached to carry out the various works of the CAT Plan. Considering the immense potential

and genuine need for women's participation in JFM programme, also the women folk shall be involved in the above activities. 30% of the plantation works in the CAT Plan shall be carried out through JFMC during the plan period. Atleast 50% members of the JFM general body should be women. For the general body meeting, the presence of at least 50% women members should be prerequisite. Instead of hiring the labour, local people and committees shall be engaged for the CAT Plan works such as plantation and maintenance etc. The wages shall be met out from the provision incorporated in the norms.

In order to achieve the targets training programmes aimed at awareness and education of the local people and building their capacity for sustainable natural resource management in the catchment will be organised. Some of the activities for which these funds are to be utilized are as under:

- Workshops of JFMC, around 30 in nos.
- Exposure visit to institutes like HFRI, at Panthagathi, at Palampur etc.
- Plantation activities
- Soil & moisture activities (only for small farm ponds)
- Repair of forest path

Under the components, a provision of **Rs 60.00 lakh** has been made. Out of this **Rs 50.00 lakh** has been earmarked for Karsog Forest Division, **Rs. 5.00 lakh** for Kotgarh Forest Division and **Rs. 5.00 lakh** for Shimla Forest Division.

#### **7.1.10 Contingencies**

Outlay in the CAT Plan for various components has been worked out on the wage rate of labour, market rate and as per H.P. Forest Department schedule rate. Efforts have been made to restrict the expenditure but access and deficit may occur as per the allocation of funds and escalation of wage rate and cost of material etc. Since the CAT Plan has to be implemented over a period of ten years, hence in the eventuality of burned or in order to accommodate any further increase in the cost of the plan, on account of increase in wages, cost of material etc. a provision of **Rs. 374.70 lakh** has been made. Out of this **Rs 230.00 lakh** has been earmarked for Karsog Forest Division, **Rs. 62.00 lakh** for Kotgarh Forest Division, **Rs. 74.00 lakh** for Shimla Forest Division and **Rs. 8.70 lakh** for WL Kullu Forest Division.

This provision could also be utilized to meet any unforeseen expenses arising in future and necessary for the achievement of the objectives of the CAT Plan. Similarly, any unspent amount left during the plan period it will be utilized by proposing the additional works in consonance with project objectives which are not covered in the CAT plan with the prior approval of the competent authority.

## 7.2 COST ESCALATION

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The present cost projections are based on the prevailing wage rates for the year 2020-21. The cost of the project will escalate as and when wage rates are hiked by the H.P. Government from time to time. In such an eventuality, CAT Plan will be recasted for proportionate increase in the cost of material, wages, etc.

## 7.3 FINANCIAL PLAN

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The cost required for Catchment Area Treatment is **Rs. 3834.00 lakh**. The details are given in **Tables 7.7**. The physical and financial targets for CAT Plan are given at **Table 7.8**. The physical and financial targets for CAT Plan in Karsog, Kotgarh, Shimla and Wildlife Kullu Forest Division are given at **Table 7.9** to **Table 7.12** respectively. The Annual Plan of Operations (APO) for a period of 10 years are given at **Annexure VII**.

Table 7.7: Cost Estimate of CAT Plan

S. No.	Year Wise Treatment Plan	Karsog Forest Division			Kotgarh Forest Division			Shimla Forest Division			WL Kullu Forest Division			Total		
		Phy.	Fin. (Rs)	%	Phy.	Fin. (Rs)	%	Phy.	Fin. (Rs)	%	Phy.	Fin. (Rs)	%	Phy.	Fin. (Rs)	%
<b>1</b>	<b>Biological Measures</b>															
i)	Normal Afforestation (ha)	114	16,158,360		6	850,440		0	0		0	0		120	17,008,800	
ii)	Enrichment Plantation (ha)	194	18,168,100		29	2,715,850		60	5,619,000		12	1,123,800		295	27,626,750	
iii)	Energy Plantation (ha)	10	1,206,900		5	603,450		0	0		0	0		15	1,810,350	
iv)	Grazing Land Development (ha)	13	1,568,970		0	0		0	0		0	0		13	1,568,970	
v)	Planting of Tall Plants (ha)	35	4,265,100		0	0		52	6,336,720		0	0		87	10,601,820	
vi)	Assisted Natural Regeneration (ha)	0	0		0	0		27	1,196,370		0	0		27	1,196,370	
vii)	Medicinal Plants/ NTFP (ha)	0	0		0	0		25	2,820,500		0	0		25	2,820,500	
viii)	Creation of New Nursery				2	5,000,000						0			5,000,000	
ix)	Upgradation of Existing Nurseries	5	6,700,000		1	2,000,000		1	1,500,000			0			10,200,000	
	<b>Sub Total</b>		<b>48,067,430</b>	<b>22.86</b>		<b>11,169,740</b>	<b>18.13</b>		<b>17,472,590</b>	<b>23.79</b>		<b>1,123,800</b>	<b>13.03</b>		<b>77,833,560</b>	<b>20.30</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>															
i)	Moisture Retention Measures (Nos)	47,200	2,926,400		7,100	440,200		10,135	628,370		2,400	148,800		66,835	4,143,770	
ii)	Drainage Line Treatment															
a	Brushwood (Rmt)	13,415	1,743,950		2,425	315,250		2,885	375,050		240	31,200		18,965	2,465,450	
b	Live Hedge (Rmt)	53,220	1,064,400		15,300	306,000		17,000	340,000		1250	25,000		86,770	1,735,400	
c	Dry Stone Check Dam/ Wall (Nos)	374	3,877,690		150	2,613,000		200	5,000,000		9	100,510		733	11,591,200	
d	Wire Crate Check Dam/ Wall (Nos)	268	7,250,500		99	4,558,000		0	0		13	351,290		380	12,159,790	
e	Water Harvesting Structure (Nos)	5	1,500,000		0	0		8	2,400,000		0	0		13	3,900,000	
f	Farm Pond Big (Nos)	0	0		0	0		17	425,000		0	0		17	425,000	
g	Farm Pond Small (Nos)	5	50,000		0	0		140	1,400,000		0	0		145	1,450,000	
iii)	Landslide and Slip Control Measures															
a	Wire Crate Check Wall (Nos)	55	2,093,270		0	0		0	0		0	0		55	2,093,270	
b	Wire Crate Retaining Wall (Nos)	12	1,760,150		23	5,094,440		0	0		0	0		35	6,854,590	
iv)	Other Interventions															
a	Water Harvesting Structure (Nos)	5	1,500,000		0	0		0	0		0	0		5	1,500,000	
b	Farm Pond Big (Nos)	30	750,000		0	0		0	0		0	0		30	750,000	
c	Farm Pond Small (Nos)	145	1,450,000		0	0		0	0		0	0		145	1,450,000	
v)	Silt Monitoring Stations	1	1,500,000		0	0		0	0		0	0		1	1,500,000	
	<b>Sub Total</b>		<b>27,466,360</b>	<b>13.06</b>		<b>13,326,890</b>	<b>21.63</b>		<b>10,568,420</b>	<b>14.39</b>		<b>656,800</b>	<b>7.62</b>		<b>52,018,470</b>	<b>13.57</b>
<b>3</b>	<b>Infrastructure Development</b>															
i)	Maintenance of departmental buildings		11,650,000	5.54		3,400,000	5.52		3,900,000	5.31		300,000	3.48		19,250,000	5.02
<b>4</b>	<b>Forest Protection</b>															
i)	Construction of Boundary Pillars		10,000,000			1,100,000			6,750,000			0			17,850,000	
ii)	Purchase of fire fighting equipments		1,500,000			400,000			1,000,000			350,000			3,250,000	
iii)	Hiring of vehicles during fire season		5,000,000			2,500,000			2,500,000			0			10,000,000	
iv)	Creation of fire line		3,500,000			250,000			0			0			3,750,000	
v)	Energy Saving Devices		6,300,000			300,000			1,000,000			0			7,600,000	
vi)	Cultural Operations		1,500,000			400,000			700,000			400,000			3,000,000	
vii)	Maintenance of roads/ paths		9,640,000			3,000,000			0			0			12,640,000	
	<b>Sub Total</b>		<b>37,440,000</b>	<b>17.81</b>		<b>7,950,000</b>	<b>12.90</b>		<b>11,950,000</b>	<b>16.27</b>		<b>750,000</b>	<b>8.70</b>		<b>58,090,000</b>	<b>15.15</b>
<b>5</b>	<b>Wildlife protection, management and conflict resolution</b>															

S. No.	Year Wise Treatment Plan	Karsog Forest Division			Kotgarh Forest Division			Shimla Forest Division			WL Kullu Forest Division			Total		
		Phy.	Fin. (Rs)	%	Phy.	Fin. (Rs)	%	Phy.	Fin. (Rs)	%	Phy.	Fin. (Rs)	%	Phy.	Fin. (Rs)	%
i)	Modern tools and equipments		9,000,000			3,215,000			3,612,500			2,458,000			18,285,500	
ii)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		1,250,000			1,710,000			1,937,500			29,000			4,926,500	
iii)	Planning		0			0			0			29,000			29,000	
iv)	Implementation		0			0			0			217,500			217,500	
v)	Training		0			0			0			5,800			5,800	
vi)	Research & Monitoring		0			0			0			5,800			5,800	
vii)	Contingency		0			0			0			2,900			2,900	
	<b>Sub Total</b>		<b>10,250,000</b>	<b>4.87</b>		<b>4,925,000</b>	<b>7.99</b>		<b>5,550,000</b>	<b>7.56</b>		<b>2,748,000</b>	<b>31.87</b>		<b>23,473,000</b>	<b>6.12</b>
<b>6</b>	<b>Operational Support</b>															
i)	Transportation support to forest staff		3,500,000			1,000,000			2,500,000			1,000,000			8,000,000	
ii)	Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.		2,000,000			850,000			0			100,000			2,950,000	
iii)	Misc. Office furniture Almirahs, File racks etc.		1,500,000			400,000			0			0			1,900,000	
iv)	Maintenance of machinery and equipments		1,000,000			300,000			700,000			100,000			2,100,000	
v)	Inverter in offices		500,000			300,000			0			0			800,000	
vi)	Amenities to staff		1,500,000			350,000			1,000,000			150,000			3,000,000	
vii)	CCTV Cameras All Ranges & Divisional Office		850,000			0			0			0			850,000	
	<b>Sub Total</b>		<b>10,850,000</b>	<b>5.16</b>		<b>3,200,000</b>	<b>5.19</b>		<b>4,200,000</b>	<b>5.72</b>		<b>1,350,000</b>	<b>15.65</b>		<b>19,600,000</b>	<b>5.11</b>
<b>7</b>	<b>Payment of Environmental Services</b>		<b>25,250,000</b>	<b>12.01</b>		<b>7,000,000</b>	<b>11.36</b>		<b>8,000,000</b>	<b>10.89</b>		<b>580,000</b>	<b>6.73</b>		<b>40,830,000</b>	<b>10.65</b>
<b>8</b>	<b>Eco-tourism</b>		<b>2,800,000</b>	<b>1.33</b>		<b>1,500,000</b>	<b>2.43</b>		<b>800,000</b>	<b>1.09</b>		<b>100,000</b>	<b>1.16</b>		<b>5,200,000</b>	<b>1.36</b>
<b>9</b>	<b>Research, Training and Capacity Building*</b>		<b>0</b>	<b>0.00</b>		<b>0</b>	<b>0.00</b>		<b>0</b>	<b>0.00</b>		<b>0</b>	<b>0.00</b>		<b>19,850,000</b>	<b>5.18</b>
<b>10</b>	<b>Monitoring &amp; Evaluation**</b>		<b>8,500,000</b>	<b>4.04</b>		<b>2,450,000</b>	<b>3.98</b>		<b>3,090,000</b>	<b>4.21</b>		<b>145,000</b>	<b>1.68</b>		<b>23,785,000</b>	<b>6.20</b>
<b>11</b>	<b>Joint Forest Management &amp; Micro Planning</b>		<b>5,000,000</b>	<b>2.38</b>		<b>500,000</b>	<b>0.81</b>		<b>500,000</b>	<b>0.68</b>		<b>0</b>	<b>0.00</b>		<b>6,000,000</b>	<b>1.56</b>
<b>12</b>	<b>Contingencies</b>		<b>23,000,000</b>	<b>10.94</b>		<b>6,200,000</b>	<b>10.06</b>		<b>7,400,000</b>	<b>10.08</b>		<b>870,000</b>	<b>10.09</b>		<b>37,470,000</b>	<b>9.77</b>
	<b>Grand Total</b>		<b>210,273,790</b>	<b>100.00</b>		<b>61,621,630</b>	<b>100.00</b>		<b>73,431,010</b>	<b>100.00</b>		<b>8,623,600</b>	<b>100.00</b>		<b>383,400,030</b>	<b>100.00</b>
	<b>Or Say</b>														<b>383,400,000</b>	<b>100.00</b>

**Note:** \* = Funds under Research, Training and Capacity Building have not been distributed Forest Division wise as utilization of these funds will be decided by the office of PCCF (HoFF), HPFD

\*\* = Total of funds under Monitoring & Evaluation also includes Rs. 96.00 lakh which are suggested for online monitoring, plan for its utilization will be prepared by Nodal Officer

**Table 7.8: Year wise target (physical and financial) for Catchment Area Treatment Plan**

S. No.	Year Wise Treatment Plan	Year - 1 (2021-22)		Year - 2 (2022-23)		Year - 3 (2023-24)		Year - 4 (2024-25)		Year - 5 (2025-26)		Year - 6 (2026-27)		Year - 7 (2027-28)		Year - 8 (2028-29)		Year - 9 (2029-30)		Year - 10 (2030-31)		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)																
1	<b>Biological Measures</b>																						
i)	<b>Normal Afforestation (ha)</b>			78	7,388,160	42	3,978,240															120	11,366,400
	1 <sup>st</sup> Year maintenance					78	1,083,420	42	583,380													120	1,666,800
	2 <sup>nd</sup> Year maintenance							78	727,740	42	391,860											120	1,119,600
	3 <sup>rd</sup> Year maintenance									78	371,280	42	199,920									120	571,200
	4 <sup>th</sup> Year maintenance											78	371,280	42	199,920							120	571,200
	5 <sup>th</sup> Year maintenance													78	371,280	42	199,920					120	571,200
	6 <sup>th</sup> Year maintenance															78	371,280	42	199,920			120	571,200
	7 <sup>th</sup> Year maintenance																	78	371,280	42	199,920	120	571,200
ii)	<b>Enrichment Plantation (ha)</b>			152	9,006,000	143	8,472,750															295	17,478,750
	1 <sup>st</sup> Year maintenance					152	1,535,200	143	1,444,300													295	2,979,500
	2 <sup>nd</sup> Year maintenance							152	1,033,600	143	972,400											295	2,006,000
	3 <sup>rd</sup> Year maintenance									152	532,000	143	500,500									295	1,032,500
	4 <sup>th</sup> Year maintenance											152	532,000	143	500,500							295	1,032,500
	5 <sup>th</sup> Year maintenance													152	532,000	143	500,500					295	1,032,500
	6 <sup>th</sup> Year maintenance															152	532,000	143	500,500			295	1,032,500
	7 <sup>th</sup> Year maintenance																	152	532,000	143	500,500	295	1,032,500
iii)	<b>Energy Plantation (ha)</b>			10	736,700	5	368,350															15	1,105,050
	1 <sup>st</sup> Year maintenance					10	138,900	5	69,450													15	208,350
	2 <sup>nd</sup> Year maintenance							10	93,300	5	46,650											15	139,950
	3 <sup>rd</sup> Year maintenance									10	47,600	5	23,800									15	71,400
	4 <sup>th</sup> Year maintenance											10	47,600	5	23,800							15	71,400
	5 <sup>th</sup> Year maintenance													10	47,600	5	23,800					15	71,400
	6 <sup>th</sup> Year maintenance															10	47,600	5	23,800			15	71,400
	7 <sup>th</sup> Year maintenance																	10	47,600	5	23,800	15	71,400
iv)	<b>Grazing Land Development (ha)</b>			9	663,030	4	294,680															13	957,710
	1 <sup>st</sup> Year maintenance					9	125,010	4	55,560													13	180,570
	2 <sup>nd</sup> Year maintenance							9	83,970	4	37,320											13	121,290
	3 <sup>rd</sup> Year maintenance									9	42,840	4	19,040									13	61,880
	4 <sup>th</sup> Year maintenance											9	42,840	4	19,040							13	61,880
	5 <sup>th</sup> Year maintenance													9	42,840	4	19,040					13	61,880
	6 <sup>th</sup> Year maintenance															9	42,840	4	19,040			13	61,880
	7 <sup>th</sup> Year maintenance																	9	42,840	4	19,040	13	61,880
v)	<b>Planting of Tall Plants (ha)</b>			21	2,051,910	66	6,448,860															87	8,500,770
	1 <sup>st</sup> Year maintenance					21	167,475	66	526,350													87	693,825
	2 <sup>nd</sup> Year maintenance							21	92,400	66	290,400											87	382,800
	3 <sup>rd</sup> Year maintenance									21	49,455	66	155,430									87	204,885
	4 <sup>th</sup> Year maintenance											21	49,455	66	155,430							87	204,885
	5 <sup>th</sup> Year maintenance													21	49,455	66	155,430					87	204,885
	6 <sup>th</sup> Year maintenance															21	49,455	66	155,430			87	204,885
	7 <sup>th</sup> Year maintenance																	21	49,455	66	155,430	87	204,885
vi)	<b>Assisted Natural regeneration (ha)</b>					27	886,140															27	886,140
	1 <sup>st</sup> Year maintenance							27	88,290													27	88,290
	2 <sup>nd</sup> Year maintenance									27	61,290											27	61,290
	3 <sup>rd</sup> Year maintenance											27	32,130									27	32,130
	4 <sup>th</sup> Year maintenance													27	32,130							27	32,130
	5 <sup>th</sup> Year maintenance															27	32,130					27	32,130
	6 <sup>th</sup> Year maintenance																	27	32,130			27	32,130

S. No.	Year Wise Treatment Plan	Year - 1 (2021-22)		Year - 2 (2022-23)		Year - 3 (2023-24)		Year - 4 (2024-25)		Year - 5 (2025-26)		Year - 6 (2026-27)		Year - 7 (2027-28)		Year - 8 (2028-29)		Year - 9 (2029-30)		Year - 10 (2030-31)		Total		
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)							
	7 <sup>th</sup> Year maintenance																			27	32,130	27	32,130	
vii)	Medicinal Plants/ NTFP (ha)					25	2,248,500															25	2,248,500	
	1 <sup>st</sup> Year maintenance							25	156,750													25	156,750	
	2 <sup>nd</sup> Year maintenance									25	126,500											25	126,500	
	3 <sup>rd</sup> Year maintenance											25	96,250									25	96,250	
	4 <sup>th</sup> Year maintenance													25	96,250							25	96,250	
	5 <sup>th</sup> Year maintenance															25	96,250					25	96,250	
viii)	<b>Creation of New Nursery</b>		5,000,000																				5,000,000	
ix)	<b>Upgradation of Existing Nurseries</b>		10,200,000																				10,200,000	
	<b>Sub Total</b>		<b>15,200,000</b>	<b>270</b>	<b>19,845,800</b>	<b>582</b>	<b>25,747,525</b>	<b>582</b>	<b>4,955,090</b>	<b>582</b>	<b>2,969,595</b>	<b>582</b>	<b>2,070,245</b>	<b>582</b>	<b>2,070,245</b>	<b>582</b>	<b>2,070,245</b>	<b>557</b>	<b>1,973,995</b>	<b>287</b>	<b>930,820</b>		<b>77,833,560</b>	
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>																							
i)	Moisture Retention Measures (Nos)	12,800	793,600	24,935	1,545,970	14,600	905,200	14,500	899,000														66,835	4,143,770
ii)	Drainage Line Treatment																							
a	Brushwood (Rmt)	1,290	167,700	6,555	852,150	5,995	779,350	5,125	666,250														18,965	2,465,450
b	Live Hedge (Rmt)	6,620	132,400	31,330	626,600	26,500	530,000	22,320	446,400														86,770	1,735,400
c	Dry Stone Check Dam/ Wall (Nos)	47	567,370	292	4,404,790	231	4,630,590	163	1,988,450														733	11,591,200
d	Wire Crate Check Dam/ Wall (Nos)	44	1,548,510	169	5,141,160	59	1,475,570	108	3,994,550														380	12,159,790
e	Water Harvesting Structure (Nos)	2	600,000	6	1,800,000	5	1,500,000	0	0														13	3,900,000
f	Farm Pond Big (Nos)	0	0	3	75,000	14	350,000	0	0														17	425,000
g	Farm Pond Small (Nos)	3	30,000	32	320,000	109	1,090,000	1	10,000														145	1,450,000
iii)	Landslide and Slip Control Measures																							
a	Wire Crate Check Wall (Nos)	0	0	0	0	22	405,060	33	1,688,210														55	2,093,270
b	Wire Crate Retaining Wall (Nos)	10	1,241,760	17	4,194,200	6	913,200	2	505,430														35	6,854,590
iv)	Other Interventions																							
a	Water Harvesting Structure (Nos)	1	300,000	3	900,000	0	0	1	300,000														5	1,500,000
b	Farm Pond Big (Nos)	9	225,000	12	300,000	2	50,000	7	175,000														30	750,000
c	Farm Pond Small (Nos)	28	280,000	52	520,000	19	190,000	46	460,000														145	1,450,000
v)	Silt Monitoring Stations	1	240,000		140,000		140,000		140,000		140,000		140,000		140,000		140,000		140,000		140,000		1	1,500,000
	<b>Sub Total</b>		<b>6,126,340</b>		<b>20,819,870</b>		<b>12,958,970</b>		<b>11,273,290</b>		<b>140,000</b>		<b>140,000</b>		<b>52,018,470</b>									
<b>3</b>	<b>Infrastructure Development</b>																							
i)	Maintenance of departmental buildings		9,625,000		9,625,000																			19,250,000
<b>4</b>	<b>Forest Protection</b>																							
i)	Construction of Boundary Pillars		17,850,000																					17,850,000
ii)	Purchase of fire fighting equipments		325,000		325,000		325,000		325,000		325,000		325,000		325,000		325,000		325,000		325,000		325,000	3,250,000
iii)	Hiring of vehicles during fire season		1,000,000		1,000,000		1,000,000		1,000,000		1,000,000		1,000,000		1,000,000		1,000,000		1,000,000		1,000,000		1,000,000	10,000,000
iv)	Creation of fire line		3,750,000																					3,750,000
v)	Energy Saving Devices		760,000		760,000		760,000		760,000		760,000		760,000		760,000		760,000		760,000		760,000		760,000	7,600,000
vi)	Cultural Operations		300,000		300,000		300,000		300,000		300,000		300,000		300,000		300,000		300,000		300,000		300,000	3,000,000
vii)	Maintenance of roads/ paths		6,320,000		6,320,000																			12,640,000
	<b>Sub Total</b>		<b>30,305,000</b>		<b>8,705,000</b>		<b>2,385,000</b>		<b>2,385,000</b>		<b>2,385,000</b>		<b>2,385,000</b>		<b>2,385,000</b>		<b>2,385,000</b>		<b>2,385,000</b>		<b>2,385,000</b>		<b>58,090,000</b>	
<b>5</b>	<b>Wildlife Protection, Management and Conflict resolution</b>																							
i)	Modern tools and equipments		4,571,375		4,571,375		4,571,375		4,571,375															18,285,500
ii)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		492,650		492,650		492,650		492,650		492,650		492,650		492,650		492,650		492,650		492,650		492,650	4,926,500
iii)	Planning		14,500		14,500																			29,000
iv)	Implementation		54,375		54,375		54,375		54,375															217,500
v)	Training		5,800																					5,800
vi)	Research & Monitoring		5,800																					5,800

S. No.	Year Wise Treatment Plan	Year - 1 (2021-22)		Year - 2 (2022-23)		Year - 3 (2023-24)		Year - 4 (2024-25)		Year - 5 (2025-26)		Year - 6 (2026-27)		Year - 7 (2027-28)		Year - 8 (2028-29)		Year - 9 (2029-30)		Year - 10 (2030-31)		Total		
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)																	
vii)	Contingency		290		290		290		290		290		290		290		290		290		290		290	2,900
	<b>Sub Total</b>		<b>5,144,790</b>		<b>5,133,190</b>		<b>5,118,690</b>		<b>5,118,690</b>		<b>492,940</b>		<b>492,940</b>		<b>492,940</b>	<b>23,473,000</b>								
<b>6</b>	<b>Operational Support</b>																							
i)	Transportation support to forest staff		8,000,000																					8,000,000
ii)	Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.		737,500		737,500		737,500		737,500															2,950,000
iii)	Misc. Office furniture Almirahs, File racks etc.		475,000		475,000		475,000		475,000															1,900,000
iv)	Maintenance of machinery and equipments		525,000		525,000		525,000		525,000															2,100,000
v)	Inverter in offices		200,000		200,000		200,000		200,000															800,000
vi)	Amenities to staff		750,000		750,000		750,000		750,000															3,000,000
vii)	CCTV Cameras All Ranges & Divisional Office		212,500		212,500		212,500		212,500															850,000
	<b>Sub Total</b>		<b>10,900,000</b>		<b>2,900,000</b>		<b>2,900,000</b>		<b>2,900,000</b>															19,600,000
<b>7</b>	<b>Payment of Environmental Services</b>		<b>4,083,000</b>		<b>4,083,000</b>		<b>4,083,000</b>	<b>40,830,000</b>																
<b>8</b>	<b>Eco-tourism</b>		<b>2,600,000</b>		<b>2,600,000</b>																			5,200,000
<b>9</b>	<b>Monitoring &amp; Evaluation*</b>		<b>1,418,500</b>		<b>1,418,500</b>		<b>1,418,500</b>	<b>14,185,000</b>																
<b>10</b>	<b>Joint Forest Management &amp; Micro Planning</b>		<b>600,000</b>		<b>600,000</b>		<b>600,000</b>	<b>6,000,000</b>																
<b>11</b>	<b>Contingencies</b>		<b>3,747,000</b>		<b>3,747,000</b>		<b>3,747,000</b>	<b>37,470,000</b>																
	<b>Grand Total</b>		<b>89,749,630</b>		<b>79,477,360</b>		<b>58,958,685</b>		<b>36,480,570</b>		<b>15,836,035</b>		<b>14,936,685</b>		<b>14,936,685</b>		<b>14,936,685</b>		<b>14,840,435</b>		<b>13,797,260</b>		<b>353,950,030</b>	

**Note: Rs. 198.50 lakh** allocated for Research, Training and Capacity Building component has not been included in the phasing as utilization of these funds will be decided by the office of PCCF (HoFF), HPFD

\* = **Rs. 96.00 lakh** allocated for online monitoring under Monitoring & Evaluation component has not been included in the phasing as plan for utilization of funds for online monitoring will be prepared by Nodal Officer

**Table 7.9: Year wise target (physical and financial) for Catchment Area Treatment Plan in Karsog Forest Division**

S. No.	Year Wise Treatment Plan	Year - 1 (2021-22)		Year - 2 (2022-23)		Year - 3 (2023-24)		Year - 4 (2024-25)		Year - 5 (2025-26)		Year - 6 (2026-27)		Year - 7 (2027-28)		Year - 8 (2028-29)		Year - 9 (2029-30)		Year - 10 (2030-31)		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
1	<b>Biological Measures</b>																						
i)	<b>Normal Afforestation (ha)</b>			72	6,819,840	42	3,978,240															114	10,798,080
	1 <sup>st</sup> Year maintenance					72	1,000,080	42	583,380													114	1,583,460
	2 <sup>nd</sup> Year maintenance							72	671,760	42	391,860											114	1,063,620
	3 <sup>rd</sup> Year maintenance									72	342,720	42	199,920									114	542,640
	4 <sup>th</sup> Year maintenance											72	342,720	42	199,920							114	542,640
	5 <sup>th</sup> Year maintenance													72	342,720	42	199,920					114	542,640
	6 <sup>th</sup> Year maintenance															72	342,720	42	199,920			114	542,640
	7 <sup>th</sup> Year maintenance																	72	342,720	42	199,920	114	542,640
ii)	<b>Enrichment Plantation (ha)</b>			79	4,680,750	115	6,813,750															194	11,494,500
	1 <sup>st</sup> Year maintenance					79	797,900	115	1,161,500													194	1,959,400
	2 <sup>nd</sup> Year maintenance							79	537,200	115	782,000											194	1,319,200
	3 <sup>rd</sup> Year maintenance									79	276,500	115	402,500									194	679,000
	4 <sup>th</sup> Year maintenance											79	276,500	115	402,500							194	679,000
	5 <sup>th</sup> Year maintenance													79	276,500	115	402,500					194	679,000
	6 <sup>th</sup> Year maintenance															79	276,500	115	402,500			194	679,000
	7 <sup>th</sup> Year maintenance																	79	276,500	115	402,500	194	679,000
iii)	<b>Energy Plantation (ha)</b>			7	515,690	3	221,010															10	736,700
	1 <sup>st</sup> Year maintenance					7	97,230	3	41,670													10	138,900
	2 <sup>nd</sup> Year maintenance							7	65,310	3	27,990											10	93,300
	3 <sup>rd</sup> Year maintenance									7	33,320	3	14,280									10	47,600
	4 <sup>th</sup> Year maintenance											7	33,320	3	14,280							10	47,600
	5 <sup>th</sup> Year maintenance													7	33,320	3	14,280					10	47,600
	6 <sup>th</sup> Year maintenance															7	33,320	3	14,280			10	47,600
	7 <sup>th</sup> Year maintenance																	7	33,320	3	14,280	10	47,600
iv)	<b>Grazing Land Development (ha)</b>			9	663,030	4	294,680															13	957,710
	1 <sup>st</sup> Year maintenance					9	125,010	4	55,560													13	180,570
	2 <sup>nd</sup> Year maintenance							9	83,970	4	37,320											13	121,290
	3 <sup>rd</sup> Year maintenance									9	42,840	4	19,040									13	61,880
	4 <sup>th</sup> Year maintenance											9	42,840	4	19,040							13	61,880
	5 <sup>th</sup> Year maintenance													9	42,840	4	19,040					13	61,880
	6 <sup>th</sup> Year maintenance															9	42,840	4	19,040			13	61,880
	7 <sup>th</sup> Year maintenance																	9	42,840	4	19,040	13	61,880
v)	<b>Plantation of Tall Plants (ha)</b>			21	2,051,910	14	1,367,940															35	3,419,850
	1 <sup>st</sup> Year maintenance					21	167,475	14	111,650													35	279,125
	2 <sup>nd</sup> Year maintenance							21	92,400	14	61,600											35	154,000
	3 <sup>rd</sup> Year maintenance									21	49,455	14	32,970									35	82,425
	4 <sup>th</sup> Year maintenance											21	49,455	14	32,970							35	82,425
	5 <sup>th</sup> Year maintenance													21	49,455	14	32,970					35	82,425
	6 <sup>th</sup> Year maintenance															21	49,455	14	32,970			35	82,425
	7 <sup>th</sup> Year maintenance																	21	49,455	14	32,970	35	82,425
vi)	<b>Upgradation of Existing Nurseries</b>		6,700,000																				6,700,000
	<b>Sub Total</b>		<b>6,700,000</b>	<b>188</b>	<b>14,731,220</b>	<b>366</b>	<b>14,863,315</b>	<b>366</b>	<b>3,404,400</b>	<b>366</b>	<b>2,045,605</b>	<b>366</b>	<b>1,413,545</b>	<b>366</b>	<b>1,413,545</b>	<b>366</b>	<b>1,413,545</b>	<b>366</b>	<b>1,413,545</b>	<b>178</b>	<b>668,710</b>	<b>48,067,430</b>	
2	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>																						
i)	Moisture Retention Measures (Nos)	9,200	570,400	14,200	880,400	11,000	682,000	12,800	793,600													47,200	2,926,400
ii)	Drainage Line Treatment																						
a	Brushwood (Rmt)	1,090	141,700	4,435	576,550	3,390	440,700	4,500	585,000													13,415	1,743,950
b	Live Hedge (Rmt)	5,270	105,400	18,280	365,600	11,700	234,000	17,970	359,400													53,220	1,064,400

S. No.	Year Wise Treatment Plan	Year - 1 (2021-22)		Year - 2 (2022-23)		Year - 3 (2023-24)		Year - 4 (2024-25)		Year - 5 (2025-26)		Year - 6 (2026-27)		Year - 7 (2027-28)		Year - 8 (2028-29)		Year - 9 (2029-30)		Year - 10 (2030-31)		Total		
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)							
c	Dry Stone Check Dam/ Wall (Nos)	32	306,070	159	1,734,880	70	719,290	113	1,117,450													374	3,877,690	
d	Wire Crate Check Dam/ Wall (Nos)	32	993,250	111	2,721,490	51	1,111,550	74	2,424,210													268	7,250,500	
e	Water Harvesting Structure (Nos)	2	600,000	2	600,000	1	300,000															5	1,500,000	
f	Farm Pond Small (Nos)	3	30,000	1	10,000			1	10,000													5	50,000	
iii)	Landslide and Slip Control Measures																							
a	Wire Crate Check Wall (Nos)					22	405,060	33	1,688,210													55	2,093,270	
b	Wire Crate Retaining Wall (Nos)			4	341,520	6	913,200	2	505,430													12	1,760,150	
iv)	Other Interventions																							
a	Water Harvesting Structure (Nos)	1	300,000	3	900,000			1	300,000													5	1,500,000	
b	Farm Pond Big (Nos)	9	225,000	12	300,000	2	50,000	7	175,000													30	750,000	
c	Farm Pond Small (Nos)	28	280,000	52	520,000	19	190,000	46	460,000													145	1,450,000	
v)	Silt Monitoring Stations	1	240,000		140,000		140,000		140,000	140,000		140,000		140,000		140,000		140,000		140,000		140,000	1	1,500,000
	<b>Sub Total</b>		<b>3,791,820</b>		<b>9,090,440</b>		<b>5,185,800</b>		<b>8,558,300</b>		<b>140,000</b>		<b>140,000</b>		<b>27,466,360</b>									
<b>3</b>	<b>Infrastructure Development</b>																							
i)	Maintenance of departmental buildings		5,825,000		5,825,000																		11,650,000	
<b>4</b>	<b>Forest Protection</b>																							
i)	Construction of Boundary Pillars		10,000,000																				10,000,000	
ii)	Purchase of fire fighting equipments		150,000		150,000		150,000		150,000		150,000		150,000		150,000		150,000		150,000		150,000		150,000	1,500,000
iii)	Hiring of vehicles during fire season		500,000		500,000		500,000		500,000		500,000		500,000		500,000		500,000		500,000		500,000		500,000	5,000,000
iv)	Creation of fire line		3,500,000																				3,500,000	
v)	Energy Saving Devices		630,000		630,000		630,000		630,000		630,000		630,000		630,000		630,000		630,000		630,000		630,000	6,300,000
vi)	Cultural Operations		150,000		150,000		150,000		150,000		150,000		150,000		150,000		150,000		150,000		150,000		150,000	1,500,000
vii)	Maintenance of roads/ paths		4,820,000		4,820,000																		9,640,000	
	<b>Sub Total</b>		<b>19,750,000</b>		<b>6,250,000</b>		<b>1,430,000</b>		<b>1,430,000</b>		<b>1,430,000</b>		<b>1,430,000</b>		<b>1,430,000</b>		<b>1,430,000</b>		<b>1,430,000</b>		<b>1,430,000</b>		<b>37,440,000</b>	
<b>5</b>	<b>Wildlife protection, management and conflict resolution</b>																							
i)	Modern tools and equipments		2,250,000		2,250,000		2,250,000		2,250,000														9,000,000	
ii)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		125,000		125,000		125,000		125,000		125,000		125,000		125,000		125,000		125,000		125,000		125,000	1,250,000
	<b>Sub Total</b>		<b>2,375,000</b>		<b>2,375,000</b>		<b>2,375,000</b>		<b>2,375,000</b>		<b>125,000</b>		<b>125,000</b>		<b>125,000</b>	10,250,000								
<b>6</b>	<b>Operational Support</b>																							
i)	Transportation support to forest staff		3,500,000																				4,500,000	
ii)	Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.		500,000		500,000		500,000		500,000														2,000,000	
iii)	Misc. Office furniture Almirahs, File racks etc.		375,000		375,000		375,000		375,000														1,500,000	
iv)	Maintenance of machinery and equipments		250,000		250,000		250,000		250,000														1,000,000	
v)	Inverter in offices		125,000		125,000		125,000		125,000														500,000	
vi)	Amenities to staff		375,000		375,000		375,000		375,000														1,500,000	
vii)	CCTV Cameras All Ranges & Divisional Office		212,500		212,500		212,500		212,500														850,000	
	<b>Sub Total</b>		<b>5,337,500</b>		<b>1,837,500</b>		<b>1,837,500</b>		<b>1,837,500</b>														10,850,000	
<b>7</b>	<b>Payment of Environmental Services</b>		2,525,000		2,525,000		2,525,000		2,525,000		2,525,000		2,525,000		2,525,000		2,525,000		2,525,000		2,525,000		2,525,000	25,250,000
<b>8</b>	<b>Eco-tourism</b>		1,400,000		1,400,000																		2,800,000	
<b>9</b>	<b>Monitoring &amp; Evaluation</b>		850,000		850,000		850,000		850,000		850,000		850,000		850,000		850,000		850,000		850,000		850,000	8,500,000
<b>10</b>	<b>Joint Forest Management &amp; Micro Planning</b>		500,000		500,000		500,000		500,000		500,000		500,000		500,000		500,000		500,000		500,000		500,000	5,000,000
<b>11</b>	<b>Contingencies</b>		2,300,000		2,300,000		2,300,000		2,300,000		2,300,000		2,300,000		2,300,000		2,300,000		2,300,000		2,300,000		2,300,000	23,000,000
	<b>Grand Total</b>		<b>51,354,320</b>		<b>47,684,160</b>		<b>31,866,615</b>		<b>23,780,200</b>		<b>9,915,605</b>		<b>9,283,545</b>		<b>9,283,545</b>		<b>9,283,545</b>		<b>9,283,545</b>		<b>9,283,545</b>		<b>8,538,710</b>	210,273,790

**Table 7.10: Year wise target (physical and financial) for Catchment Area Treatment Plan in Kotgarh Forest Division**

S. No.	Year Wise Treatment Plan	Year - 1 (2021-22)		Year - 2 (2022-23)		Year - 3 (2023-24)		Year - 4 (2024-25)		Year - 5 (2025-26)		Year - 6 (2026-27)		Year - 7 (2027-28)		Year - 8 (2028-29)		Year - 9 (2029-30)		Year - 10 (2030-31)		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>1</b>	<b>Biological Measures</b>																						
i)	<b>Normal Afforestation (ha)</b>			6	568,320																6	568,320	
	1 <sup>st</sup> Year maintenance					6	83,340														6	83,340	
	2 <sup>nd</sup> Year maintenance							6	55,980												6	55,980	
	3 <sup>rd</sup> Year maintenance									6	28,560										6	28,560	
	4 <sup>th</sup> Year maintenance										6	28,560									6	28,560	
	5 <sup>th</sup> Year maintenance											6	28,560								6	28,560	
	6 <sup>th</sup> Year maintenance												6	28,560							6	28,560	
	7 <sup>th</sup> Year maintenance													6	28,560					6	28,560		
ii)	<b>Enrichment Plantation (ha)</b>			23	1,362,750	6	355,500														29	1,718,250	
	1 <sup>st</sup> Year maintenance					23	232,300	6	60,600												29	292,900	
	2 <sup>nd</sup> Year maintenance							23	156,400	6	40,800										29	197,200	
	3 <sup>rd</sup> Year maintenance									23	80,500	6	21,000								29	101,500	
	4 <sup>th</sup> Year maintenance										23	80,500	6	21,000							29	101,500	
	5 <sup>th</sup> Year maintenance											23	80,500	6	21,000						29	101,500	
	6 <sup>th</sup> Year maintenance												23	80,500	6	21,000					29	101,500	
	7 <sup>th</sup> Year maintenance													23	80,500	6	21,000			29	101,500		
iii)	<b>Energy Plantation (ha)</b>			3	221,010	2	147,340														5	368,350	
	1 <sup>st</sup> Year maintenance					3	41,670	2	27,780												5	69,450	
	2 <sup>nd</sup> Year maintenance							3	27,990	2	18,660										5	46,650	
	3 <sup>rd</sup> Year maintenance									3	14,280	2	9,520								5	23,800	
	4 <sup>th</sup> Year maintenance										3	14,280	2	9,520							5	23,800	
	5 <sup>th</sup> Year maintenance											3	14,280	2	9,520						5	23,800	
	6 <sup>th</sup> Year maintenance												3	14,280	2	9,520					5	23,800	
	7 <sup>th</sup> Year maintenance													3	14,280	2	9,520			5	23,800		
iv)	<b>Creation of New Nursery</b>		5,000,000																				5,000,000
v)	<b>Upgradation of Existing Nurseries</b>		2,000,000																				2,000,000
	<b>Sub Total</b>		<b>7,000,000</b>	<b>32</b>	<b>2,152,080</b>	<b>40</b>	<b>860,150</b>	<b>40</b>	<b>328,750</b>	<b>40</b>	<b>182,800</b>	<b>40</b>	<b>153,860</b>	<b>40</b>	<b>153,860</b>	<b>40</b>	<b>153,860</b>	<b>40</b>	<b>153,860</b>	<b>8</b>	<b>30,520</b>	<b>11,169,740</b>	
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>																						
i)	Moisture Retention Measures (Nos)	3,600	223,200	1,800	111,600			1,700	105,400													7,100	440,200
ii)	Drainage Line Treatment																						
a	Brushwood (Rmt)	200	26,000	1,300	169,000	300	39,000	625	81,250													2,425	315,250
b	Live Hedge (Rmt)	1,350	27,000	7,800	156,000	1,800	36,000	4,350	87,000													15,300	306,000
c	Dry Stone Check Dam/ Wall (Nos)	15	261,300	70	1,219,400	15	261,300	50	871,000													150	2,613,000
d	Wire Crate Check Dam/ Wall (Nos)	12	555,260	45	2,068,380	8	364,020	34	1,570,340													99	4,558,000
iii)	Landslide and Slip Control Measures																						
a	Wire Crate Retaining Wall (Nos)	10	1,241,760	13	3,852,680																	23	5,094,440
	<b>Sub Total</b>		<b>2,334,520</b>		<b>7,577,060</b>		<b>700,320</b>		<b>2,714,990</b>														<b>13,326,890</b>
<b>3</b>	<b>Infrastructure Development</b>																						
i)	Maintenance of departmental buildings		1,700,000		1,700,000																		3,400,000
<b>4</b>	<b>Forest Protection</b>																						
i)	Construction of Boundary Pillars		1,100,000																				1,100,000
ii)	Purchase of fire fighting equipments		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		400,000
iii)	Hiring of vehicles during fire season		250,000		250,000		250,000		250,000		250,000		250,000		250,000		250,000		250,000		250,000		2,500,000
iv)	Creation of fire line		250,000																				250,000
v)	Energy Saving Devices		30,000		30,000		30,000		30,000		30,000		30,000		30,000		30,000		30,000		30,000		300,000
vi)	Cultural Operations		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		400,000
vii)	Maintenance of roads/ paths		1,500,000		1,500,000																		3,000,000

S. No.	Year Wise Treatment Plan	Year - 1 (2021-22)		Year - 2 (2022-23)		Year - 3 (2023-24)		Year - 4 (2024-25)		Year - 5 (2025-26)		Year - 6 (2026-27)		Year - 7 (2027-28)		Year - 8 (2028-29)		Year - 9 (2029-30)		Year - 10 (2030-31)		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
	<b>Sub Total</b>		<b>3,210,000</b>		<b>1,860,000</b>		<b>360,000</b>		<b>360,000</b>		<b>7,950,000</b>												
<b>5</b>	<b>Wildlife protection, management and conflict resolution</b>																						
i)	Modern tools and equipments		803,750		803,750		803,750		803,750														<b>3,215,000</b>
ii)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		171,000		171,000		171,000		171,000		171,000		171,000		171,000		171,000		171,000		171,000		<b>1,710,000</b>
	<b>Sub Total</b>		<b>974,750</b>		<b>974,750</b>		<b>974,750</b>		<b>974,750</b>		<b>171,000</b>		<b>171,000</b>		<b>4,925,000</b>								
<b>6</b>	<b>Operational Support</b>																						
i)	Transportation support to forest staff		1,000,000																				<b>1,000,000</b>
ii)	Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.		212,500		212,500		212,500		212,500														<b>850,000</b>
iii)	Misc. Office furniture Almirahs, File racks etc.		100,000		100,000		100,000		100,000														<b>400,000</b>
iv)	Maintenance of machinery and equipments		75,000		75,000		75,000		75,000														<b>300,000</b>
v)	Inverter in offices		75,000		75,000		75,000		75,000														<b>300,000</b>
vi)	Amenities to staff		87,500		87,500		87,500		87,500														<b>350,000</b>
	<b>Sub Total</b>		<b>1,550,000</b>		<b>550,000</b>		<b>550,000</b>		<b>550,000</b>														<b>3,200,000</b>
<b>7</b>	<b>Payment of Environmental Services</b>		700,000		700,000		700,000		700,000		700,000		700,000		700,000		700,000		700,000		700,000		<b>7,000,000</b>
<b>8</b>	<b>Eco-tourism</b>		750,000		750,000																		<b>1,500,000</b>
<b>9</b>	<b>Monitoring &amp; Evaluation</b>		245,000		245,000		245,000		245,000		245,000		245,000		245,000		245,000		245,000		245,000		<b>2,450,000</b>
<b>10</b>	<b>Joint Forest Management &amp; Micro Planning</b>		50,000		50,000		50,000		50,000		50,000		50,000		50,000		50,000		50,000		50,000		<b>500,000</b>
<b>11</b>	<b>Contingencies</b>		620,000		620,000		620,000		620,000		620,000		620,000		620,000		620,000		620,000		620,000		<b>6,200,000</b>
	<b>Grand Total</b>		<b>19,134,270</b>		<b>17,178,890</b>		<b>5,060,220</b>		<b>6,543,490</b>		<b>2,328,800</b>		<b>2,299,860</b>		<b>2,299,860</b>		<b>2,299,860</b>		<b>2,299,860</b>		<b>2,176,520</b>		<b>61,621,630</b>

**Table 7.11: Year wise target (physical and financial) for Catchment Area Treatment Plan in Shimla Forest Division**

S. No.	Year Wise Treatment Plan	Year - 1 (2021-22)		Year - 2 (2022-23)		Year - 3 (2023-24)		Year - 4 (2024-25)		Year - 5 (2025-26)		Year - 6 (2026-27)		Year - 7 (2027-28)		Year - 8 (2028-29)		Year - 9 (2029-30)		Year - 10 (2030-31)		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)						
<b>1</b>	<b>Biological Measures</b>																						
i)	<b>Enrichment Plantation (ha)</b>			38	2,251,500	22	1,303,500															60	3,555,000
	1 <sup>st</sup> Year maintenance					38	383,800	22	222,200													60	606,000
	2 <sup>nd</sup> Year maintenance							38	258,400	22	149,600											60	408,000
	3 <sup>rd</sup> Year maintenance									38	133,000	22	77,000									60	210,000
	4 <sup>th</sup> Year maintenance											38	133,000	22	77,000							60	210,000
	5 <sup>th</sup> Year maintenance													38	133,000	22	77,000					60	210,000
	6 <sup>th</sup> Year maintenance															38	133,000	22	77,000			60	210,000
	7 <sup>th</sup> Year maintenance																	38	133,000	22	77,000	60	210,000
ii)	<b>Plantation of Tall Plants (ha)</b>					52	5,080,920															52	5,080,920
	1 <sup>st</sup> Year maintenance							52	414,700													52	414,700
	2 <sup>nd</sup> Year maintenance									52	228,800											52	228,800
	3 <sup>rd</sup> Year maintenance											52	122,460									52	122,460
	4 <sup>th</sup> Year maintenance													52	122,460							52	122,460
	5 <sup>th</sup> Year maintenance															52	122,460					52	122,460
	6 <sup>th</sup> Year maintenance																	52	122,460			52	122,460
	7 <sup>th</sup> Year maintenance																			52	122,460	52	122,460
iii)	<b>Assisted Natural Regeneration (ha)</b>					27	886,140															27	886,140
	1 <sup>st</sup> Year maintenance							27	88,290													27	88,290
	2 <sup>nd</sup> Year maintenance									27	61,290											27	61,290
	3 <sup>rd</sup> Year maintenance											27	32,130									27	32,130
	4 <sup>th</sup> Year maintenance													27	32,130							27	32,130
	5 <sup>th</sup> Year maintenance															27	32,130					27	32,130
	6 <sup>th</sup> Year maintenance																	27	32,130			27	32,130
	7 <sup>th</sup> Year maintenance																			27	32,130	27	32,130
iv)	<b>Medicinal Plants/ NTFP (ha)</b>					25	2,248,500															25	2,248,500
	1 <sup>st</sup> Year maintenance							25	156,750													25	156,750
	2 <sup>nd</sup> Year maintenance									25	126,500											25	126,500
	3 <sup>rd</sup> Year maintenance											25	96,250									25	96,250
	4 <sup>th</sup> Year maintenance													25	96,250							25	96,250
	5 <sup>th</sup> Year maintenance															25	96,250					25	96,250
v)	<b>Upgradation of Existing Nurseries</b>		1,500,000																				1,500,000
	<b>Sub Total</b>		<b>1,500,000</b>	<b>38</b>	<b>2,251,500</b>	<b>164</b>	<b>9,902,860</b>	<b>164</b>	<b>1,140,340</b>	<b>164</b>	<b>699,190</b>	<b>164</b>	<b>460,840</b>	<b>164</b>	<b>460,840</b>	<b>164</b>	<b>460,840</b>	<b>139</b>	<b>364,590</b>	<b>101</b>	<b>231,590</b>		<b>17,472,590</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>																						
i)	Moisture Retention Measures (Nos)			6,535	405,170	3,600	223,200															10,135	628,370
ii)	Drainage Line Treatment																						
a	Brushwood (Rmt)			580	75,400	2,305	299,650															2,885	375,050
b	Live Hedge (Rmt)			4,000	80,000	13,000	260,000															17,000	340,000
c	Dry Stone Check Dam/ Wall (Nos)			54	1,350,000	146	3,650,000															200	5,000,000
d	Water Harvesting Structure (Nos)			4	1,200,000	4	1,200,000															8	2,400,000
e	Farm Pond Big (Nos)			3	75,000	14	350,000															17	425,000
f	Farm Pond Small (Nos)			31	310,000	109	1,090,000															140	1,400,000
	<b>Sub Total</b>				<b>3,495,570</b>		<b>7,072,850</b>																<b>10,568,420</b>
<b>3</b>	<b>Infrastructure Development</b>																						
i)	Maintenance of departmental buildings		1,950,000		1,950,000																		3,900,000
<b>4</b>	<b>Forest Protection</b>																						
i)	Construction of Boundary Pillars		6,750,000																				6,750,000
ii)	Purchase of fire fighting equipments		100,000		100,000		100,000		100,000		100,000		100,000		100,000		100,000		100,000		100,000		1,000,000

S. No.	Year Wise Treatment Plan	Year - 1 (2021-22)		Year - 2 (2022-23)		Year - 3 (2023-24)		Year - 4 (2024-25)		Year - 5 (2025-26)		Year - 6 (2026-27)		Year - 7 (2027-28)		Year - 8 (2028-29)		Year - 9 (2029-30)		Year - 10 (2030-31)		Total		
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	
iii)	Hiring of vehicles during fire season		250,000		250,000		250,000		250,000		250,000		250,000		250,000		250,000		250,000		250,000		250,000	2,500,000
iv)	Energy Saving Devices		100,000		100,000		100,000		100,000		100,000		100,000		100,000		100,000		100,000		100,000		100,000	1,000,000
v)	Cultural Operations		70,000		70,000		70,000		70,000		70,000		70,000		70,000		70,000		70,000		70,000		70,000	700,000
	<b>Sub Total</b>		<b>7,270,000</b>		<b>520,000</b>		<b>520,000</b>		<b>520,000</b>		<b>520,000</b>		<b>520,000</b>		<b>520,000</b>		<b>520,000</b>		<b>520,000</b>		<b>520,000</b>		<b>520,000</b>	11,950,000
<b>5</b>	<b>Wildlife protection, management and conflict resolution</b>																							
i)	Modern tools and equipments		903,125		903,125		903,125		903,125															3,612,500
ii)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		193,750		193,750		193,750		193,750		193,750		193,750		193,750		193,750		193,750		193,750		193,750	1,937,500
	<b>Sub Total</b>		<b>1,096,875</b>		<b>1,096,875</b>		<b>1,096,875</b>		<b>1,096,875</b>		<b>193,750</b>		<b>193,750</b>		<b>193,750</b>	5,550,000								
<b>6</b>	<b>Operational Support</b>																							
i)	Transportation support to forest staff		2,500,000																					2,500,000
ii)	Maintenance of machinery and equipments		175,000		175,000		175,000		175,000															700,000
iii)	Amenities to staff		250,000		250,000		250,000		250,000															1,000,000
	<b>Sub Total</b>		<b>2,925,000</b>		<b>425,000</b>		<b>425,000</b>		<b>425,000</b>															4,200,000
<b>7</b>	<b>Payment of Environmental Services</b>		800,000		800,000		800,000		800,000		800,000		800,000		800,000		800,000		800,000		800,000		800,000	8,000,000
<b>8</b>	<b>Eco-tourism</b>		400,000		400,000																			800,000
<b>9</b>	<b>Monitoring &amp; Evaluation</b>		309,000		309,000		309,000		309,000		309,000		309,000		309,000		309,000		309,000		309,000		309,000	3,090,000
<b>10</b>	<b>Joint Forest Management &amp; Micro Planning</b>		50,000		50,000		50,000		50,000		50,000		50,000		50,000		50,000		50,000		50,000		50,000	500,000
<b>11</b>	<b>Contingencies</b>		740,000		740,000		740,000		740,000		740,000		740,000		740,000		740,000		740,000		740,000		740,000	7,400,000
	<b>Grand Total</b>		<b>17,040,875</b>		<b>12,037,945</b>		<b>20,916,585</b>		<b>5,081,215</b>		<b>3,311,940</b>		<b>3,073,590</b>		<b>3,073,590</b>		<b>3,073,590</b>		<b>2,977,340</b>		<b>2,844,340</b>		<b>73,431,010</b>	

**Table 7.12: Year wise target (physical and financial) for Catchment Area Treatment Plan in Wildlife Kullu Forest Division**

S. No.	Year Wise Treatment Plan	Year - 1 (2021-22)		Year - 2 (2022-23)		Year - 3 (2023-24)		Year - 4 (2024-25)		Year - 5 (2025-26)		Year - 6 (2026-27)		Year - 7 (2027-28)		Year - 8 (2028-29)		Year - 9 (2029-30)		Year - 10 (2030-31)		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)						
<b>1</b>	<b>Biological Measures</b>																						
i)	Enrichment Plantation (ha)			12	711,000																	12	711,000
	1 <sup>st</sup> Year maintenance					12	121,200															12	121,200
	2 <sup>nd</sup> Year maintenance							12	81,600													12	81,600
	3 <sup>rd</sup> Year maintenance									12	42,000											12	42,000
	4 <sup>th</sup> Year maintenance											12	42,000									12	42,000
	5 <sup>th</sup> Year maintenance													12	42,000							12	42,000
	6 <sup>th</sup> Year maintenance															12	42,000					12	42,000
	7 <sup>th</sup> Year maintenance																	12	42,000			12	42,000
	<b>Sub Total</b>			<b>12</b>	<b>711,000</b>	<b>12</b>	<b>121,200</b>	<b>12</b>	<b>81,600</b>	<b>12</b>	<b>42,000</b>				<b>1,123,800</b>								
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>																						
i)	Moisture Retention Measures (Nos)			2,400	148,800																	2,400	148,800
ii)	Drainage Line Treatment																						
a	Brushwood (Rmt)			240	31,200																	240	31,200
b	Live Hedge (Rmt)			1,250	25,000																	1,250	25,000
c	Dry Stone Check Dam/ Wall (Nos)			9	100,510																	9	100,510
d	Wire Crate Check Dam/ Wall (Nos)			13	351,290																	13	351,290
	<b>Sub Total</b>				<b>656,800</b>																		<b>656,800</b>
<b>3</b>	<b>Infrastructure Development</b>																						
i)	Maintenance of departmental buildings		150,000		150,000																		300,000
<b>4</b>	<b>Forest Protection</b>																						
i)	Purchase of fire fighting equipments		35,000		35,000		35,000		35,000		35,000		35,000		35,000		35,000		35,000		35,000		350,000
ii)	Cultural Operations		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		400,000
	<b>Sub Total</b>		<b>75,000</b>		<b>75,000</b>		<b>75,000</b>		<b>75,000</b>		<b>75,000</b>		<b>75,000</b>		<b>75,000</b>		<b>75,000</b>		<b>75,000</b>		<b>75,000</b>		<b>750,000</b>
<b>5</b>	<b>Wildlife protection, management and conflict resolution</b>																						
i)	Modern tools and equipments		614,500		614,500		614,500		614,500														2,458,000
ii)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		2,900		2,900		2,900		2,900		2,900		2,900		2,900		2,900		2,900		2,900		29,000
iii)	Planning		14,500		14,500																		29,000
iv)	Implementation		54,375		54,375		54,375		54,375														217,500
v)	Training		5,800																				5,800
vi)	Research & Monitoring		5,800																				5,800
vii)	Contingency		290		290		290		290		290		290		290		290		290		290		2,900
	<b>Sub Total</b>		<b>698,165</b>		<b>686,565</b>		<b>672,065</b>		<b>672,065</b>		<b>3,190</b>		<b>3,190</b>		<b>2,748,000</b>								
<b>6</b>	<b>Operational Support</b>																						
i)	Transportation support to forest staff		1,000,000																				1,000,000
ii)	Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.		25,000		25,000		25,000		25,000														100,000
iii)	Maintenance of machinery and equipments		25,000		25,000		25,000		25,000														100,000
iv)	Amenities to staff		37,500		37,500		37,500		37,500														150,000
	<b>Sub Total</b>		<b>1,087,500</b>		<b>87,500</b>		<b>87,500</b>		<b>87,500</b>														<b>1,350,000</b>
<b>7</b>	<b>Payment of Environmental Services</b>		58,000		58,000		58,000		58,000		58,000		58,000		58,000		58,000		58,000		58,000		580,000
<b>8</b>	<b>Eco-tourism</b>		50,000		50,000																		100,000
<b>9</b>	<b>Monitoring &amp; Evaluation</b>		14,500		14,500		14,500		14,500		14,500		14,500		14,500		14,500		14,500		14,500		145,000
<b>10</b>	<b>Contingencies</b>		87,000		87,000		87,000		87,000		87,000		87,000		87,000		87,000		87,000		87,000		870,000
	<b>Grand Total</b>		<b>2,220,165</b>		<b>2,576,365</b>		<b>1,115,265</b>		<b>1,075,665</b>		<b>279,690</b>		<b>237,690</b>		<b>8,623,600</b>								

# **ANNEXURES**

# Annexure - I

Status of Hydro Power Potential in Himachal Pradesh (Oct-2020)																
Sr. No	Sector		Commissioned		Under Construction		At Various Stage of Clearance & Investigation		To be Allotted		Disputed/ Cancelled		Foregone		Grand Total	
			No. of Projects	Capacity in MW	No. of Projects	Capacity in MW	No. of Projects	Capacity in MW	No. of Projects	Capacity in MW	No. of Projects	Capacity in MW	No. of Projects	Capacity in MW	No. of Projects	Capacity in MW
1	Himurja	State	5	0.76	1	5.00	7	29.50	0	0	0	0	0	0	13	35.26
		Private	88	326.25	34	104.69	620	1348.54	0	0	0	0	0	0	742	1779.68
2	HPSEBL		28	489.16	1	100.00	7	92.00	0	0	0	0	0	36	681.16	
3	HPPCL		2	165.00	3	691.00	17	2300.00	0	0	0	0	20	22	3176.00	
4	Central & Joint		12	7457.73	1	800.00	12	3396.00	0	0	0	0	0	25	11653.73	
5	Yamuna Projects (Himachal Share)		0	131.57	0	0	0	0	0	0	0	0	0	0	131.57	
	Ranjeet Sagar Dam (Himachal Share)		0	27.60	0	0	0	0	0	0	0	0	0	0	27.60	
	Kishau Dam(660 MW) (Himachal Share)		0	0	0	0	324.00	0	0	0	0	0	0	0	324.00	
6	Private		28	2047.5	15	656.3	53	1782.5	30	1304.5	6	50.50	6	130	6576.3	
Total Allotted			163	10645.57	55	2357.19	716	9272.54	30	1304.5	6	50.50	6	968	24385.3	
<b>Total Identified Hydro Power Potential in the State</b>													<b>27436.00</b>			
<b>Harnessable Power Potential in the State</b>													<b>23579.8</b>			
<b>Total Harnesses</b>													<b>10645.57</b>			
<b>Balance yet to be Harnesses</b>													<b>12934.23</b>			

Government of Himachal Pradesh **Annexure - II**  
Forest Department.

No. FFE-B-F-(5)-9/2017

Dated: Shimla-2, 21<sup>st</sup> November, 2019

**NOTIFICATION**

In partial modification of the earlier Notification No. FFE-B-F(2)-72/2004-Pt.-II dated 30-09-2009, the Governor, Himachal Pradesh is pleased to revise the outlay of Catchment Area Treatment Plan from existing 2.5% to 1.5% of the total project cost for all the Hydro Electric Projects having capacity above 10MW in Himachal Pradesh. The remaining terms as mentioned in the aforesaid Govt. of H.P. Notification No. FFE-B-F(2)-72/2004-Pt.-II dated 30-09-2009 shall remain the same.

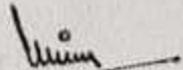
The revised outlay shall become applicable to all the Catchment Area Treatment Plan(s) which shall be submitted by the User Agencies to the Forest Department on or after the date of issue of this notification.

**By Order,**

Ram Subhag Singh  
Addl.Chief Secretary (Forests) to the  
Government of Himachal Pradesh.

Endst. No. As above Dated, Shimla-2 the **21<sup>st</sup> November, 2019**

- 1 All Administrative Secretaries to the Government of Himachal Pradesh.
- 2 The Pr.CCF(HoFF) Shimla-1.He is requested to circulate this notification to all the CCFs/CFs/DFOs(WL&T) in H.P.
- 3 The Pr.CCF(W.L) Talland, Shimla-1.
- 4 The APCCF-cum-Nodal Officer(FCA) Talland Shimla.
- 5 The Under Secretary (GAD) to the GoHP w.r.t Cabinet Item No. 22 dated 18-11-2019.
- 6 The Private Secretary to the Chief Minister, Himachal Pradesh.
- 7 The Private Secretary to the Forest Minister Himachal Pradesh.
- 8 The Private Secretary to the Chief Secretary to the GoHP.
- 9 Guard File.

  
(Sat Pal Dhiman) 21-11-2019  
Joint Secretary (Forests) to the  
Government of Himachal Pradesh.

S/FCA  
APCCF(FCA)

22/11



सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

जल विद्युत परियोजना मूल्यांकन प्रभाग  
Hydro Project Appraisal Division

No. 2/HP/58/CEA/2017-PAC/ 97-135

Date: 11.02.2021

**OFFICE MEMORANDUM**

**Subject: Accord of Concurrence to Sunni Dam (4x73 MW+1x73 MW+1x17 MW= 382 MW) Hydro Electric Project in Himachal Pradesh by M/s SJVN Ltd. under section 8 of the Electricity Act, 2003-regarding**

M/s SJVN Ltd. submitted Detailed Project Report (DPR) of the Sunni Dam HEP (4x73 MW+1x73 MW+1x17 MW= 382 MW) in Himachal Pradesh to CEA vide letter dated 09.09.2019 for concurrence. Thereafter, the DPR was forwarded to various appraising groups of CEA, CWC, GSI, CSMRS, MoJS (erstwhile MoWR, RD&GR) for examination of respective aspects. After clearance from all appraising groups, the proposal was considered for accord of Concurrence in the Authority Meeting (No. 05/2020 ) of CEA held on 23.12.2020 through Video Conferencing (VC) based on the Agenda Note circulated vide CEA letter No. CEA-SY-25-12/1/2019-PAC Division dated 18.12.2020.

In exercise of the powers conferred to the Authority under Section 8 of the Electricity Act, 2003, the Central Electricity Authority accords Concurrence to the aforesaid Hydro Electric Project at an Estimated Cost of Rs. 2475.35 Crore (July 2020 PL) including IDC of Rs. 346.88 Crores & FC of Rs. 8.66 Crores with the following stipulations: -

The cost of the scheme as mentioned above is indicative and may change on account of following as per actual: -

- Price Escalation
- Change in Law
- Change in quantities (duly approved by competent authority) due to Geological Surprises.
- Foreign Currency Exchange Rate.

2. The abstract of approved Project Cost along with the tentative Financial Package and details of Cost of Civil Works, E&M and ATS (Associated Transmission System) Estimates are furnished at **Annex-I, I (A), I (B) and I (C) respectively**. The Salient Features of the scheme are given at **Annex- II**.

3. This Concurrence is subject to fulfillment of the following conditions: -

2

**File No.CEA-SY-25-12/1/2019-PAC Division**

- (i) M/s SJVNL shall comply to the suggestions/observations of Central Water Commission (CWC) on aspects of Hydrology, Dam Design, Hydel Civil Design, Foundation Engineering & Seismic Aspects and Inter-State etc. as given in **Annex –III** and as incorporated in the final DPR.
- (ii) M/s SJVNL shall comply to the suggestions/observations of Central Electricity Authority (CEA) on aspects of E&M design & Power Evacuation etc as given in **Annex – IV** and as incorporated in the final DPR.
- (iii) M/s SJVNL shall comply to the suggestions/observations of GSI as given in **Annex–V** and as incorporated in the final DPR. M/s SJVNL shall complete balance explorations/investigations, if any, as suggested by GSI. Results of explorations/investigations shall be communicated from time to time for concurrence of CEA/CWC/GSI regularly. Cost for changes required consequent to investigations shall be absorbed by M/s SJVNL.
- (iv) M/s SJVNL shall comply to the suggestions/observations of Central Soil & Materials Research Station (CSMRS) on Construction material & Geotechnical aspects as given in **Annex – VI** and as incorporated in the final DPR. M/s SJVNL shall complete balance explorations/investigations and should be submitted for review and the progress of all the pending investigations must be reported periodically to CSMRS & CEA.
- (v) In case, any change in e-flows is suggested by MoEF&CC in future, M/s SJVNL shall review the installed capacity & design energy of the project and furnish the same for appraisal to CEA before commencement of construction of the project. For projects where construction already started/commissioned, M/s SJVNL shall review the design energy and furnish the same for appraisal of CEA.  
  
Further, M/s SJVNL shall also review the design energy based on revised hydrology on commissioning of the project and thereafter at interval of every 10 years and furnish the same for appraisal of CEA.
- (vi) In case geological surprises in underground works are met, M/s SJVNL shall systematically maintain a record of geological surprises, those are encountered. At the same time, M/s SJVNL shall request the State Govt. to constitute an expert committee consisting of representatives from State Govt., GSI, CWC, CEA etc. Once a committee is constituted, M/s SJVNL shall submit their proposal for the enhanced cost to the expert committee, which in time shall examine and recommend impact on the cost thereof.
- (vii) M/s SJVNL shall use the seismic design parameters approved by National Committee on Seismic Design Parameters (NCSDP) for design purposes.
- (viii) In case, changes are made in design parameters, during construction, due to site conditions or otherwise, the same shall be intimated and got concurred from the Authority (CEA) before M/s SJVNL implements such changes.
- (ix) Tariff of the project shall be as determined/ adopted by the appropriate Electricity Regulatory Commission.
- (x) M/s SJVNL shall obtain Environmental and Forest clearance from MoEF&CC and shall submit a copy to CEA.

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- (xi) Suitable R&R plan shall be prepared by M/s SJVNL and submitted to MoEF&CC for obtaining their clearance.
- (xii) M/s SJVNL Shall comply with the conditions as mentioned in the Ministry of Water Resources, RD&GR (now Ministry of Jal Shakti) letter no.15011/1/2015-PP Dated 15.12.2015 (the corrected letter as forwarded by MoWR, RD&GR. vide letter no.L-15011/1/2015-PP Dated 22.12.2016, copy attached at **Annexure-VII**) for project design and shall ensure adequate e-flow for different months as prescribed by MoEF&CC particularly during lean months and longitudinal connectivity.
- (xiii) As per ISM-2 Dte., CWC letter dated 15.10.2019, there should not be any consumptive use of water as no allocation of Satluj water has been made to State of Himachal Pradesh as per Bhakra Nangal Agreement, 1959 and other conditions mentioned in BBMB letter dated 13.01.2012 (**Copy enclosed at Annex-VIII**).
- (xiv) If any impact on wild life is observed, M/s SJVNL would obtain clearance from National Board of Wild Life and shall submit the same to CEA.
- (xv) If Scheduled Tribe population is getting affected at project site, clearance under Forest Right Act/Ministry of Social Justice & Empowerment/ Ministry of Tribal Affairs, Govt of India/State Government shall be obtained by M/s SJVNL and shall submit the same to CEA.
- (xvi) M/s SJVNL shall take appropriate precautions to avert flooding of powerhouse by adopting measures listed at **Annexure – IX**.
- (xvii) M/s SJVNL shall take appropriate preventive measures of Disaster Management in case of Dam failure or sudden release of water as per conditions contained in **Annex-X**.
- (xviii) M/s. SJVNL shall obtain the clearance from Ministry of Defence & shall comply with the conditions stipulated therein.
- (xix) M/s SJVNL shall obtain clearance from Ministry of Home Affairs regarding participation of foreign companies in tender works packages and shall comply with the conditioned stipulated therein.
- (xx) M/s SJVNL have obtained clearance from International angle from Ministry of Water Resources, RD&GR (now Ministry of Jal Shakti) vide letter no.Y-19011/7/2015-IT/1027-30 Dated 12.03.2018. M/s SJVNL shall comply with the condition stipulated in the clearance letter (copy attached at **Annex-XI**).
- (xxi) M/s SJVNL shall comply with the guidelines for participation of foreign Companies in tendering for work packages of Hydro Electric Projects in sensitive areas, issued by Ministry of Power vide No. 7/1/2002-DO(NHPC) [Vol. II], dated 03.09.09 appended at **Annex-XII**.
- (xxii) M/s SJVNL shall deploy modern tools / software for construction monitoring of the project by establishing IT based monitoring systems and linking the same to CEA network.



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- (xxiii) M/s SJVNL shall ensure availability of adequate quantities of rock/sand from quarries/excavated muck/burrow areas to meet the requirement of coarse & fine aggregates for both wearing & non-wearing surfaces.
- (xxiv) Fly ash and fly ash based products shall be used in the construction of various works to the extent possible in accordance with MoEF notification dated 14.09.1999 and its amendment dated 27.08.2003 and as revised on 06.11.2008. Construction material surveys shall include the required investigations for use of fly ash and fly ash based products in various works, infrastructure facilities etc. and their feasibility shall be ascertained by M/s SJVNL.
- (xxv) M/s SJVNL shall submit the final updated DPR to the concerned State Government/s, appropriate Electricity Regulatory Commission and the Transmission Utility under intimation to the Authority. M/s. SJVNL shall also forward a copy of final updated DPR to co-basin States and Indus wing of MoJS under intimation to the Authority.
- (xxvi) Information in respect of tying up essential inputs/statutory clearances, results of investigations/studies shall be submitted by M/s SJVNL to CEA/CWC/GSI/CSMRS on receipt of same from time to time.
- (xxvii) The broad technical aspects of the project proposal in the project report have been scrutinized in CEA in consultation with CWC, GSI, CSMRS and other concerned agencies. The scrutiny is based on the data, assessment and certificates presented in the report and information/clarifications received as compliances to the observations on the assumption that the data and information furnished are accurate and have been collected reliably by the project authorities from dependable sources and/or after carrying out detailed surveys and investigations as presented in the report.
- (xxviii) Project is scheduled to be completed within 63 months from the zero date of 01<sup>st</sup> June, 2021.
- i) Unit –wise commissioning schedule of the project is given below:
- Unit-I (73 MW) : 61 months
  - Unit-II (73 MW) : 61 months
  - Unit-III (73 MW) : 62 months
  - Unit-IV (73 MW) : 62 months
  - Unit-V (73 MW) : 63 months
  - Unit-VI (17 MW) : 63 months
- (xxix) In case time gap between Concurrence accorded to the scheme by CEA and award of one of major civil packages (either Dam or HRT or Powerhouse) by M/s. SJVNL is three years or more, a fresh Concurrence of CEA shall be obtained by M/s. SJVNL.
- (xxx) The project developer has to approach CTU to seek connectivity/Long Term Access (LTA) as per CERC regulations at least five years before the anticipated commissioning of the project. The transmission system for the project would be firmed up after grant of LTA, as per CERC Regulations. The developer must

**File No.CEA-SY-25-12/1/2019-PAC Division**

ensure that generating machines are capable of operation in synchronous condenser mode.

- (xxxii) Revalidation of Concurrence can also be considered, in case, the reason for delay in award of one of major civil packages (either of Dam/HRT/Powerhouse) is beyond the control of developer. However, proposal for revalidation shall be submitted three months before the expiry of validity of the Concurrence, which is three years from the date of issue of this Concurrence Memorandum.
- (xxxiii) Concurrence is subject to compliance by M/s SJVNL of various policies/guidelines etc. issued by Govt. of India from time to time.
- (xxxiii) M/s SJVNL shall comply strictly the “Public Procurement (Preference to make in India) Order, 2017 (PPP-MII Order)” issued by Department of Industrial Policy and Promotion, Ministry of Commerce & Industry, Govt. of India vide its letter no. P-45021/2/2017-B.E.-II dated 15.06.17. **(Copy enclosed at Annex-XIII).**
4. Monthly Status Report of compliance of the conditions stipulated under para 3 of this Concurrence letter shall be submitted by M/s. SJVNL to Chief Engineer (HPA), CEA.
5. Monthly Progress Report of the project shall be submitted by M/s. SJVNL to Hydro-Project Monitoring (HPM) Division of CEA. Three (3) copies of the half-yearly progress reports on both physical progress of the scheme and expenditure actually incurred, duly certified by statutory auditors shall be submitted to the Authority till the Commercial Operation Date of the plant. The project authorities shall give free accessibility to CEA officers and staff to have on the spot assessment of various aspects of the project.
6. Monthly status of the project from the date of Concurrence to date of Commercial Operation (CoD) of the project shall be furnished by M/s. SJVNL to Chief Engineer (HPA), CEA as per the proforma enclosed at **Annex-XIV**.
7. The Authority reserves the right to revoke this Concurrence, if the conditions stipulated in this Office Memorandum are not complied with to the satisfaction of the Authority.

**Encls: Annexures I, I (A) , I (B) , I (C) II, III, IV, V, VI, VII, VIII, IX, X , XI ,XII , XIII & IV.**

  
(V.K. Mishra) 11/2/21  
Secretary, CEA

To,  
As per list

**File No.CEA-SY-25-12/1/2019-PAC Division**

1. Chairman-cum-Managing Director, M/s SJNV Ltd., Corporate Office Complex, Shanan, Shimla-171006 (HP).
2. Secretary, Ministry of Power, Govt. of India, Shram Shakti Bhawan, Rafi Marg, New Delhi –110119.
3. Secretary, MoEF&CC, Government of India, Paryavaran Bhawan, CGO Complex, Lodhi Road, New Delhi – 110003.
4. Chairperson, Central Electricity Regulatory Commission, 3rd & 4th Floor, Chanderlok Building, 36, Janpath, New Delhi-110001.
5. Chairperson, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi- 110066.
6. Chairperson, Central Water Commission, Sewa Bhawan, R.K. Puram, New Delhi – 110066.
7. Principal Secretary (MPP&Power), Department of Power, Government of Himachal Pradesh, Shimla-171002
8. Chairman-cum-Managing Director, Power Grid Corporation of India Limited, Saudamini, Plot No.2, Sector 29, Gurgaon - 122001 (Haryana).
9. Adviser (Energy), Neeti Ayog, Yojana Bhawan, New Delhi – 110001
10. Member (Hydro/Planning/Thermal/Grid Operation & Distribution/Economic & Commercial/Power Systems), CEA, Sewa Bhawan, R.K. Puram New Delhi – 110606.
11. Member (D&R), Central Water Commission, Sewa Bhawan, R. K. Puram, New Delhi - 110606.
12. Joint Secretary (Hydro), Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi-110119.
13. Commissioner (Indus Wing), Ministry of Water Resources, RD&GR, 2<sup>nd</sup> Floor, Block-3, CGO Complex, Lodhi Road, New Delhi-110003.
14. Chief Engineer (HPA/PSP&PA-I/F&CA/TCD/Legal/HEPR/HPP&I/HE&TD), CEA, Sewa Bhawan, R.K. Puram, New Delhi – 110606.
15. Chief Engineer (PAO), CWC, Sewa Bhawan, R.K. Puram, New Delhi – 110066.
16. Chief Engineer, Design (NW&S), CWC, Sewa Bhawan, R.K. Puram, New Delhi – 110066.
17. Director (LHIM&EPE Division), Geological Survey of India, A-II, Pushpa Bhawan, Madangir Road, New Delhi – 110062.
18. Director , CSMRS, Olof Palme Marg, Hauz khas , New Delhi-110016
19. Director {PA(N)/Hydology(N)/CMDDD(NW&S)/HCD(NW&S)/FE&SA/ISM/CA-HWF/CMC/Instrumentation}, CWC, Sewa Bhawan, R.K. Puram, New Delhi – 110066.

### 1. Norm for Normal Afforestation (1100 Plants/Hectare)

#### A. Abstract

Component	Rate (Rs.)
Fencing	37200
Planting	32150
Nursery Cost of Plants (@ Rs. 23.06/ plant for 1100 plants)	25366
<b>Total</b>	<b>94716</b>
<b>Or Say</b>	<b>94720</b>
<b>Maintenance</b>	
1st Year Maintenance	6280
Nursery Cost of Plants (@ Rs. 23.06/ plant for 330 plants)	7609.8
Total	13889.8
Or Say	13890
2nd Year Maintenance	4250
Nursery Cost of Plants (@ Rs. 23.06/ plant for 220 plants)	5073.2
Total	9323.2
Or Say	9330
3rdYear Maintenance	2225
Nursery Cost of Plants (@ Rs. 23.06/ plant for 110 plants)	2536.6
Total	4761.6
Or Say	4760
4th Year Maintenance	2225
Nursery Cost of Plants (@ Rs. 23.06/ plant for 110 plants)	2536.6
Total	4761.6
Or Say	4760
5th Year Maintenance	2225
Nursery Cost of Plants (@ Rs. 23.06/ plant for 110 plants)	2536.6
Total	4761.6
Or Say	4760
6th Year Maintenance	2225
Nursery Cost of Plants (@ Rs. 23.06/ plant for 110 plants)	2536.6
Total	4761.6
Or Say	4760
7th Year Maintenance	2225
Nursery Cost of Plants (@ Rs. 23.06/ plant for 110 plants)	2536.6
Total	4761.6
Or Say	4760
<b>Total Maintenance</b>	<b>47020</b>
<b>Grand Total</b>	<b>141740</b>

#### B. Detailed

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
<b>A</b>	<b>SURVEY, DEMARCATION &amp; FENCING:-</b>						
1	Survey & Demarcation of Plantation Area	ha.	1	101.00	101.00	0.67	185.17
2	Preparation/ Purchase of RCC Fence Post	No.	50	250.00	12500.00	0.00	17900.00
3	Carriage of RCC Fence Post upto 165 cm long over a distance of 2 km uphill/ downhill	KM/ No.	50	33.5	3350.00	22.33	6141.67
4	Preparation /Digging of Holes of 20x30x50 cm size	No.	50	9.06	453.00	3.02	830.50
5	Fixing of RCC Fence Post i/c Strutting	No.	50	7.16	358.00	2.39	656.33

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
6	Carriage of B/Wire over a distance of 2 Kms uphill/ downhill	KM/ Qtl.	0.75	73.65	110.48	0.74	202.54
7	Stretching & Fixing of Barbed Wire in 4 Strands	Rmt.	600	4.80	2880.00	19.20	5280.00
8	Interlacing of Thorny Bushes along the Fence	Rmt.	150	4.09	613.50	4.09	1124.75
9	Cost of Barbed Wire	Qtl.	0.75	6510	4882.50	0.00	4882.50
<b>Total -A/Survey, Demarcation &amp; Fencing:</b>							<b>37203.45</b>
<b>Or Say</b>							<b>37200.00</b>
<b>B.</b>	<b>PLANTING:-</b>						
1	Bush Cutting in Strips (3m x 3m)	ha.	1	1192.80	1192.80	7.95	2186.80
2	Digging of Pits of 45x45x45 cm Size	No.	550	9.54	5247.00	34.98	9619.50
3	Digging of Pits of 30x30x30 cm Size	No.	550	4.77	2623.50	17.49	4809.75
4	Filling of Pits of 45x45x45 cm size	No.	550	2.72	1496.00	9.97	2742.67
5	Filling of Pits of 30x30x30 cm size	No.	550	1.91	1050.50	7.00	1925.92
6	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/ No.	550	1.9	2090.00	13.93	3831.67
7	Carriage of naked root Plants over a distance 2 Km uphill/downhill	KM/ No.	550	0.26	286.00	1.91	524.33
8	Planting of Plants Raised in P/Bags	No.	550	2.18	1199.00	7.99	2198.17
9	Planting of Plants with naked roots	No.	550	1.83	1006.50	6.71	1845.25
10	Nursery Cost of Plants	No.	1100	4.75	5225.00	23.06	25366.00
11	Construction of Inspection Path	Rmt.	100	11	1100.00	7.33	2016.67
12	Cost of Sign Board, Carriage & Fixing	No.	0	LS	450.00	0.00	450.00
<b>Total -B/Planting:</b>							<b>57516.72</b>
<b>Or Say</b>							<b>57520.00</b>
<b>Grand Total (A+B):</b>							<b>94720.00</b>
<b>1st YEAR MAINTENANCE (30 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	165	4.77	787.05	5.25	1442.93
2	Re-digging of Pits 30x30x30 cm	No.	165	2.38	392.70	2.62	719.95
3	Filling of Pits 45x45x45 cm	No.	165	2.72	448.80	2.99	822.80
4	Filling of Pits 30x30x30 cm	No.	165	1.91	315.15	2.10	577.78
5	Planting of Plants raised in P/Bags	No.	165	2.18	359.70	2.40	659.45
6	Planting of Plants with naked roots	No.	165	1.83	301.95	2.01	553.58
7	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/ No.	165	1.9	627.00	4.18	1149.50
8	Carriage of naked root plants over a distance 2 Km uphill/downhill	KM/ No.	165	0.26	85.80	0.57	157.30
9	Nursery Cost of Plants	No.	330	4.75	1567.50	23.06	7609.80
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/1st Year Maintenance:</b>							<b>13891.08</b>
<b>Or Say</b>							<b>13890.00</b>
<b>2nd YEAR MAINTENANCE (20 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	110	4.77	524.70	3.50	961.95
2	Re-digging of Pits 30x30x30cm	No.	110	2.38	261.80	1.75	479.97
3	Filling of Pits 45x45x45 cm	No.	110	2.72	299.20	1.99	548.53
4	Filling of Pits 30x30x30 cm	No.	110	1.91	210.10	1.40	385.18
5	Planting of Plants raised in P/Bags	No.	110	2.18	239.80	1.60	439.63
6	Planting of Plants with naked roots	No.	110	1.83	201.30	1.34	369.05
7	Carriage of Plants in P. Bags over a distance of 2 Km uphill/downhill	No.	110	1.9	418.00	2.79	766.33
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	110	0.26	57.20	0.38	104.87
9	Nursery Cost of Plants	No.	220	4.75	1045.00	23.06	5073.20
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/2nd Year Maintenance:</b>							<b>9326.72</b>

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
				<b>Or Say</b>			<b>9330.00</b>
<b>3rd YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	55	4.77	262.35	1.75	480.98
2	Re-digging of Pits 30x30x30 cm	No.	55	2.38	130.90	0.87	239.98
3	Filling of Pits 45x45x45 cm	No.	55	2.72	149.60	1.00	274.27
4	Filling of Pits 30x30x30 cm	No.	55	1.91	105.05	0.70	192.59
5	Planting of Plants raised in P/Bags	No.	55	2.18	119.90	0.80	219.82
6	Planting of Plants with naked roots	No.	55	1.83	100.65	0.67	184.53
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	55	1.9	209.00	1.39	383.17
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	55	0.26	28.60	0.19	52.43
9	Nursery Cost of Plants	No.	110	4.75	522.50	23.06	2536.60
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
				<b>Total/3rd Year Maintenance:</b>			<b>4762.36</b>
				<b>Or Say</b>			<b>4760.00</b>
<b>4th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	55	4.77	262.35	1.75	480.98
2	Re-digging of Pits 30x30x30 cm	No.	55	2.38	130.90	0.87	239.98
3	Filling of Pits 45x45x45 cm	No.	55	2.72	149.60	1.00	274.27
4	Filling of Pits 30x30x30 cm	No.	55	1.91	105.05	0.70	192.59
5	Planting of Plants raised in P/Bags	No.	55	2.18	119.90	0.80	219.82
6	Planting of Plants with naked roots	No.	55	1.83	100.65	0.67	184.53
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	55	1.9	209.00	1.39	383.17
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	55	0.26	28.60	0.19	52.43
9	Nursery Cost of Plants	No.	110	4.75	522.50	23.06	2536.60
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
				<b>Total/4th Year Maintenance:</b>			<b>4762.36</b>
				<b>Or Say</b>			<b>4760.00</b>
<b>5th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	55	4.77	262.35	1.75	480.98
2	Re-digging of Pits 30x30x30 cm	No.	55	2.38	130.90	0.87	239.98
3	Filling of Pits 45x45x45 cm	No.	55	2.72	149.60	1.00	274.27
4	Filling of Pits 30x30x30 cm	No.	55	1.91	105.05	0.70	192.59
5	Planting of Plants raised in P/Bags	No.	55	2.18	119.90	0.80	219.82
6	Planting of Plants with naked roots	No.	55	1.83	100.65	0.67	184.53
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	55	1.9	209.00	1.39	383.17
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	55	0.26	28.60	0.19	52.43
9	Nursery Cost of Plants	No.	110	4.75	522.50	23.06	2536.60
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
				<b>Total/5th Year Maintenance:</b>			<b>4762.36</b>
				<b>Or Say</b>			<b>4760.00</b>
<b>6th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	55	4.77	262.35	1.75	480.98
2	Re-digging of Pits 30x30x30 cm	No.	55	2.38	130.90	0.87	239.98
3	Filling of Pits 45x45x45 cm	No.	55	2.72	149.60	1.00	274.27
4	Filling of Pits 30x30x30 cm	No.	55	1.91	105.05	0.70	192.59
5	Planting of Plants raised in P/Bags	No.	55	2.18	119.90	0.80	219.82
6	Planting of Plants with naked roots	No.	55	1.83	100.65	0.67	184.53
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	55	1.9	209.00	1.39	383.17

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	55	0.26	28.60	0.19	52.43
9	Nursery Cost of Plants	No.	110	4.75	522.50	23.06	2536.60
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/6th Year Maintenance:</b>							<b>4762.36</b>
<b>Or Say</b>							<b>4760.00</b>
<b>7th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	55	4.77	262.35	1.75	480.98
2	Re-digging of Pits 30x30x30 cm	No.	55	2.38	130.90	0.87	239.98
3	Filling of Pits 45x45x45 cm	No.	55	2.72	149.60	1.00	274.27
4	Filling of Pits 30x30x30 cm	No.	55	1.91	105.05	0.70	192.59
5	Planting of Plants raised in P/Bags	No.	55	2.18	119.90	0.80	219.82
6	Planting of Plants with naked roots	No.	55	1.83	100.65	0.67	184.53
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	55	1.9	209.00	1.39	383.17
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	55	0.26	28.60	0.19	52.43
9	Nursery Cost of Plants	No.	110	4.75	522.50	23.06	2536.60
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/7th Year Maintenance:</b>							<b>4762.36</b>
<b>Or Say</b>							<b>4760.00</b>
<b>Grand Total (A + B + Maintenance)</b>							<b>141740.00</b>

## 2. Norm for Enrichment Plantation (800 Plants/Hectare)

### A. Abstract

Component	Rate (Rs.)
Fencing	16153
Planting	24647.25
Nursery Cost of Plants (@ Rs. 23.06/ plant for 800 plants)	18448
<b>Total</b>	<b>59248.25</b>
<b>Or Say</b>	<b>59250</b>
<b>Maintenance</b>	
1st Year Maintenance	4622.75
Nursery Cost of Plants (@ Rs. 23.06/ plant for 240 plants)	5534.4
Total	10157.15
Or Say	10100
2nd Year Maintenance	3148.75
Nursery Cost of Plants (@ Rs. 23.06/ plant for 160 plants)	3689.6
Total	6838.35
Or Say	6800
3rdYear Maintenance	1672.73
Nursery Cost of Plants (@ Rs. 23.06/ plant for 80 plants)	1844.8
Total	3517.53
Or Say	3500
4th Year Maintenance	1672.73
Nursery Cost of Plants (@ Rs. 23.06/ plant for 80 plants)	1844.8
Total	3517.53
Or Say	3500
5th Year Maintenance	1672.73
Nursery Cost of Plants (@ Rs. 23.06/ plant for 80 plants)	1844.8
Total	3517.53
Or Say	3500

Component	Rate (Rs.)
6th Year Maintenance	1672.73
Nursery Cost of Plants (@ Rs. 23.06/ plant for 80 plants)	1844.8
Total	3517.53
Or Say	3500
7th Year Maintenance	1672.73
Nursery Cost of Plants (@ Rs. 23.06/ plant for 80 plants)	1844.8
Total	3517.53
Or Say	3500
<b>Total Maintenance</b>	<b>34400</b>
<b>Grand Total</b>	<b>93650</b>

### B. Detailed

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas	
<b>A</b>	<b>SURVEY, DEMARCATION &amp; FENCING:-</b>							
1	Survey & Demarcation of Plantation Area	ha.	1	101.00	101.00	0.67	185.17	
2	Cutting and preparation of wooden fence posts 1.85 mt long and 8 to 10 cm dia including debarking and fashioning the top 1.5 cms in conical shape	No.	50	12.95	647.50	4.32	1187.08	
3	Carriage of wooden Fence Post over a distance of 2 km	KM/ No.	50	6.82	682.00	4.55	1250.33	
4	Charring and coaltaring of ends of fence posts up to 45 at bottom and 15 cms at conical end	No.	50	2.8	140.00	0.93	256.67	
5	Preparation /Digging of Holes of 20 to 30 cm dia and 45 cm deep	No.	50	9.07	453.50	3.02	831.42	
6	Fixing of wooden Fence Post i/c Strutting	No.	50	7.16	358.00	2.39	656.33	
7	Carriage of B/Wire over a distance of 2 Kms	KM/ Qtl.	0.75	73.65	110.48	0.74	202.54	
8	Stretching & Fixing of Barbed Wire in 4 Strands	Rmt.	600	4.80	2880.00	19.20	5280.00	
9	Interlacing of Thorny Bushes along the Fence	Rmt.	150	4.00	600.00	4.00	1100.00	
10	Cost of Barbed Wire	Qtl.	0.75	6510	4882.50	0.00	4882.50	
11	Cost of U-Nails	Qtl.	0.05	6400	320.00		320.00	
<b>Total -A/Survey, Demarcation &amp; Fencing:</b>								<b>16152.04</b>
<b>Or Say</b>								<b>16150.00</b>
<b>B.</b>	<b>PLANTING:-</b>							
1	Bush Cutting in Strips (3m x 3m)	ha.	1	1192.80	1192.80	7.95	2186.80	
2	Digging of Pits of 45x45x45 cm Size	No.	400	9.54	3816.00	25.44	6996.00	
3	Digging of Pits of 30x30x30 cm Size	No.	400	4.77	1908.00	12.72	3498.00	
4	Filling of Pits of 45x45x45 cm size	No.	400	2.72	1088.00	7.25	1994.67	
5	Filling of Pits of 30x30x30 cm size	No.	400	1.91	764.00	5.09	1400.67	
6	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/ No.	400	1.9	1520.00	10.13	2786.67	
7	Carriage of naked root Plants over a distance 2 Km uphill/downhill	KM/ No.	400	0.26	208.00	1.39	381.33	
8	Planting of Plants Raised in P/Bags	No.	400	2.18	872.00	5.81	1598.67	
9	Planting of Plants with naked roots	No.	400	1.83	732.00	4.88	1342.00	
10	Nursery Cost of Plants	No.	800	4.75	3800.00	23.06	18448.00	
11	Construction of Inspection Path	Rmt.	100	11	1100.00	7.33	2016.67	
12	Cost of Sign Board, Carriage & Fixing	No.	0	LS	450.00	0.00	450.00	
<b>Total -B/Planting:</b>								<b>43099.47</b>

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
<b>Or Say</b>							<b>43100.00</b>
<b>Grand Total (A+B):</b>							<b>59250.00</b>
<b>1st YEAR MAINTENANCE (30 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	120	4.77	572.40	3.82	1049.40
2	Re-digging of Pits 30x30x30 cm	No.	120	2.38	285.60	1.90	523.60
3	Filling of Pits 45x45x45 cm	No.	120	2.72	326.40	2.18	598.40
4	Filling of Pits 30x30x30 cm	No.	120	1.91	229.20	1.53	420.20
5	Planting of Plants raised in P/Bags	No.	120	2.18	261.60	1.74	479.60
6	Planting of Plants with naked roots	No.	120	1.83	219.60	1.46	402.60
7	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/ No.	120	1.9	456.00	3.04	836.00
8	Carriage of naked root plants over a distance 2 Km uphill/downhill	KM/ No.	120	0.26	62.40	0.42	114.40
9	Nursery Cost of Plants	No.	240	4.75	1140.00	23.06	5534.40
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/1st Year Maintenance:</b>							<b>10156.60</b>
<b>Or Say</b>							<b>10100.00</b>
<b>2nd YEAR MAINTENANCE (20 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	80	4.77	381.60	2.54	699.60
2	Re-digging of Pits 30x30x30cm	No.	80	2.38	190.40	1.27	349.07
3	Filling of Pits 45x45x45 cm	No.	80	2.72	217.60	1.45	398.93
4	Filling of Pits 30x30x30 cm	No.	80	1.91	152.80	1.02	280.13
5	Planting of Plants raised in P/Bags	No.	80	2.18	174.40	1.16	319.73
6	Planting of Plants with naked roots	No.	80	1.83	146.40	0.98	268.40
7	Carriage of Plants in P. Bags over a distance of 2 Km uphill/downhill	No.	80	1.9	304.00	2.03	557.33
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	80	0.26	41.60	0.28	76.27
9	Nursery Cost of Plants	No.	160	4.75	760.00	23.06	3689.60
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/2nd Year Maintenance:</b>							<b>6837.07</b>
<b>Or Say</b>							<b>6800.00</b>
<b>3rd YEAR MAINTENANCE (10% BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	40	4.77	190.80	1.27	349.80
2	Re-digging of Pits 30x30x30 cm	No.	40	2.38	95.20	0.63	174.53
3	Filling of Pits 45x45x45 cm	No.	40	2.72	108.80	0.73	199.47
4	Filling of Pits 30x30x30 cm	No.	40	1.91	76.40	0.51	140.07
5	Planting of Plants raised in P/Bags	No.	40	2.18	87.20	0.58	159.87
6	Planting of Plants with naked roots	No.	40	1.83	73.20	0.49	134.20
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	40	1.9	152.00	1.01	278.67
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	40	0.26	20.80	0.14	38.13
9	Nursery Cost of Plants	No.	80	4.75	380.00	23.06	1844.80
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/3rd Year Maintenance:</b>							<b>3517.53</b>
<b>Or Say</b>							<b>3500.00</b>
<b>4th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	40	4.77	190.80	1.27	349.80
2	Re-digging of Pits 30x30x30 cm	No.	40	2.38	95.20	0.63	174.53
3	Filling of Pits 45x45x45 cm	No.	40	2.72	108.80	0.73	199.47
4	Filling of Pits 30x30x30 cm	No.	40	1.91	76.40	0.51	140.07
5	Planting of Plants raised in P/Bags	No.	40	2.18	87.20	0.58	159.87
6	Planting of Plants with naked roots	No.	40	1.83	73.20	0.49	134.20

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	40	1.9	152.00	1.01	278.67
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	40	0.26	20.80	0.14	38.13
9	Nursery Cost of Plants	No.	80	4.75	380.00	23.06	1844.80
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/4th Year Maintenance:</b>							<b>3517.53</b>
<b>Or Say</b>							<b>3500.00</b>
<b>5th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	40	4.77	190.80	1.27	349.80
2	Re-digging of Pits 30x30x30 cm	No.	40	2.38	95.20	0.63	174.53
3	Filling of Pits 45x45x45 cm	No.	40	2.72	108.80	0.73	199.47
4	Filling of Pits 30x30x30 cm	No.	40	1.91	76.40	0.51	140.07
5	Planting of Plants raised in P/Bags	No.	40	2.18	87.20	0.58	159.87
6	Planting of Plants with naked roots	No.	40	1.83	73.20	0.49	134.20
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	40	1.9	152.00	1.01	278.67
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	40	0.26	20.80	0.14	38.13
9	Nursery Cost of Plants	No.	80	4.75	380.00	23.06	1844.80
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/5th Year Maintenance:</b>							<b>3517.53</b>
<b>Or Say</b>							<b>3500.00</b>
<b>6th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	40	4.77	190.80	1.27	349.80
2	Re-digging of Pits 30x30x30 cm	No.	40	2.38	95.20	0.63	174.53
3	Filling of Pits 45x45x45 cm	No.	40	2.72	108.80	0.73	199.47
4	Filling of Pits 30x30x30 cm	No.	40	1.91	76.40	0.51	140.07
5	Planting of Plants raised in P/Bags	No.	40	2.18	87.20	0.58	159.87
6	Planting of Plants with naked roots	No.	40	1.83	73.20	0.49	134.20
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	40	1.9	152.00	1.01	278.67
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	40	0.26	20.80	0.14	38.13
9	Nursery Cost of Plants	No.	80	4.75	380.00	23.06	1844.80
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/4th Year Maintenance:</b>							<b>3517.53</b>
<b>Or Say</b>							<b>3500.00</b>
<b>7th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	40	4.77	190.80	1.27	349.80
2	Re-digging of Pits 30x30x30 cm	No.	40	2.38	95.20	0.63	174.53
3	Filling of Pits 45x45x45 cm	No.	40	2.72	108.80	0.73	199.47
4	Filling of Pits 30x30x30 cm	No.	40	1.91	76.40	0.51	140.07
5	Planting of Plants raised in P/Bags	No.	40	2.18	87.20	0.58	159.87
6	Planting of Plants with naked roots	No.	40	1.83	73.20	0.49	134.20
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	40	1.9	152.00	1.01	278.67
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	40	0.26	20.80	0.14	38.13
9	Nursery Cost of Plants	No.	80	4.75	380.00	23.06	1844.80
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/5th Year Maintenance:</b>							<b>3517.53</b>
<b>Or Say</b>							<b>3500.00</b>
<b>Grand Total (A + B + Maintenance)</b>							<b>93650.00</b>

### 3. Norm for Energy Plantation and Grazing Land Development (1100 Plants/Hectare)

#### A. Abstract

Component	Rate (Rs.)
Fencing	16150
Planting	32150
Nursery Cost of Plants (@ Rs. 23.06/ plant for 1100 plants)	25366
<b>Total</b>	<b>73666</b>
<b>Or Say</b>	<b>73670</b>
<b>Maintenance</b>	
1st Year Maintenance	6280
Nursery Cost of Plants (@ Rs. 23.06/ plant for 330 plants)	7609.8
Total	13889.8
Or Say	13890
2nd Year Maintenance	4250
Nursery Cost of Plants (@ Rs. 23.06/ plant for 220 plants)	5073.2
Total	9323.2
Or Say	9330
3rdYear Maintenance	2225
Nursery Cost of Plants (@ Rs. 23.06/ plant for 110 plants)	2536.6
Total	4761.6
Or Say	4760
4th Year Maintenance	2225
Nursery Cost of Plants (@ Rs. 23.06/ plant for 110 plants)	2536.6
Total	4761.6
Or Say	4760
5th Year Maintenance	2225
Nursery Cost of Plants (@ Rs. 23.06/ plant for 110 plants)	2536.6
Total	4761.6
Or Say	4760
6th Year Maintenance	2225
Nursery Cost of Plants (@ Rs. 23.06/ plant for 110 plants)	2536.6
Total	4761.6
Or Say	4760
7th Year Maintenance	2225
Nursery Cost of Plants (@ Rs. 23.06/ plant for 110 plants)	2536.6
Total	4761.6
Or Say	4760
<b>Total Maintenance</b>	<b>47020</b>
<b>Grand Total</b>	<b>120690</b>

#### B. Detailed

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
<b>A</b>	<b>SURVEY, DEMARCATION &amp; FENCING:-</b>						
1	Survey & Demarcation of Plantation Area	ha.	1	101.00	101.00	0.67	185.17
2	Cutting and preparation of wooden fence posts 1.85 mt long and 8 to 10 cm dia including debarking and fashioning the top 1.5 cms in conical shape	No.	50	12.95	647.50	4.32	1187.08
3	Carriage of wooden Fence Post over a distance of 2 km	KM/ No.	50	6.82	682.00	4.55	1250.33
4	Charring and coaltaring of ends of fence posts up to 45 at bottom and 15 cms at conical end	No.	50	2.8	140.00	0.93	256.67
5	Preparation /Digging of Holes of 20 to 30 cm dia and 45 cm deep	No.	50	9.07	453.50	3.02	831.42

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas	
6	Fixing of wooden Fence Post i/c Strutting	No.	50	7.16	358.00	2.39	656.33	
7	Carriage of B/Wire over a distance of 2 Kms	KM/ Qtl.	0.75	73.65	110.48	0.74	202.54	
8	Stretching & Fixing of Barbed Wire in 4 Strands	Rmt.	600	4.80	2880.00	19.20	5280.00	
9	Interlacing of Thorny Bushes along the Fence	Rmt.	150	4.00	600.00	4.00	1100.00	
10	Cost of Barbed Wire	Qtl.	0.75	6510	4882.50	0.00	4882.50	
11	Cost of U-Nails	Qtl.	0.05	6400	320.00		320.00	
<b>Total -A/Survey, Demarcation &amp; Fencing:</b>								<b>16152.04</b>
<b>Or Say</b>								<b>16150.00</b>
<b>B.</b>	<b>PLANTING:-</b>							
1	Bush Cutting in Strips (3m x 3m)	ha.	1	1192.80	1192.80	7.95	2186.80	
2	Digging of Pits of 45x45x45 cm Size	No.	550	9.54	5247.00	34.98	9619.50	
3	Digging of Pits of 30x30x30 cm Size	No.	550	4.77	2623.50	17.49	4809.75	
4	Filling of Pits of 45x45x45 cm size	No.	550	2.72	1496.00	9.97	2742.67	
5	Filling of Pits of 30x30x30 cm size	No.	550	1.91	1050.50	7.00	1925.92	
6	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/ No.	550	1.9	2090.00	13.93	3831.67	
7	Carriage of naked root Plants over a distance 2 Km uphill/downhill	KM/ No.	550	0.26	286.00	1.91	524.33	
8	Planting of Plants Raised in P/Bags	No.	550	2.18	1199.00	7.99	2198.17	
9	Planting of Plants with naked roots	No.	550	1.83	1006.50	6.71	1845.25	
10	Nursery Cost of Plants	No.	1100	4.75	5225.00	23.06	25366.00	
11	Construction of Inspection Path	Rmt.	100	11	1100.00	7.33	2016.67	
12	Cost of Sign Board, Carriage & Fixing	No.	0	LS	450.00	0.00	450.00	
<b>Total -B/Planting:</b>								<b>57516.72</b>
<b>Or Say</b>								<b>57520.00</b>
<b>Grand Total (A+B):</b>								<b>73670.00</b>
<b>1st YEAR MAINTENANCE (30 % BEATING UP):</b>								
1	Re-digging of Pits 45x45x45 cm	No.	165	4.77	787.05	5.25	1442.93	
2	Re-digging of Pits 30x30x30 cm	No.	165	2.38	392.70	2.62	719.95	
3	Filling of Pits 45x45x45 cm	No.	165	2.72	448.80	2.99	822.80	
4	Filling of Pits 30x30x30 cm	No.	165	1.91	315.15	2.10	577.78	
5	Planting of Plants raised in P/Bags	No.	165	2.18	359.70	2.40	659.45	
6	Planting of Plants with naked roots	No.	165	1.83	301.95	2.01	553.58	
7	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/ No.	165	1.9	627.00	4.18	1149.50	
8	Carriage of naked root plants over a distance 2 Km uphill/downhill	KM/ No.	165	0.26	85.80	0.57	157.30	
9	Nursery Cost of Plants	No.	330	4.75	1567.50	23.06	7609.80	
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00	
<b>Total/1st Year Maintenance:</b>								<b>13891.08</b>
<b>Or Say</b>								<b>13890.00</b>
<b>2nd YEAR MAINTENANCE (20 % BEATING UP):</b>								
1	Re-digging of Pits 45x45x45 cm	No.	110	4.77	524.70	3.50	961.95	
2	Re-digging of Pits 30x30x30cm	No.	110	2.38	261.80	1.75	479.97	
3	Filling of Pits 45x45x45 cm	No.	110	2.72	299.20	1.99	548.53	
4	Filling of Pits 30x30x30 cm	No.	110	1.91	210.10	1.40	385.18	
5	Planting of Plants raised in P/Bags	No.	110	2.18	239.80	1.60	439.63	
6	Planting of Plants with naked roots	No.	110	1.83	201.30	1.34	369.05	
7	Carriage of Plants in P. Bags over a distance of 2 Km uphill/downhill	No.	110	1.9	418.00	2.79	766.33	
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	110	0.26	57.20	0.38	104.87	
9	Nursery Cost of Plants	No.	220	4.75	1045.00	23.06	5073.20	

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/2nd Year Maintenance:</b>							<b>9326.72</b>
<b>Or Say</b>							<b>9330.00</b>
<b>3rd YEAR MAINTENANCE (15% BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	55	4.77	262.35	1.75	480.98
2	Re-digging of Pits 30x30x30 cm	No.	55	2.38	130.90	0.87	239.98
3	Filling of Pits 45x45x45 cm	No.	55	2.72	149.60	1.00	274.27
4	Filling of Pits 30x30x30 cm	No.	55	1.91	105.05	0.70	192.59
5	Planting of Plants raised in P/Bags	No.	55	2.18	119.90	0.80	219.82
6	Planting of Plants with naked roots	No.	55	1.83	100.65	0.67	184.53
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	55	1.9	209.00	1.39	383.17
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	55	0.26	28.60	0.19	52.43
9	Nursery Cost of Plants	No.	110	4.75	522.50	23.06	2536.60
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/3rd Year Maintenance:</b>							<b>4762.36</b>
<b>Or Say</b>							<b>4760.00</b>
<b>4th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	55	4.77	262.35	1.75	480.98
2	Re-digging of Pits 30x30x30 cm	No.	55	2.38	130.90	0.87	239.98
3	Filling of Pits 45x45x45 cm	No.	55	2.72	149.60	1.00	274.27
4	Filling of Pits 30x30x30 cm	No.	55	1.91	105.05	0.70	192.59
5	Planting of Plants raised in P/Bags	No.	55	2.18	119.90	0.80	219.82
6	Planting of Plants with naked roots	No.	55	1.83	100.65	0.67	184.53
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	55	1.9	209.00	1.39	383.17
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	55	0.26	28.60	0.19	52.43
9	Nursery Cost of Plants	No.	110	4.75	522.50	23.06	2536.60
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/4th Year Maintenance:</b>							<b>4762.36</b>
<b>Or Say</b>							<b>4760.00</b>
<b>5th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	55	4.77	262.35	1.75	480.98
2	Re-digging of Pits 30x30x30 cm	No.	55	2.38	130.90	0.87	239.98
3	Filling of Pits 45x45x45 cm	No.	55	2.72	149.60	1.00	274.27
4	Filling of Pits 30x30x30 cm	No.	55	1.91	105.05	0.70	192.59
5	Planting of Plants raised in P/Bags	No.	55	2.18	119.90	0.80	219.82
6	Planting of Plants with naked roots	No.	55	1.83	100.65	0.67	184.53
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	55	1.9	209.00	1.39	383.17
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	55	0.26	28.60	0.19	52.43
9	Nursery Cost of Plants	No.	110	4.75	522.50	23.06	2536.60
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/5th Year Maintenance:</b>							<b>4762.36</b>
<b>Or Say</b>							<b>4760.00</b>
<b>6th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	55	4.77	262.35	1.75	480.98
2	Re-digging of Pits 30x30x30 cm	No.	55	2.38	130.90	0.87	239.98
3	Filling of Pits 45x45x45 cm	No.	55	2.72	149.60	1.00	274.27
4	Filling of Pits 30x30x30 cm	No.	55	1.91	105.05	0.70	192.59
5	Planting of Plants raised in P/Bags	No.	55	2.18	119.90	0.80	219.82
6	Planting of Plants with naked roots	No.	55	1.83	100.65	0.67	184.53

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	55	1.9	209.00	1.39	383.17
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	55	0.26	28.60	0.19	52.43
9	Nursery Cost of Plants	No.	110	4.75	522.50	23.06	2536.60
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/6th Year Maintenance:</b>							<b>4762.36</b>
<b>Or Say</b>							<b>4760.00</b>
<b>7th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	55	4.77	262.35	1.75	480.98
2	Re-digging of Pits 30x30x30 cm	No.	55	2.38	130.90	0.87	239.98
3	Filling of Pits 45x45x45 cm	No.	55	2.72	149.60	1.00	274.27
4	Filling of Pits 30x30x30 cm	No.	55	1.91	105.05	0.70	192.59
5	Planting of Plants raised in P/Bags	No.	55	2.18	119.90	0.80	219.82
6	Planting of Plants with naked roots	No.	55	1.83	100.65	0.67	184.53
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	55	1.9	209.00	1.39	383.17
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	55	0.26	28.60	0.19	52.43
9	Nursery Cost of Plants	No.	110	4.75	522.50	23.06	2536.60
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/7th Year Maintenance:</b>							<b>4762.36</b>
<b>Or Say</b>							<b>4760.00</b>
<b>Grand Total (A + B + Maintenance)</b>							<b>120690.00</b>

#### 4. Norm for Planting of Tall Plants (500 Plants/Hectare)

##### A. Abstract

Component	Rate (Rs.)
Fencing	16620
Planting	49213.01
Nursery Cost of Plants (@ Rs. 63.76/ plant for 500 plants)	31880
<b>Total</b>	<b>97713.01</b>
<b>Or Say</b>	<b>97710</b>
<b>Maintenance</b>	
1st Year Maintenance	4787.86
Nursery Cost of Plants (@ Rs. 63.76/ plant for 50 plants)	3188
Total	7975.86
Or Say	7975
2nd Year Maintenance	2869.28
Nursery Cost of Plants (@ Rs. 63.76/ plant for 25 plants)	1594
Total	4463.28
Or Say	4400
3rdYear Maintenance	1718.13
Nursery Cost of Plants (@ Rs. 63.76/ plant for 10 plants)	637.6
Total	2355.73
Or Say	2355
4th Year Maintenance	1718.13
Nursery Cost of Plants (@ Rs. 63.76/ plant for 10 plants)	637.6
Total	2355.73
Or Say	2355
5th Year Maintenance	1718.13
Nursery Cost of Plants (@ Rs. 63.76/ plant for 10 plants)	637.6
Total	2355.73

Component	Rate (Rs.)
Or Say	2355
5th Year Maintenance	1718.13
Nursery Cost of Plants (@ Rs. 63.76/ plant for 10 plants)	637.6
Total	2355.73
Or Say	2355
5th Year Maintenance	1718.13
Nursery Cost of Plants (@ Rs. 63.76/ plant for 10 plants)	637.6

## B. Detailed

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
<b>A</b>	<b>SURVEY, DEMARCATION &amp; FENCING:-</b>						
1	Survey & Demarcation of Plantation Area	ha.	1	101.00	101.00	0.67	185.17
2	Cutting and preparation of wooden fence posts 1.85 mt long and 8 to 10 cm dia including debarking and fashioning the top 1.5 cms in conical shape	No.	50	12.95	647.50	4.32	1187.08
3	Carriage of wooden Fence Post over a distance of 1 km uphill/ downhill	KM/ No.	50	6.82	341.00	2.27	625.17
4	Charring and coaltaring of ends of fence posts up to 45 at bottom and 15 cms at conical end	No.	50	2.8	140.00	0.93	256.67
5	Preparation /Digging of Holes of 20 to 30 cm dia and 45 cm deep	No.	50	9.06	453.00	3.02	830.50
6	Fixing of wooden Fence Post i/c Strutting	No.	50	7.16	358.00	2.39	656.33
7	Carriage of B/Wire from store to nearest road head near plantation site in motor transport (average carriage 10 kms)	Qtl.	0.84	LS	535.70	3.57	982.12
8	Carriage of B/Wire over a distance of 1 Kms	KM/ Qtl.	0.84	73.65	61.87	0.41	113.42
9	Stretching & Fixing of Barbed Wire in 4 Strands	Rmt.	585	4.80	2808.00	18.72	5148.00
10	Interlacing of Thorny Bushes along the Fence	Rmt.	147	4.09	601.23	4.01	1102.26
11	Cost of Barbed Wire	Qtl.	0.84	6510	5468.40	0.00	5468.40
12	Cost of U-Nails	Qtl.	0.01	6400	64.00		64.00
<b>Total -A/Survey, Demarcation &amp; Fencing:</b>							<b>16619.11</b>
<b>Or Say</b>							<b>16620.00</b>
<b>B.</b>	<b>PLANTING:-</b>						
1	Digging of Pits of 60x60x60 cm Size	No.	500	17.45	8725.00	58.17	15995.83
2	Filling of Pits of 60x60x60 cm size	No.	500	3.54	1770.00	11.80	3245.00
3	Carriage of poly plants from nursery to nearest road head near plantation site in motor transport (average distance 10 kms)	No.	500	LS	2142.80	14.29	3928.47
4	Carriage of Plants in P. Bags over distance 1 Km uphill/downhill	KM/ No.	500	14.76	7380.00	49.20	13530.00
5	Planting of tall plants in pits i/c ramming	No.	500	6.54	3270.00	21.80	5995.00
6	Nursery Cost of Plants	No.	500	4.75	2375.00	63.76	31880.00
7	Construction of Inspection Path	Rmt.	100	11	1100.00	7.33	2016.67
8	Mulching of Plants	No.	500	0.84	420.00	2.80	770.00
9	Moisture retention Interventions/ Trenching/ Water harvesting/ Water during stress period	No.	500	LS	2035.66	13.57	3732.04
<b>Total -B/Planting:</b>							<b>81093.01</b>

					<b>Or Say</b>		<b>81090.00</b>
					<b>Grand Total (A+B):</b>		<b>97710.00</b>
<b>1st YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 60x60x60 cm	No.	50	10.48	524.00	3.49	960.67
2	Filling of Pits 60x60x60 cm	No.	50	3.54	177.00	1.18	324.50
3	Carriage of poly plants from nursery to nearest road head near plantation site in motor transport (average distance 10 kms)	No.	50	LS	321.42	2.14	589.27
4	Carriage of Plants in P. Bags over distance 1 Km uphill/downhill	KM/ No.	50	14.76	738.00	4.92	1353.00
5	Planting of tall plants in pits i/c ramming	No.	50	6.54	654.00	4.36	1199.00
6	Nursery Cost of Plants	No.	50	4.75	237.50	63.76	3188.00
7	Repair of Fencing	Rmt	50	1.80	90.00	0.60	165.00
8	Moisture retention Interventions/ Trenching/ Water harvesting/ Water during stress period	No.	50	LS	107.14	<b>0.71</b>	196.42
					<b>Total/1st Year Maintenance:</b>		<b>7975.86</b>
					<b>Or Say</b>		<b>7975.00</b>
<b>2nd YEAR MAINTENANCE (5% BEATING UP):</b>							
1	Re-digging of Pits 60x60x60 cm	No.	25	10.48	262.00	1.75	480.33
2	Filling of Pits 60x60x60 cm	No.	25	3.54	88.50	0.59	162.25
3	Carriage of poly plants from nursery to nearest road head near plantation site in motor transport (average distance 10 kms)	No.	25	LS	321.42	2.14	589.27
4	Carriage of Plants in P. Bags over distance 1 Km uphill/downhill	KM/ No.	25	14.76	369.00	2.46	676.50
5	Planting of tall plants in pits i/c ramming	No.	25	6.54	327.00	2.18	599.50
6	Nursery Cost of Plants	No.	25	4.75	118.75	63.76	1594.00
7	Repair of Fencing	Rmt	50	1.80	90.00	0.60	165.00
8	Moisture retention Interventions/ Trenching/ Water harvesting/ Water during stress period	No.	25	LS	107.14	<b>0.71</b>	196.42
					<b>Total/2nd Year Maintenance:</b>		<b>4463.28</b>
					<b>Or Say</b>		<b>4400.00</b>
<b>3rd YEAR MAINTENANCE (2% BEATING UP):</b>							
1	Re-digging of Pits 60x60x60 cm	No.	10	10.48	104.80	0.70	192.13
2	Filling of Pits 60x60x60 cm	No.	10	3.54	35.40	0.24	64.90
3	Carriage of poly plants from nursery to nearest road head near plantation site in motor transport (average distance 10 kms)	No.	10	LS	321.42	2.14	589.27
4	Carriage of Plants in P. Bags over distance 1 Km uphill/downhill	KM/ No.	10	14.76	147.60	0.98	270.60
5	Planting of tall plants in pits i/c ramming	No.	10	6.54	130.80	0.87	239.80
6	Nursery Cost of Plants	No.	10	4.75	47.50	63.76	637.60
7	Repair of Fencing	Rmt	50	1.80	90.00	0.60	165.00
8	Moisture retention Interventions/ Trenching/ Water harvesting/ Water during stress period	No.	10	LS	107.14	<b>0.71</b>	196.42
					<b>Total/3rd Year Maintenance:</b>		<b>2355.73</b>
					<b>Or Say</b>		<b>2355.00</b>
<b>4th YEAR MAINTENANCE (2% BEATING UP):</b>							
1	Re-digging of Pits 60x60x60 cm	No.	10	10.48	104.80	0.70	192.13
2	Filling of Pits 60x60x60 cm	No.	10	3.54	35.40	0.24	64.90
3	Carriage of poly plants from nursery to nearest road head near plantation site in motor transport (average distance 10 kms)	No.	10	LS	321.42	2.14	589.27
4	Carriage of Plants in P. Bags over	KM/ No.	10	14.76	147.60	0.98	270.60

	distance 1 Km uphill/downhill	No.					
5	Planting of tall plants in pits i/c ramming	No.	10	6.54	130.80	0.87	239.80
6	Nursery Cost of Plants	No.	10	4.75	47.50	63.76	637.60
7	Repair of Fencing	Rmt	50	1.80	90.00	0.60	165.00
8	Moisture retention Interventions/ Trenching/ Water harvesting/ Water during stress period	No.	10	LS	107.14	<b>0.71</b>	196.42
<b>Total/4th Year Maintenance:</b>							<b>2355.73</b>
<b>Or Say</b>							<b>2355.00</b>
<b>5th YEAR MAINTENANCE (2% BEATING UP):</b>							
1	Re-digging of Pits 60x60x60 cm	No.	10	10.48	104.80	0.70	192.13
2	Filling of Pits 60x60x60 cm	No.	10	3.54	35.40	0.24	64.90
3	Carriage of poly plants from nursery to nearest road head near plantation site in motor transport (average distance 10 kms)	No.	10	LS	321.42	2.14	589.27
4	Carriage of Plants in P. Bags over distance 1 Km uphill/downhill	KM/ No.	10	14.76	147.60	0.98	270.60
5	Planting of tall plants in pits i/c ramming	No.	10	6.54	130.80	0.87	239.80
6	Nursery Cost of Plants	No.	10	4.75	47.50	63.76	637.60
7	Repair of Fencing	Rmt	50	1.80	90.00	0.60	165.00
8	Moisture retention Interventions/ Trenching/ Water harvesting/ Water during stress period	No.	10	LS	107.14	<b>0.71</b>	196.42
<b>Total/5th Year Maintenance:</b>							<b>2355.73</b>
<b>Or Say</b>							<b>2355.00</b>
<b>6th YEAR MAINTENANCE (2% BEATING UP):</b>							
1	Re-digging of Pits 60x60x60 cm	No.	10	10.48	104.80	0.70	192.13
2	Filling of Pits 60x60x60 cm	No.	10	3.54	35.40	0.24	64.90
3	Carriage of poly plants from nursery to nearest road head near plantation site in motor transport (average distance 10 kms)	No.	10	LS	321.42	2.14	589.27
4	Carriage of Plants in P. Bags over distance 1 Km uphill/downhill	KM/ No.	10	14.76	147.60	0.98	270.60
5	Planting of tall plants in pits i/c ramming	No.	10	6.54	130.80	0.87	239.80
6	Nursery Cost of Plants	No.	10	4.75	47.50	63.76	637.60
7	Repair of Fencing	Rmt	50	1.80	90.00	0.60	165.00
8	Moisture retention Interventions/ Trenching/ Water harvesting/ Water during stress period	No.	10	LS	107.14	<b>0.71</b>	196.42
<b>Total/6th Year Maintenance:</b>							<b>2355.73</b>
<b>Or Say</b>							<b>2355.00</b>
<b>7th YEAR MAINTENANCE (2% BEATING UP):</b>							
1	Re-digging of Pits 60x60x60 cm	No.	10	10.48	104.80	0.70	192.13
2	Filling of Pits 60x60x60 cm	No.	10	3.54	35.40	0.24	64.90
3	Carriage of poly plants from nursery to nearest road head near plantation site in motor transport (average distance 10 kms)	No.	10	LS	321.42	2.14	589.27
4	Carriage of Plants in P. Bags over distance 1 Km uphill/downhill	KM/ No.	10	14.76	147.60	0.98	270.60
5	Planting of tall plants in pits i/c ramming	No.	10	6.54	130.80	0.87	239.80
6	Nursery Cost of Plants	No.	10	4.75	47.50	63.76	637.60
7	Repair of Fencing	Rmt	50	1.80	90.00	0.60	165.00
8	Moisture retention Interventions/ Trenching/ Water harvesting/ Water during stress period	No.	10	LS	107.14	<b>0.71</b>	196.42
<b>Total/7th Year Maintenance:</b>							<b>2355.73</b>
<b>Or Say</b>							<b>2355.00</b>
<b>Grand Total (A + B + Maintenance)</b>							<b>121860.00</b>

## 5. Norm for Assisted Natural Regeneration (250 Plants/Hectare)

### A. Abstract

Component	Rate (Rs.)
Fencing	16150
Planting	10902.84
Nursery Cost of Plants (@ Rs. 23.06/ plant for 250 plants)	5765
<b>Total</b>	<b>32817.84</b>
<b>Or Say</b>	<b>32820</b>
<b>Maintenance</b>	
1st Year Maintenance	1562.13
Nursery Cost of Plants (@ Rs. 23.06/ plant for 74 plants)	1706.44
Total	3268.57
Or Say	3270
2nd Year Maintenance	1119.71
Nursery Cost of Plants (@ Rs. 23.06/ plant for 50 plants)	1153
Total	2272.71
Or Say	2270
3rdYear Maintenance	640.42
Nursery Cost of Plants (@ Rs. 23.06/ plant for 24 plants)	553.44
Total	1193.86
Or Say	1190
4th Year Maintenance	640.42
Nursery Cost of Plants (@ Rs. 23.06/ plant for 24 plants)	553.44
Total	1193.86
Or Say	1190
5th Year Maintenance	640.42
Nursery Cost of Plants (@ Rs. 23.06/ plant for 24 plants)	553.44
Total	1193.86
Or Say	1190
6th Year Maintenance	640.42
Nursery Cost of Plants (@ Rs. 23.06/ plant for 24 plants)	553.44
Total	1193.86
Or Say	1190
7th Year Maintenance	640.42
Nursery Cost of Plants (@ Rs. 23.06/ plant for 24 plants)	553.44
Total	1193.86
Or Say	1190
<b>Total Maintenance</b>	<b>11490</b>
<b>Grand Total</b>	<b>44310</b>

### B. Detailed

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
<b>A</b>	<b>SURVEY, DEMARCATION &amp; FENCING:-</b>						
1	Survey & Demarcation of Plantation Area	ha.	1	101.00	101.00	0.67	185.17
2	Cutting and preparation of wooden fence posts 1.85 mt long and 8 to 10 cm dia including debarking and fashioning the top 1.5 cms in conical shape	No.	50	12.95	647.50	4.32	1187.08
3	Carriage of wooden Fence Post over a distance of 2 km	KM/ No.	50	6.82	682.00	4.55	1250.33
4	Charring and coaltaring of ends of fence posts up to 45 at bottom and 15 cms at conical end	No.	50	2.8	140.00	0.93	256.67
5	Preparation /Digging of Holes of 20 to 30 cm dia and 45 cm deep	No.	50	9.07	453.50	3.02	831.42

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas	
6	Fixing of wooden Fence Post i/c Strutting	No.	50	7.16	358.00	2.39	656.33	
7	Carriage of B/Wire over a distance of 2 Kms	KM/ Qtl.	0.75	73.65	110.48	0.74	202.54	
8	Stretching & Fixing of Barbed Wire in 4 Strands	Rmt.	600	4.80	2880.00	19.20	5280.00	
9	Interlacing of Thorny Bushes along the Fence	Rmt.	150	4.00	600.00	4.00	1100.00	
10	Cost of Barbed Wire	Qtl.	0.75	6510	4882.50	0.00	4882.50	
11	Cost of U-Nails	Qtl.	0.05	6400	320.00		320.00	
<b>Total -A/Survey, Demarcation &amp; Fencing:</b>								<b>16152.04</b>
<b>Or Say</b>								<b>16150.00</b>
<b>B.</b>	<b>PLANTING:-</b>							
1	Bush Cutting/ cultural operation	ha.	1	1192.80	1192.80	7.95	2186.80	
2	Digging of Pits of 45x45x45 cm Size	No.	125	9.54	1192.50	7.95	2186.25	
3	Digging of Pits of 30x30x30 cm Size	No.	125	4.77	596.25	3.98	1093.13	
4	Filling of Pits of 45x45x45 cm size	No.	125	2.72	340.00	2.27	623.33	
5	Filling of Pits of 30x30x30 cm size	No.	125	1.91	238.75	1.59	437.71	
6	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/ No.	125	1.9	475.00	3.17	870.83	
7	Carriage of naked root Plants over a distance 2 Km uphill/downhill	KM/ No.	125	0.26	65.00	0.43	119.17	
8	Planting of Plants Raised in P/Bags	No.	125	2.18	272.50	1.82	499.58	
9	Planting of Plants with naked roots	No.	125	1.83	228.75	1.53	419.38	
10	Nursery Cost of Plants	No.	250	4.75	1187.50	23.06	5765.00	
11	Construction of Inspection Path	Rmt.	100	11	1100.00	7.33	2016.67	
12	Cost of Sign Board, Carriage & Fixing	No.	0	LS	450.00	0.00	450.00	
<b>Total -B/Planting:</b>								<b>16667.84</b>
<b>Or Say</b>								<b>16670.00</b>
<b>Grand Total (A+B):</b>								<b>32820.00</b>
<b>1st YEAR MAINTENANCE (30 % BEATING UP):</b>								
1	Re-digging of Pits 45x45x45 cm	No.	37	4.77	176.49	1.18	323.57	
2	Re-digging of Pits 30x30x30 cm	No.	37	2.38	88.06	0.59	161.44	
3	Filling of Pits 45x45x45 cm	No.	37	2.72	100.64	0.67	184.51	
4	Filling of Pits 30x30x30 cm	No.	37	1.91	70.67	0.47	129.56	
5	Planting of Plants raised in P/Bags	No.	37	2.18	80.66	0.54	147.88	
6	Planting of Plants with naked roots	No.	37	1.83	67.71	0.45	124.14	
7	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/ No.	37	1.9	140.60	0.94	257.77	
8	Carriage of naked root plants over a distance 2 Km uphill/downhill	KM/ No.	37	0.26	19.24	0.13	35.27	
9	Nursery Cost of Plants	No.	74	4.75	351.50	23.06	1706.44	
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00	
<b>Total/1st Year Maintenance:</b>								<b>3268.57</b>
<b>Or Say</b>								<b>3270.00</b>
<b>2nd YEAR MAINTENANCE (20 % BEATING UP):</b>								
1	Re-digging of Pits 45x45x45 cm	No.	25	4.77	119.25	0.80	218.63	
2	Re-digging of Pits 30x30x30cm	No.	25	2.38	59.50	0.40	109.08	
3	Filling of Pits 45x45x45 cm	No.	25	2.72	68.00	0.45	124.67	
4	Filling of Pits 30x30x30 cm	No.	25	1.91	47.75	0.32	87.54	
5	Planting of Plants raised in P/Bags	No.	25	2.18	54.50	0.36	99.92	
6	Planting of Plants with naked roots	No.	25	1.83	45.75	0.31	83.88	
7	Carriage of Plants in P. Bags over a distance of 2 Km uphill/downhill	No.	25	1.9	95.00	0.63	174.17	
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	25	0.26	13.00	0.09	23.83	

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
9	Nursery Cost of Plants	No.	50	4.75	237.50	23.06	1153.00
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/2nd Year Maintenance:</b>							<b>2272.71</b>
<b>Or Say</b>							<b>2270.00</b>
<b>3rd YEAR MAINTENANCE (10% BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	12	4.77	57.24	0.38	104.94
2	Re-digging of Pits 30x30x30 cm	No.	12	2.38	28.56	0.19	52.36
3	Filling of Pits 45x45x45 cm	No.	12	2.72	32.64	0.22	59.84
4	Filling of Pits 30x30x30 cm	No.	12	1.91	22.92	0.15	42.02
5	Planting of Plants raised in P/Bags	No.	12	2.18	26.16	0.17	47.96
6	Planting of Plants with naked roots	No.	12	1.83	21.96	0.15	40.26
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	12	1.9	45.60	0.30	83.60
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	12	0.26	6.24	0.04	11.44
9	Nursery Cost of Plants	No.	24	4.75	114.00	23.06	553.44
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/3rd Year Maintenance:</b>							<b>1193.86</b>
<b>Or Say</b>							<b>1190.00</b>
<b>4th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	12	4.77	57.24	0.38	104.94
2	Re-digging of Pits 30x30x30 cm	No.	12	2.38	28.56	0.19	52.36
3	Filling of Pits 45x45x45 cm	No.	12	2.72	32.64	0.22	59.84
4	Filling of Pits 30x30x30 cm	No.	12	1.91	22.92	0.15	42.02
5	Planting of Plants raised in P/Bags	No.	12	2.18	26.16	0.17	47.96
6	Planting of Plants with naked roots	No.	12	1.83	21.96	0.15	40.26
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	12	1.9	45.60	0.30	83.60
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	12	0.26	6.24	0.04	11.44
9	Nursery Cost of Plants	No.	24	4.75	114.00	23.06	553.44
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/4th Year Maintenance:</b>							<b>1193.86</b>
<b>Or Say</b>							<b>1190.00</b>
<b>5th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	12	4.77	57.24	0.38	104.94
2	Re-digging of Pits 30x30x30 cm	No.	12	2.38	28.56	0.19	52.36
3	Filling of Pits 45x45x45 cm	No.	12	2.72	32.64	0.22	59.84
4	Filling of Pits 30x30x30 cm	No.	12	1.91	22.92	0.15	42.02
5	Planting of Plants raised in P/Bags	No.	12	2.18	26.16	0.17	47.96
6	Planting of Plants with naked roots	No.	12	1.83	21.96	0.15	40.26
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	12	1.9	45.60	0.30	83.60
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	12	0.26	6.24	0.04	11.44
9	Nursery Cost of Plants	No.	24	4.75	114.00	23.06	553.44
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/5th Year Maintenance:</b>							<b>1193.86</b>
<b>Or Say</b>							<b>1190.00</b>
<b>6th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	12	4.77	57.24	0.38	104.94
2	Re-digging of Pits 30x30x30 cm	No.	12	2.38	28.56	0.19	52.36
3	Filling of Pits 45x45x45 cm	No.	12	2.72	32.64	0.22	59.84
4	Filling of Pits 30x30x30 cm	No.	12	1.91	22.92	0.15	42.02
5	Planting of Plants raised in P/Bags	No.	12	2.18	26.16	0.17	47.96

S. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of @ Rs. 150/- for Non-Tribal Areas	Mandays involved	Amount at the wage rate of Rs. 275/- for Non-Tribal Areas
6	Planting of Plants with naked roots	No.	12	1.83	21.96	0.15	40.26
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	12	1.9	45.60	0.30	83.60
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	12	0.26	6.24	0.04	11.44
9	Nursery Cost of Plants	No.	24	4.75	114.00	23.06	553.44
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/6th Year Maintenance:</b>							<b>1193.86</b>
<b>Or Say</b>							<b>1190.00</b>
<b>7th YEAR MAINTENANCE (10 % BEATING UP):</b>							
1	Re-digging of Pits 45x45x45 cm	No.	12	4.77	57.24	0.38	104.94
2	Re-digging of Pits 30x30x30 cm	No.	12	2.38	28.56	0.19	52.36
3	Filling of Pits 45x45x45 cm	No.	12	2.72	32.64	0.22	59.84
4	Filling of Pits 30x30x30 cm	No.	12	1.91	22.92	0.15	42.02
5	Planting of Plants raised in P/Bags	No.	12	2.18	26.16	0.17	47.96
6	Planting of Plants with naked roots	No.	12	1.83	21.96	0.15	40.26
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	12	1.9	45.60	0.30	83.60
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	12	0.26	6.24	0.04	11.44
9	Nursery Cost of Plants	No.	24	4.75	114.00	23.06	553.44
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00
<b>Total/7th Year Maintenance:</b>							<b>1193.86</b>
<b>Or Say</b>							<b>1190.00</b>
<b>Grand Total (A + B + Maintenance)</b>							<b>44310.00</b>

## 6. Norm for Development of Medicinal Plants (13200 Plants/Hectare)

### A. Abstract

Component	Rate (Rs.)
Bush cutting in strips/ patches	1673.20
Preparation of trenches/ patches including digging & stacking of soil along berms (1.00x0.50x0.15 m3) @ Rs. 1041.79/100	20987.90
Planting of plants in patches @ 295.21/1200	5750.84
Cost of carriage of Plants (L/S)	3984.65
Total	32396.59
Nursery Cost of Plants	57536.90
Grand Total	89933.49
Or Say	<b>89940.00</b>
1st YEAR MAINTENANCE (5% BEATING UP):	6270.00
2nd YEAR MAINTENANCE (3% BEATING UP):	5060.00
3rd YEAR MAINTENANCE (2% BEATING UP):	3850.00
4th YEAR MAINTENANCE (2% BEATING UP):	3850.00
5th YEAR MAINTENANCE (2% BEATING UP):	3850.00
<b>Grand Total</b>	<b>112820.00</b>

### B. Detailed

Particulars of Works	Unit	Qty.	Rate at the wage rate of Rs.150/-	Amount at the wage rate of Rs. 150/-	Amount at the wage rate of Rs. 275/-
Bush cutting in strips/ patches	LS	LS	LS	913.60	1673.20
Preparation of trenches/ patches including digging & stacking of soil along berms (1.00x0.50x0.15 m3) @	No.	1100	1041.79 per 100	11459.69	20987.90

Rs. 1041.79/100					
Planting of plants in patches @ 295.21/1200	No.	13200	295.21 per 1200	3247.31	5750.84
Cost of carriage of Plants (L/S)	LS	LS	LS	2250.00	3984.65
Total				17870.60	32396.59
Nursery Cost of Plants	No.	13200	2.38	31416.00	57536.90
Grand Total				49286.60	89933.49
Or Say				49290.00	<b>89940.00</b>
1st YEAR MAINTENANCE (5% BEATING UP):					6270.00
2nd YEAR MAINTENANCE (3% BEATING UP):					5060.00
3rd YEAR MAINTENANCE (2% BEATING UP):					3850.00
4th YEAR MAINTENANCE (2% BEATING UP):					3850.00
5th YEAR MAINTENANCE (2% BEATING UP):					3850.00
<b>Grand Total (including Maintenance)</b>					<b>112820.00</b>

HP State Compensatory Afforestation Fund Management & Planning Authority  
(HP State Authority), Aranya-Bhawan, Talland, Shimla - 171 001.  
Phone No: 0177-2623457; 2629750; email: hpstatecampa@gmail.com

No. Ft. State CAMPA/20210/Norms/Vol.II/ Dated: Shimla-1, the

23 MAY 2020

From: Pr. CCF (HoFF) H.P. Shimla. To: 1 Pr. CCF (Wildlife) HP Shimla.  
2 All Chief Project Directors in HP  
3 All CCFs/CFs/DFOs (T & WL) in HP

**Subject: Norms for plantations and maintenance of old plantations for Non-Tribal and Tribal Areas for the year 2020-21.**

Memorandum:

The norms for undertaking new plantations, maintenance of old plantations and lantana eradication under the sectors of Compensatory Afforestation, CAT Plans and NPV of State Authority (CAMPA) in Non-Tribal, Tribal-I & Tribal-II (Keylong and Jhalma Ranges of Lahaul Forest Division) areas for the year 2020-21 are sent herewith. The norms have been prepared taking into account the increased wage rate of Rs. 275/- per day. Consequent upon the delinking of nurseries from plantations, the norms have been fixed separately for plantations. The norms for raising plants in the nurseries stand already conveyed to you.

2 It is clarified that the areas of lantana infestation cleared under NPV will be taken up for planting of tall plants either @ 500 tall plants or @ 200 tall plants per hectare as per the site requirement. The norms in respect of both these models of plantations indicate the upper limit. The actual expenditure for fencing and planting may be restricted to 80% of the upper limit without reducing the number of plants to be planted. However, plantations in some lantana eradicated areas may be done with the normal plants @ 1100 or @ 800 plants per hectare as per site requirement provided that the same is technically approved by the concerned Controlling Officers (CCFs/CFs).

3 It is, therefore, requested that the works of new plantations, maintenance of old plantations and lantana eradication activities may be executed as per norms approved for the year 2020-21. Any deviation will be viewed seriously.

Encl: As above/

23. 5. 2020  
Pr. Chief Conservator of Forests (HoFF)  
Himachal Pradesh.

O/C

*[Signature]*  
20/5/20

HP State Compensatory Afforestation Fund Management & Planning Authority  
(HP State Authority), Aranya-Bhawan, Talland, Shimla - 171 001.  
Phone No: 0177-2623457; 2629750; email: [hpstatecompa@gmail.com](mailto:hpstatecompa@gmail.com)

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Endst. No. As above/

Dated: Shimla-1, the 23 MAY 2020

Copy alongwith copy of norms for 2020-21 is forwarded to:

- 1 Pr. CCF (Finance) Shimla, Addl. Pr.CCF (R&T) Sundernagar and Addl. Pr.CCF (M&E) Shimla.
- 2 CCF (IT) Shimla with the request to get the norms for 2020-21 uploaded on HPFD website.

Encl: As above/

8 23.5.2020  
Pr. Chief Conservator of Forests (HoFF),  
Himachal Pradesh.

o/c

Fisher  
23/5/20

Sr.No.	Name of Scheme	Name of Component	Norms for 2020-21			Remarks
			Non Tribal Areas	Tribal-I Areas	Tribal-II Areas (Keylong & Jhalma Ranges of Jhahaul Division)	
<b>NORMS FOR PLANTATIONS UNDER CAT PLANS EXCLUDING NURSERY COST</b>						
1	Afforestation (1100 plants/ha.) - Fencing with RCC Fence Posts	FENCING PLANTING Total Maintenance 1st year Maintenance 2nd year Maintenance 3rd to 5th year Maint.	37200 32150 69350 6280 4250 2225	40810 40080 80890 7850 5320 2780	NA NA NA NA NA NA	Norms include:- -4 strand b/wire fencing with RCC Fence Posts. -Interlacing of thorny bushes. - Digging & Filling of 550 Pits of 45x 45x45 cms. - Digging & Filling of 550 Pits of 30x 30x30cms. - Planting of 550 P/bag raised plants. - Planting of 550 naked roots Plants. -Bush cutting in strips of 3m x3m -C/o inspection path. -Fixing of sign board.
2	Afforestation/ Energy Plantation/ Timber Plantation/ Fuel & Fodder Plantation (1100 Plants/Ha.) - Fencing with Wooden Fence Posts	FENCING PLANTING Total Maintenance 1st year Maintenance 2nd year Maintenance 3rd to 5th year Maint.				Norms include:- -4 strand b/wire fencing with Wooden Fence Posts. -Interlacing of thorny bushes. - Digging & Filling of 550 Pits of 45x 45x45 cms. - Digging & Filling of 550 Pits of 30x 30x30cms. - Planting of 550 P/bag raised plants. - Planting of 550 naked roots Plants. -Bush cutting in strips of 3m x3m -C/o inspection path. -Fixing of sign board.
3	Enrichment/ Replenishment Plantation (200 Plants/Ha.) - Fencing with Wooden Fence Posts	FENCING PLANTING Total Maintenance 1st year Maintenance 2nd year Maintenance 3rd to 5th year Maint.				Norms include:- -4 strand b/wire fencing with Wooden Fence Posts. -Interlacing of thorny bushes. - Digging & Filling of 400 Pits of 45x 45x45 cms. - Digging & Filling of 400 Pits of 30x 30x30cms. - Planting of 400 P/bag raised plants. - Planting of 400 naked roots Plants. -Bush cutting in strips of 3m x3m -C/o inspection path. -Fixing of sign board.
Adopt Departmental Norms						

Sr.No.	Name of Scheme	Name of Component	Norms for 2020-21			Remarks	
			Non Tribal Areas	Tribal-I Areas	Tribal-II Areas (Keylong & Jhalma Ranges of Lahaul Division)		
4	Assisted Natural Regeneration (ANR) Plantation (250 Plants/Ha.) - Fencing with Wooden Fence Posts	FENCING				Norms include:- -4 strand b/wire fencing with Wooden Fence Posts. -Interlacing of thorny bushes. - Digging & Filling of 125 Pits of 45x 45x45 cms. - Digging & Filling of 125 Pits of 30x 30x30cms. - Planting of 125 P/bag raised plants. - Planting of 125 naked roots Plants. -Bush cutting/ Cultural Operations.	
		PLANTING					
		Total					
		Maintenance					
		1st year Maintenance					
		2nd year Maintenance					
3rd to 5th year Maint.							
5	Medicinal/NTFP Plantation Shrubs/Perennial Herbs Plantation (4400 Plants/Ha.)				Adopt Departmental Norms	Norms include:- -Preparing, Digging & filling of 1100 patches. -Planting 4400 plants in patches@ 4 plants/patch. - Bush cutting in strips/ patches.	
		Fencing Cost	0	0			
		Planting Cost	60130	75300			NA
		Maintenance					NA
		1st year Maintenance	6270	7810			NA
		2nd year Maintenance	5027	6270			NA
		3rd year Maintenance	3717	4620			NA
		Fencing Cost	0	0			NA
		Planting Cost	89940	113050			NA
		Maintenance					NA
ii	Herb Plantation (13200 Plants/Ha.)				Norms include:- -Preparing, Digging & filling of 1100 patches. -Planting 13200 plants in patches @ 12 plants/patch. - Bush cutting in strips/ patches.		
		1st year Maintenance	6270	7810		NA	
		2nd year Maintenance	5060	6160		NA	
		3rd year Maintenance	3850	4620		NA	
		Fencing Cost	0	0		NA	
		Planting Cost	89940	113050		NA	

Himachal Pradesh State Authority CAMPA

**PLANTATIONS UNDER CAT PLANS - FENCING WITH RCC FENCE POSTS**

Norm for NEW PLANTATION in Non-Tribal & Tribal Areas for 2020-21

(Model: 1100 Plants per Hectare - Activity-wise Calculations)

Sr. No.	Particulars of Works	Unit	Qty.	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of Rs. 150/- for Non-Tribal areas	Mandays Involved	Amount at wage rate of Rs. 275/- for Non-Tribal areas	Amount at wage rate of Rs. 343.75/- for Tribal areas
<b>A SURVEY, DEMARCATION &amp; FENCING:-</b>								
1	Survey & Demarcation of Plantation Area	ha.	1	101.00	101.00	0.67	185.17	231.46
2	Preparation / Purchase of RCC Fence Post	No.	50	358.00	12500.00	0.00	17900.00	17900.00
3	Carriage of RCC Fence Post upto 165 cm long over a distance of 2 km uphill/downhill	KM/No.	50	33.5	3350.00	22.33	6141.67	7677.08
4	Preparation /Digging of Holes of 20x30x50 cm size	No.	50	9.06	453.00	3.02	830.50	1038.13
5	Fixing of RCC Fence Post i/c Strutting	No.	50	7.16	358.00	2.39	656.33	820.42
6	Carriage of B/Wire over distance 2 Kms uphill/downhill	KM/Qtl.	0.8	73.65	110.48	0.74	202.54	253.17
7	Stretching & Fixing of Barbed Wire in 4 Strands	Rmt.	600	4.80	2880.00	19.20	5280.00	6600.00
8	Interlacing of Thorny Bushes along the Fence	Rmt.	150	4.09	613.50	4.09	1124.75	1405.94
9	Cost of Barbed Wire	Qtl.	0.8	6510	4882.50	0.00	4882.50	4882.50
<b>Total -A/Survey, Demarcation &amp; Fencing:</b>							<b>37203.45</b>	<b>40808.69</b>
<b>Or Say</b>							<b>37200</b>	<b>40810</b>
<b>B. PLANTING:-</b>								
1	Bush Cutting in Strips (3m x 3m)	ha.	1	1192.80	1192.80	7.95	2186.80	2733.50
2	Digging of Pits of 45x45x45 cm Size	No.	550	9.54	5247.00	34.98	9619.50	12024.38
3	Digging of Pits of 30x30x30 cm Size	No.	550	4.77	2623.50	17.49	4809.75	6012.19
4	Filling of Pits of 45x45x45 cm size	No.	550	2.72	1496.00	9.97	2742.67	3428.33
5	Filling of Pits of 30x30x30 cm size	No.	550	1.91	1050.50	7.00	1925.92	2407.40
6	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/No.	550	1.9	2090.00	13.93	3831.67	4789.58
7	Carriage of naked root Plants over a distance 2 Km uphill/downhill	KM/No.	550	0.26	286.00	1.91	524.33	655.42
8	Planting of Plants Raised in P/Bags	No.	550	2.18	1199.00	7.99	2198.17	2747.71
9	Planting of Plants with naked roots	No.	550	1.83	1006.50	6.71	1845.25	2306.56
10	Construction of Inspection Path	Rmt.	100	11	1100.00	7.33	2016.67	2520.83
11	Cost of Sign Board, Carriage & Fixing	No.	0	LS	450.00	0.00	450.00	450.00
<b>Total -B/Planting:</b>							<b>32150.72</b>	<b>40075.90</b>
<b>Or Say</b>							<b>32150</b>	<b>40080</b>
<b>Grand Total (A+B):</b>							<b>69350</b>	<b>80890</b>

23.5.2020  
Pr. Chief Conservator of Forests (HoFF), Himachal Pradesh

**PLANTATIONS UNDER CAT PLANS - FENCING WITH RCC FENCE POSTS**  
**Norm for MAINTENANCE OF OLD PLANTATIONS in Non-Tribal & Tribal Areas for 2020-21**  
 (Model: 1100 Plants per Hectare - Activity-wise Calculations)

Sr. No.	Particulars of Works	Unit	Qty	Rate per Unit at wage rate of Rs. 150/-	Amount at wage rate of Rs. 150/- for Non-Tribal areas	Mandays Involved	Amount at wage rate of Rs. 250/- for Non-Tribal areas	Amount at wage rate of Rs. 312/- for Tribal areas	Amount at wage rate of Rs. 275/- for Non-Tribal areas	Amount at wage rate of Rs. 343.75/- for Tribal areas	
<b>1st YEAR MAINTENANCE (30 % BEATING UP):</b>											
1	Re-digging of Pits 45x45x45 cm	No.	165	4.77	787.05	5.25	1311.75	1637.06	1442.93	1803.66	
2	Re-digging of Pits 30x30x30 cm	No.	165	2.38	392.70	2.62	654.50	816.82	719.95	899.94	
3	Filling of Pits 45x45x45 cm	No.	165	2.72	448.80	2.99	748.00	933.50	822.80	1028.50	
4	Filling of Pits 30x30x30 cm	No.	165	1.91	315.15	2.10	525.25	655.51	577.78	722.22	
5	Planting of Plants raised in P/Bags	No.	165	2.18	359.70	2.40	599.50	748.18	659.45	824.31	
6	Planting of Plants with naked roots	No.	165	1.83	301.95	2.01	503.25	628.06	553.58	691.97	
7	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/No.	165	1.9	627.00	4.18	1045.00	1304.16	1149.50	1436.88	
8	Carriage of naked root plants over a distance 2 Km up/downhill	KM/No.	165	0.26	85.80	0.57	143.00	178.46	157.30	196.63	
9	Repair of Fencing	Rmt	60	1.80	108.00	0.72	180.00	224.64	198.00	247.50	
<b>Total/1st Year Maintenance:</b>								5710.25	7126.39	6281.28	7851.59
<b>Or Say</b>								5700	7100	6280	7850
<b>2nd YEAR MAINTENANCE (20 % BEATING UP):</b>											
1	Re-digging of Pits 45x45x45 cm	No.	110	4.77	524.70	3.50	874.50	1091.38	961.95	1202.44	
2	Re-digging of Pits 30x30x30 cm	No.	110	2.38	261.80	1.75	436.33	544.54	479.97	599.96	
3	Filling of Pits 45x45x45 cm	No.	110	2.72	299.20	1.99	498.67	622.34	548.53	685.67	
4	Filling of Pits 30x30x30 cm	No.	110	1.91	210.10	1.40	350.17	437.01	385.18	481.48	
5	Planting of Plants raised in P/Bags	No.	110	2.18	239.80	1.60	399.67	498.78	439.63	549.54	
6	Planting of Plants with naked roots	No.	110	1.83	201.30	1.34	335.50	418.70	369.05	461.31	
7	Carriage of Plants in P/Bags over a distance of 2 Km up/downhill	No.	110	1.9	418.00	2.79	696.67	869.44	766.33	957.92	
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	110	0.26	57.20	0.38	95.33	118.98	104.87	131.08	
9	Repair of Fencing	Rmt	60	1.80	108.00	0.72	180.00	224.64	198.00	247.50	
<b>Total/2nd Year Maintenance:</b>								3866.83	4825.81	4253.52	5316.90
<b>Or Say</b>								3850	4800	4250	5320
<b>3rd to 5th YEAR MAINTENANCE (10 % BEATING UP):</b>											
1	Re-digging of Pits 45x45x45 cm	No.	55	4.77	262.35	1.75	437.25	545.69	480.98	601.22	
2	Re-digging of Pits 30x30x30 cm	No.	55	2.38	130.90	0.87	218.17	272.27	239.98	299.98	
3	Filling of Pits 45x45x45 cm	No.	55	2.72	149.60	1.00	249.33	311.17	274.27	342.83	
4	Filling of Pits 30x30x30 cm	No.	55	1.91	105.05	0.70	175.08	218.50	192.59	240.74	
5	Planting of Plants raised in P/Bags	No.	55	2.18	119.90	0.80	199.83	249.39	219.82	274.77	
6	Planting of Plants with naked roots	No.	55	1.83	100.65	0.67	167.75	209.35	184.53	230.66	
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	55	1.9	209.00	1.39	348.33	434.72	383.17	478.96	
8	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	No.	55	0.26	28.60	0.19	47.67	59.49	52.43	65.54	
9	Repair of Fencing	Rmt	60	1.80	108.00	0.72	180.00	224.64	198.00	247.50	
<b>Total/3rd Year Maintenance:</b>								2023.42	2525.22	2225.76	2782.20
<b>Or Say</b>								2000	2500	2225	2780

23.5.2020

Pr. Chief Conservator of Forests (HoFF), Himachal Pradesh

B. Norms for New Plantation of Annual/ Biannual Herbs (Model: 13200 Plants per ha.)									
Activity	Quantity	Rate at the Wage Rate of Rs. 150/-	Amount at the Wage Rate of Rs. 150/-	Amount @ 225/- For Non Tribal areas	Amount @ 281/- For tribal areas	Amount @ 250/- For Non Tribal areas	Amount @ 312/- For Tribal areas	Amount @ 275/- for Non-Tribal areas	Amount @ 343.75/- for Non-Tribal areas
Bush cutting in strips/ patches (L/S)	LS		913.6	1370.35	1716.21	1521.089	1904.9931	1673.2	2095.4924
Preparation of trenches/ patches including digging & stacking of soil along berms (1.00x0.50x0.15m <sup>3</sup> ) @ Rs. 295.21/1200	1100 No.	1041.79 per 100	11459.69	17189.07	21527.26	19079.87	23895.2586	20987.9	26234.784
Planting of plants in patches @ 295.21/1200	13200 No.	295.21 per 1200	3247.31	4870.83	6100.13	5228.034	6771.1443	5750.84	7448.2587
Cost of carriage of Plants (L/S)	LS		2250	3374.91	4226.67	3622.41	4691.6037	3984.65	5160.7641
<b>Total</b>			<b>17870.6</b>	<b>26805.16</b>	<b>33570.27</b>	<b>29451.4</b>	<b>37262.9997</b>	<b>32396.5</b>	<b>40989.3</b>
Or say				26800	33550	29700	37200	32400	40990
Nursery cost of Plants	13200 No.	2.38	31416	47122.74	59015.62	52306.24	65507.3382	57536.9	72058.072
Or say								57540	72060
<b>Grand Total</b>				<b>73922.74</b>	<b>92565.62</b>	<b>82006.24</b>	<b>102707.3382</b>	<b>89933.4</b>	<b>113047.37</b>
Or say				73900	92550	82000	102700	89940	113050

23.5.2020  
Principal CCF (Hoff) Himachal Pradesh

**Abstract Norms for Plantation of Medicinal Herbs under CAT Plans:-w.e.f. 01.04.2020**

**New Plantation of Herb Species**

(For Non Tribal Areas @ Rs. 275/-)

Component	No. of Plants per Hectare	Nursery Cost	Fencing Cost	Planting Cost	Total Cost per Hectare
New Plantation of Herb species	13200	57540	N.A.	32400	89940
<b>Maintenance of old Plantations:</b>					
1st Year Maintenance (5% Beating up)	660	2882	N.A.	3388	6270
2 <sup>nd</sup> Year Maintenance (3% Beating up)	400	1870	N.A.	3190	5060
3 <sup>rd</sup> Year Maintenance (2% Beating up)	250	1320	N.A.	2530	3850

(For Tribal Areas @ Rs. 343.75/-)

Component	No. of Plants per Hectare	Nursery Cost	Fencing Cost	Planting Cost	Total Cost per Hectare
Herb species Plantation	13200	72060	N.A.	40990	113050
<b>Maintenance of plantations:</b>					
1st Year Maintenance (5% Beating up)	660	3740	N.A.	4070	7810
2 <sup>nd</sup> Year Maintenance (3% Beating up)	400	2310	N.A.	3850	6160
3 <sup>rd</sup> Year Maintenance (2% Beating up)	250	1430		3190	4620

*23.5.2020*

Principal CCF (HoFF), Himachal Pradesh

# Annexure - IVc

No.Ft. 1790-/71(D)2011-12/Vol-VIII(Norms)  
Himachal Pradesh Forest Department

Dated 22 APR 2020 Shimla, the

From: Pr. CCF (HoFF)HP

To:1. Pr. CCF (WL) HP  
2. PCCF (M&E & Eco Tourism)  
3. APCCF (CAT Plans & CAMPA) Shimla  
4. APCCFs (R&T) Sundernagar; APCCF (IT);  
(Projects & EAPs)  
o/o Pr. CCF HP  
5. CPDs IDP Solan; HPFECPP  
(KfW) D/shala & HPFEMLP Shimla  
6. All CCFS/CFs (T & WL) in HP  
7. Registrar (Bud) O/o CCF (HoFF) HP

Subject: Cost norms for raising **New Plantations** and **Maintenance of Old Plantations (Normal Plantations)** for Non-Tribal & Tribal Areas for the year 2020-21.

Memo

Consequent upon the revision of daily wage rates from existing ₹250/- to ₹ 275/- per day in the state of Himachal Pradesh vide Finance Department letter No. FIN-(PR)B(7)-33/2010 dated 24.03.2020, the cost norms for raising of new plantation and maintenance of old plantations for 5 years (**Normal Plantations**) in Non-Tribal & Tribal-I & Tribal -II areas have been calculated on increased wage rates and are enclosed herewith for taking further necessary action.

These cost norms indicate the upper limits and DFOs will choose items and book actual cost such that the total expenditure should not exceed the indicated per hectare cost norms.

Encl: As above.

22.4.2020

Pr. Chief Conservator of Forests (HoFF),  
Himachal Pradesh

Abstract of Per Ha. Norms for raising Normal plantation & maintenance of 5 year old maintenance during the year 2020-21 (Based on basic wage rate of ₹275/- per day)

Name of scheme	New Plantation		
	N/Tribal	Tribal-1	Tribal-II
Afforestation/Re-afforestation of Scrub Areas/Soil and Water Conservation	48300	59000	112500
Enrichment	40800	49600	103100
Dev. Of Pasture & Grazing lands			
a) Alpine Pasture	30700	37000	--
b)Low lying grazing lands	36200	43900	--
Maintenance			
Afforestation/Re-afforestation of Scrub Areas/Soil and Water Conservation			
1st Year Maintenance	6250	7800	40300
2nd Year Maintenance	4250	5300	26000
3rd Year Maintenance	3200	4000	15300
4th & 5th Year Maintenance	2200	2750	7400
Enrichment			
1st Year Maintenance	4600	5750	29300
2nd Year Maintenance	3100	3900	19100
3rd Year Maintenance	2400	3000	11200
4th & 5th Year Maintenance	1650	2050	5400
Dev. Of Pasture & Grazing lands			
a) Alpine Pasture			
1st Year Maintenance	4125	5145	5145
2nd Year Maintenance	2750	3410	3410
3rd Year Maintenance	1375	1700	1700
4th & 5th Year Maintenance	685	845	845
b)Low lying grazing lands			
1st Year Maintenance	4275	5390	5390
2nd Year Maintenance	3120	3880	3880
3rd Year Maintenance	1790	2255	2255
4th & 5th Year Maintenance	920	1155	1155

*22.4.2020*

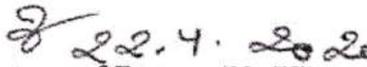
Pr. Chief Conserator of Forests (HoFF)  
Himachal P Pradesh

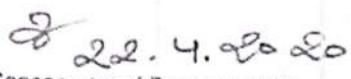
Himachal Pradesh Forest Department

Norms for New Plantations (Normal) for the year 2020-21 {Non-Tribal; Tribal-I & Tribal-II areas} w.e.f. 01.04.2020

(In Rupees)

S. No	Name of Scheme	Plants per ha	Component	Non Tribal	Tribal I	Tribal II	Remarks	
1	i) Afforestation	1100	Fencing Cost including material component	16153	18900	78200	B/wire fencing in Non-Tribal & Tribal-I areas and Stone Fencing in Tribal -II (Keylong & Jhalra Ranges of Lahaul Division) Areas - Wage rate ₹ 275/- per day for non-tribal & ₹ 344/- per day for tribal areas.	
	ii) Re-afforestation of Scrub Areas		Planting Cost	32146	40100	34420		
	iii) Soil and Water Conservation							
			Total	48299	59000	112620		
			OR SAY	48300	59000	112500		
2	i) Enrichment Planting	800	Fencing Cost including material component	16153	18900	78200		
			Planting Cost	24647	30718	25012		
			Total	40800	49618	103212		
			OR SAY	40800	49600	103100		

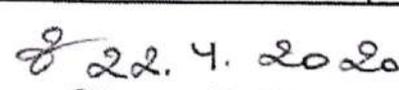
  
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 Himachal Pradesh

Revised Cost Norms per hectare for raising Normal Plantation for the year 2020-21 in respect of Schemes Enrichment Planting (800 Plants/Ha) w.e.f. 01.04.2020								
Sr. No.	Particulars of Works	Unit	Quantity	Rate per Unit at wage rate of Rs.150/-	Amount at wage rate of Rs. 150/- for Non- Tribal areas	Mandays involved	Amount at wage rate of Rs. 275/- for Non- Tribal areas	Amount at wage rate of Rs. 344/- for Tribal
<b>A SURVEY, DEMARCATION &amp; FENCING:-</b>								
1	Survey & Demarcation of Plantation Area	ha.	1	101.00	101.00	0.67	184.25	230.48
2	Cutting and preparation of wooden fence posts 1.85 mt long and 8 to 10 cm dia including debarking and fashioning the top 1.5 cms in conical shape	No.	50	12.95	647.50	4.32	1188.00	1486.08
3	Carriage of wooden Fence Post over a distance of 2 km	KM/No.	50	6.82	682.00	4.55	1251.25	1565.20
4	Charring and coaltering of ends of fence posts up to 45 at bottom and 15 cms at conical end	No.	50	2.8	140.00	0.93	255.75	319.92
5	Preparation /Digging of Holes of 20 to 30 cm dia and 45 cm deep	No.	50	9.07	453.50	3.02	830.50	1038.88
6	Fixing of wooden Fence Post i/c Strutting	No.	50	7.16	358.00	2.39	657.25	822.16
7	Carriage of B/Wire over a distance of 2 Kms	KM/Qtl.	0.75	73.65	110.48	0.74	203.50	254.56
8	Stretching & Fixing of Barbed Wire in 4 Strands	Rmt.	600	4.80	2880.00	19.20	5280.00	6604.80
9	Interlacing of Thorny Bushes along the Fence	Rmt.	150	4.00	600.00	4.00	1100.00	1376.00
10	Cost of Barbed Wire	Qtl.	0.75	6510	4882.50	0.00	4882.50	4882.50
11	Cost of U-Nails	Qtl.	0.05	6400	320.00		320.00	320.00
<b>Total -A-Survey, Demarcation &amp; Fencing:</b>					<b>11174.98</b>	<b>39.82</b>	<b>16153.00</b>	<b>18900.58</b>
<b>B. PLANTING:-</b>								
1	Bush Cutting in Strips (3m x 3m)	ha.	1	1192.80	1192.80	7.95	2186.25	2734.80
2	Digging of Pits of 45x45x45 cm Size	No.	400	9.54	3816.00	25.44	6996.00	8751.36
3	Digging of Pits of 30x30x30 cm Size	No.	400	4.77	1908.00	12.72	3498.00	4375.68
4	Filling of Pits of 45x45x45 cm size	No.	400	2.72	1088.00	7.25	1993.75	2494.00
5	Filling of Pits of 30x30x30 cm size	No.	400	1.91	764.00	5.09	1399.75	1750.96
6	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/No.	400	1.90	1520.00	10.13	2785.75	3484.72
7	Carriage of naked root Plants over a distance 2 Km uphill/downhill	KM/No.	400	0.26	208.00	1.39	382.25	478.16
8	Planting of Plants Raised in P/Bags	No.	400	2.18	872.00	5.81	1597.75	1998.64
9	Planting of Plants with naked roots	No.	400	1.83	732.00	4.88	1342.00	1678.72
10	Construction of Inspection Path	Rmt.	100	11	1100.00	7.33	2015.75	2521.52
11	Cost of sign board, carriage & fixing	No.	1	450	450.00		450.00	450.00
<b>Total -B-Planting:</b>					<b>13650.80</b>	<b>87.99</b>	<b>24647.25</b>	<b>30718.56</b>
<b>Grand Total (A+B):</b>							<b>40800.25</b>	<b>49619.14</b>
<b>Or Say</b>							<b>40800.00</b>	<b>49600.00</b>
					 Principal Chief Conservator of Forests (HoFF), Himachal Pradesh.			

**Himachal Pradesh Forest Department**

Norms for Dev. of Pasture & Grazing Lands for the year 2020-21 (Non-Tribal & Tribal areas) w.e.f.  
01.04.2020

(in Rupees)

Sr. No.	Name of Scheme	Component	Non-Tribal wage rate ₹275/- per day	Tribal wage rate ₹344/- per day
1	Development of Pasture & Grazing Lands			
a)	Alpine Pasture	Fencing cost (wage component)	11777.84	14722.30
		Fencing material	5202.50	5202.50
		Removal of weeds	13735.89	17169.86
		Sowing of grass seeds/tufts in trenches/ patches of size 2mx1m(400-500/ha)		
		Moisture retention interventions gully plugging, water ponds etc.)		
		Total	30716.23	37094.56
		Or Say	30700.00	37000.00
b)	Low Lying Grazing Lands	Fencing cost (wage component)	11777.84	14722.30
		Fencing material	5202.50	5202.50
		Removal of weeds	19230.23	24037.79
		Sowing of grass seeds/tufts in trenches/ patches of size 2mx1m(400-500/ha)		
		Planting of 200 plants of fodder species		
		Moisture retention interventions gully plugging, water ponds etc.)		
		Application of farm yard manure		
		Total	36210.57	43962.59
	Or say	36200.00	43900.00	
		 Pr. Chief Conserator of Forests (HoFF) Himachal Ptradesh		



Per hectare cost norm for 5 year maintenance of old Plantation for the year 2020-21 in respect of Enrichment Plantation								
Sr. No.	Particulars of Works	Unit	Quantity	Rate per Unit at the wage rate of Rs.150/-	Amount at wage rate of Rs. 150/- for Non-Tribal areas	Mandays involved	Amount at wage rate of Rs. 275/- for Non-Tribal areas	Amount at wage rate of Rs. 344/- for Tribal areas
<b>1st YEAR MAINTENANCE (30 % BEATING UP):</b>								
1	Re-digging of Pits 45x45x45 cm	No.	120	4.77	572.40	3.82	1059.50	1314.08
2	Re-digging of Pits 30x30x30 cm	No.	120	2.38	285.60	1.90	522.50	653.60
3	Filling of Pits 45x45x45 cm	No.	120	2.72	326.40	2.18	599.50	749.92
4	Filling of Pits 30x30x30 cm	No.	120	1.91	229.20	1.53	420.75	526.32
5	Planting of Plants raised in P/Bags	No.	120	2.18	261.60	1.74	478.50	598.56
6	Planting of Plants with naked roots	No.	120	1.83	219.60	1.46	401.50	502.24
7	Carriage of Plants in P. Bags over distance 2 Km uphill/downhill	KM/No.	120	1.9	456.00	3.04	836.00	1045.76
8	Carriage of naked root plants over a distance 2 Km uphill/downhill	KM/No.	120	0.26	62.40	0.42	115.50	144.48
9	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00	247.68
<b>Total 1st Year Maintenance:</b>					<b>2521.20</b>	<b>16.81</b>	<b>4622.75</b>	<b>5782.64</b>
Or Say							<b>4600.00</b>	<b>5750.00</b>
<b>2nd YEAR MAINTENANCE (20 % BEATING UP):</b>								
1	Re-digging of Pits 45x45x45 cm	No.	80	4.77	381.60	2.54	698.50	873.76
2	Re-digging of Pits 30x30x30cm	No.	80	2.38	190.40	1.27	349.25	436.88
3	Filling of Pits 45x45x45 cm	No.	80	2.72	217.60	1.45	398.75	498.80
4	Filling of Pits 30x30x30 cm	No.	80	1.91	152.80	1.02	280.50	350.88
5	Planting of Plants raised in P/Bags	No.	80	2.18	174.40	1.16	319.00	399.04
6	Planting of Plants with naked roots	No.	80	1.83	146.40	0.98	269.50	337.12
7	Carriage of Plants in P. Bags over a distance of 2 Km uphill/downhill	No.	80	1.9	304.00	2.03	558.25	698.32
8	Carriage of naked root plants over a distance 2 Km uphill/downhill	No.	80	0.26	41.60	0.28	77.00	96.32
9	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00	247.68
<b>Total 2nd Year Maintenance:</b>					<b>1716.80</b>	<b>11.45</b>	<b>3148.75</b>	<b>3938.80</b>
Or Say							<b>3100.00</b>	<b>3900.00</b>
<b>3rd YEAR MAINTENANCE (15 % BEATING UP):</b>								
1	Re-digging of Pits 45x45x45 cm	No.	60	4.77	286.20	1.91	525.25	657.04
2	Re-digging of Pits 30x30x30 cm	No.	60	2.38	142.80	0.95	261.25	326.80
3	Filling of Pits 45x45x45 cm	No.	60	2.72	163.20	1.09	299.75	374.66
4	Filling of Pits 30x30x30 cm	No.	60	1.91	114.60	0.76	209.00	261.44
5	Planting of Plants raised in P/Bags	No.	60	2.18	130.80	0.87	239.25	299.28
6	Planting of Plants with naked roots	No.	60	1.83	109.80	0.73	200.75	251.12
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	60	1.9	228.00	1.52	418.00	522.88
8	Carriage of naked root plants over a distance 2 Km uphill/downhill	No.	60	0.26	31.20	0.21	57.75	72.24
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00	247.66
<b>Total 3rd Year Maintenance:</b>					<b>1314.60</b>	<b>8.76</b>	<b>2409.00</b>	<b>3013.44</b>
Or Say							<b>2400.00</b>	<b>3000.00</b>
<b>4th/5th YEAR MAINTENANCE (10 % BEATING UP):</b>								
1	Re-digging of Pits 45x45x45 cm	No.	40	4.77	190.80	1.27	349.25	436.88
2	Re-digging of Pits 30x30x30 cm	No.	40	2.38	95.20	0.63	173.25	216.72
3	Filling of Pits 45x45x45 cm	No.	40	2.72	108.80	0.73	200.75	251.12
4	Filling of Pits 30x30x30 cm	No.	40	1.91	76.40	0.51	140.25	175.44
5	Planting of Plants raised in P/Bags	No.	40	2.18	87.20	0.58	159.50	199.52
6	Planting of Plants with naked roots	No.	40	1.83	73.20	0.49	134.75	168.56
7	Carriage of Plants in P. Bags over a distance 2 Km uphill/downhill	No.	40	1.9	152.00	1.01	277.75	347.44
8	Carriage of naked root plants over a distance 2 Km uphill/downhill	No.	40	0.26	20.80	0.14	38.50	48.16
10	Repair of Fencing	Rmt	60	1.80	108.00	0.72	198.00	247.68
<b>Total 4th &amp; 5th Year Maintenance:</b>					<b>912.40</b>	<b>6.08</b>	<b>1672.00</b>	<b>2091.52</b>
Or Say							<b>1650.00</b>	<b>2050.00</b>

*22.4.2020*

Principal Chief Conservator of Forests(HoFF).  
Himachal Pradesh.

# Annexure - IVd

No.Ft. 1790-/71(D)2019-20/Vol-IX(Norms)  
Himachal Pradesh Forest Department

Dated

Shimla, the 19 MAY 2020

From: Pr. CCF (HoFF)HP

To:1. Pr. CCF (WL) HP  
2.APCCF (CAMPA)  
3. CPDs IDP Solan; HPFECPP (KfW)  
D/shala & HPFEMLP Shimla  
4. CCF(Projects & EAPs)  
5. All CCFS/CFs (T &WL) in HP  
6. Registrar (Bud) O/o PCCF(HoFF)HP

Subject:

Cost norms for raising plants (**Normal and Tall plants**) in nurseries for Non-Tribal & Tribal Areas for the year 2020-21.

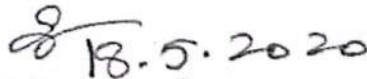
Memo

Consequent upon the revision of daily wage rates from existing ₹250/- to ₹ 275/- per day in the state of Himachal Pradesh vide Finance Department letter No. FIN-(PR)B(7)-33/2010 dated 24.03.2020, the cost norms for raising plants (**Normal and Tall plants**) in nurseries in Non-Tribal & Tribal areas approved vide H.P. Government letter No. FFE-B-F(5)1/2017 dated 12.03.2018 (circulated to the field offices vide this office endst. of even number dated 16<sup>th</sup> March, 2018) have been calculated on increased wage rates and are enclosed herewith for taking further necessary action.

2. The conditions laid down by the Govt. while approving the cost norms for raising plants in nurseries vide letter quoted above shall remain enforced and should be followed in letter and spirit.

These cost norms indicate the upper limits but the expenditure should be restricted to the actual requirement as specified by the Govt. while approving cost norms.

Encl: As above.

  
Pr. Chief Conservator of Forests(HoFF),  
Himachal Pradesh

Endst. No. As above.

Dated

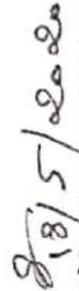
Copy alongwith enclosures is forwarded to CCF(IT) o/o Pr. CCF(HoFF) Shimla for information and necessary action. These cost norms may please be uploaded on departmental website.

Encl: As above

  
Pr. Chief Conservator of Forests(HoFF),  
Himachal Pradesh

**Financial Year Wise split of per Plant Nursery Cost for different Species to be raised in Poly Bags for the year 2020-21 at the basic wage rate of ₹275/- per day**

Financial Year	Chil/ Other BLs				Ban				Deodar				Fir/ Spruce	
	Normal		Tall		Normal		Tall		Normal		Tall		Normal	
	(1½ Year Old)	(2½ Year Old)	(2½ Year Old)	(3½ Year Old)	(4½ Year Old)	(4½ Year Old)								
Non Tribal	Tribal	Non Tribal	Tribal	Non Tribal	Tribal	Non Tribal	Tribal	Non Tribal	Tribal	Non Tribal	Tribal	Non Tribal	Tribal	
1st	8.95	10.64	8.95	10.64	9.91	11.60	9.91	11.60	1.73	2.07	1.73	2.07	1.69	2.02
2 <sup>nd</sup>	5.26	6.57	35.36	40.59	5.26	6.57	5.26	6.57	13.22	16.03	13.22	16.03	8.81	10.71
3 <sup>rd</sup>	2.63	3.29	8.60	10.75	5.26	6.57	35.36	40.59	4.60	5.75	4.60	5.75	4.60	5.75
4 <sup>th</sup>	--	--	4.63	5.79	2.63	3.29	8.6	10.75	1.97	2.46	1.97	2.46	21.00	24.4
5 <sup>th</sup>	--	--	--	--	--	--	4.63	5.79	--	--	--	--	4.60	5.75
6 <sup>th</sup>	--	--	--	--	--	--	--	--	--	--	--	--	1.97	2.46
<b>Total Cost</b>	<b>16.84</b>	<b>20.50</b>	<b>57.54</b>	<b>67.77</b>	<b>23.06</b>	<b>28.03</b>	<b>63.76</b>	<b>75.30</b>	<b>21.52</b>	<b>26.31</b>	<b>61.56</b>	<b>72.77</b>	<b>42.67</b>	<b>51.09</b>

  
 Pr. Chief Conservator of Forests (HoFF)  
 Himachal Pradesh, Shimla

**COST NORMS FOR RAISING NORMAL & TALL PLANTS IN NURSERIES**  
 Calculated for 100 plants on the wage rate of ₹ 275 for Non Tribal areas and ₹ 343.75 for Tribal areas

Sr. No.	Activity	Unit	Rate (for Wages @₹210)	Qty.	2020-21	
					Amount (in ₹)	
					For Non Tribal areas	For Tribal Areas
<b>I. COST OF RAISING NORMAL CHIL &amp; BROAD LEAVED PLANTS IN POLYBAGS IN THE NURSERY (1½ year old)</b>						
<b>First Financial Year Activities (From Seed sowing to March)</b>						
1	Preparing of nursery beds including layout	Sqm	28.70	0.69	25.89	32.36
2	Filling of P/bags of size 5"x9" including collection, carriage, sieving of soil, mixing of manure/humus, insecticide/ pesticide	No./100	381.99	1	499.71	624.64
3	Lining of P/bags	No./100	27.30	1	35.72	44.65
4	Sowing of seed in polythene bags	%	23.80	1	31.14	38.93
5	Mulching of polythene bags	%	7.42	1	9.70	12.13
6	Resowing of seed (20%)	%	23.80	0.2	6.23	7.79
7	Hand watering of P/bags (20 days)	No./100	2.52	20	65.93	82.41
8	Cost of vermi compost	Eg	7.00	17	119.00	119.00
9	Cost of insecticide/ pesticide	LS	-	-	15.00	15.00
10	Cost of polythene bags	Eg	160.00	0.3	48.00	48.00
11	Cost of seed	LS	20.00	LS	20.00	20.00
12	Cost of procurement of sand including its carriage upto nursery	Cu Mt	500.00	0.039	19.50	19.50
<b>Total Cost in First Financial Year</b>					<b>895.82</b>	<b>1064.41</b>
<b>Or say</b>					<b>895.00</b>	<b>1064.00</b>
<b>Per plant cost for 1st year</b>					<b>8.95</b>	<b>10.64</b>
<b>Second Financial Year Activities (April to March)</b>						
1	Hand watering of P/bags (120 days)	No./100	2.52	120	395.59	494.49
2	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	108.06
3	Shifting and grading of plants	No./100	33.60	1	43.96	54.95
<b>Total Cost in Second Financial Year</b>					<b>526.00</b>	<b>657.50</b>
<b>Or say</b>					<b>526.00</b>	<b>657.00</b>
<b>Per plant cost for 2nd year</b>					<b>5.26</b>	<b>6.57</b>
<b>Third Financial Year Activities (April to March)</b>						
1	Hand watering of P/bags (60 days)	No./100	2.52	60	197.80	247.25
2	Weeding and hoeing of plants (1 time)	No./100	16.52	1	21.62	27.03
3	Shifting and grading of plants	No./100	33.60	1	43.96	54.95
<b>Total Cost in Third Financial Year</b>					<b>263.38</b>	<b>329.23</b>
<b>Or say</b>					<b>263.00</b>	<b>329.00</b>
<b>Per plant cost for 3rd year</b>					<b>2.63</b>	<b>3.29</b>
<b>G. TOTAL of costs for 3 years</b>					<b>1684.00</b>	<b>2050.00</b>
<b>Total cost per Plant</b>					<b>16.84</b>	<b>20.50</b>

Sr. No.	Activity	Unit	Rate (for Wages @₹210)	Qty.	2020-21	
					Amount (in ₹)	
					For Non Tribal areas	For Tribal Areas
<b>2. COST OF RAISING TALL CHIL &amp; BROAD LEAVED PLANTS IN POLY BAGS IN NURSERY (2½ year old)</b>						
<b>First Financial Year Activities (Seed sowing to March)</b>						
1	Preparing of nursery beds including layout	Sqm	28.70	0.69	25.89	32.36
2	Filling of P/bags of size 5"x9" including collection, carriage and sieving of soil, mixing of manure humus, insecticide/ pesticide	No./100	381.99	1	499.71	624.64
3	Lining of P/bags	No./100	27.30	1	35.72	44.65
4	Sowing of seed in polythene bags	%	23.80	1	31.14	38.93
5	Mulching of polythene bags	%	7.42	1	9.70	12.13
6	Resowing of seed (20%)	%	23.80	0.2	6.23	7.79
7	Hand watering of P/bags (20 days)	No./100	2.52	20	65.93	82.41
8	Cost of vermi compost	Eg	7.00	17	119.00	119.00
9	Cost of insecticide/ pesticide	LS	-	-	15.00	15.00
10	Cost of polythene bags	Eg	160.00	0.3	48.00	48.00
11	Cost of seed	LS	20.00	LS	20.00	20.00
12	Cost of procurement of sand including its carriage upto nursery	Cu Mt	500.00	0.039	19.50	19.50
<b>Total Cost in First Financial Year</b>					<b>895.82</b>	<b>1064.41</b>
or say					<b>895.00</b>	<b>1064.00</b>
<b>Per plant cost for 1st year</b>					<b>8.95</b>	<b>10.64</b>
<b>Second Financial Year Activities (April to March)</b>						
1	Preparing of nursery beds including layout for accomodating 9"x16" P/Bags	Sqm	28.70	2.04	76.59	95.74
2	Filling of P/bags of size 9"x16" by collection, sieving and carriage of soil, mixing of Sand/manure/ humus/vermicompost/ insecticide/ pesticide including transplanting of plants already grown in 5"x9" P/bags into 9"x16" size P/bag which also include the removal of a part of ball of earth and untwining of roots.	No./100	1111.88	1	1454.54	1818.18
3	Lining of P/bags	No./100	61.21	1	80.07	100.09
4	Hand watering of P/bags (120 days)	No./100	2.52	120	395.59	494.49
5	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	108.06
6	Cost of vermi compost	Eg	7.00	134	938.00	938.00
7	Cost of insecticide/ pesticide	LS	-	-	80.00	80.00
8	Cost of polythene bags	Eg	160.00	2	320.00	320.00
9	Cost of procurement of sand including its carriage upto nursery	Cu Mt	500.00	0.21	105.00	105.00
<b>Total Cost in Second Financial Year</b>					<b>3536.24</b>	<b>4059.56</b>
or Say					<b>3536.00</b>	<b>4059.00</b>
<b>Per plant cost for 2nd year</b>					<b>35.36</b>	<b>40.59</b>

Sr. No.	Activity	Unit	Rate (for Wages @₹210)	Qty.	2020-21	
					Amount (in ₹)	
					For Non Tribal areas	For Tribal Areas
<b>Third Financial Year Activities (April to March)</b>						
1	Preparing nursery beds to shift 9"x16" P bags at a spacing of 9" row to row	Sq Mtr	28.70	3.57	134.05	167.56
2	Shifting and Grading of Plants at a spacing of 9" row to row	No./100	186.80	1	244.38	305.48
3	Hand watering of P/bags (120 days)	No./100	2.52	120	395.59	454.49
4	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	108.06
<b>Total Cost in 3rd Financial Year</b>					<b>860.47</b>	<b>1075.59</b>
or say					<b>860.00</b>	<b>1075.00</b>
Per plant cost for 3rd year					<b>8.60</b>	<b>10.75</b>
<b>Fourth Financial Year Activities (April to June)</b>						
1	Hand watering of P/bags (60 days)	No./100	2.52	60	197.80	247.25
2	Weeding and hoeing of plants (1 time)	No./100	16.52	1	21.62	27.03
3	Shifting and Grading of Plants	No./100	186.80	1	244.38	305.48
<b>Total Cost in fourth Financial Year</b>					<b>463.80</b>	<b>579.76</b>
or say					<b>463.00</b>	<b>579.00</b>
Per plant cost for 4th year					<b>4.63</b>	<b>5.79</b>
<b>G. TOTAL of costs for 4 years</b>					<b>5754.00</b>	<b>6777.00</b>
Total cost per Plant					<b>57.54</b>	<b>67.77</b>
<b>3. COST OF RAISING NORMAL BAN PLANTS IN POLY BAGS IN NURSERY (2½ year old)</b>						
<b>First Financial Year Activities (From Seed sowing to March)</b>						
1	Preparing of nursery beds including layout	Sqm	28.70	0.69	25.89	32.36
2	Filling of P/bags of size 5"x9" including collection, carriage, sieving of soil, mixing of manure/humus, insecticide/ pesticide	No./100	381.99	1	499.71	624.64
3	Lining of P/bags	No./100	27.30	1	35.72	44.65
4	Sowing of seed in polythene bags	%	23.80	1	31.14	38.93
5	Mulching of polythene bags	%	7.42	1	9.70	12.13
6	Resowing of seed (20%)	%	23.80	0.2	6.23	7.79
7	Hand watering of P/bags (20 days)	No./100	2.52	20	65.93	82.41
8	Cost of vermi compost	Eg	7.00	17	119.00	119.00
9	Cost of insecticide/ pesticide	LS	-	-	15.00	15.00
10	Cost of polythene bags	Eg	160.00	0.3	48.00	48.00
11	Cost of seed	Eg	152.60	0.76	115.98	115.98
12	Cost of procurement of sand including its carriage upto nursery	Cu Mt	500.00	0.039	19.50	19.50
<b>Total Cost in First Financial Year</b>					<b>991.80</b>	<b>1160.39</b>
Or say					<b>991.00</b>	<b>1160.00</b>
Per plant cost for 1st year					<b>9.91</b>	<b>11.60</b>

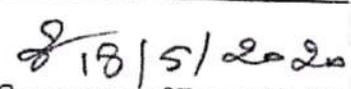
Sr. No.	Activity	Unit	Rate (for Wages @₹210)	Qty.	2020-21	
					Amount (in ₹)	
					For Non Tribal areas	For Tribal Areas
<b>Second Financial Year Activities (April to March)</b>						
1	Hand watering of P/bags (120 days)	No./100	2.52	120	395.59	494.49
2	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	108.06
3	Shifting and grading of plants	No./100	33.60	1	43.96	54.95
<b>Total Cost in Second Financial Year</b>					<b>526.00</b>	<b>657.50</b>
Or say					<b>526.00</b>	<b>657.00</b>
<b>Per plant cost for 2nd year</b>					<b>5.26</b>	<b>6.57</b>
<b>Third Financial Year Activities (April to March)</b>						
1	Hand watering of P/bags (120 days)	No./100	2.52	120	395.59	494.49
2	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	103.06
3	Shifting and grading of plants	No./100	33.60	1	43.96	54.95
<b>Total Cost in Third Financial Year</b>					<b>526.00</b>	<b>657.50</b>
Or say					<b>526.00</b>	<b>657.00</b>
<b>Per plant cost for 3rd year</b>					<b>5.26</b>	<b>6.57</b>
<b>Fourth Financial Year Activities (April to June)</b>						
1	Hand watering of P/bags (60 days)	No./100	2.52	60	197.80	247.25
2	Weeding and hoeing of plants (1 time)	No./100	16.52	1	21.62	27.03
3	Shifting and grading of plants	No./100	33.60	1	43.96	54.95
<b>Total Cost in Fourth Financial Year</b>					<b>263.38</b>	<b>329.23</b>
Or say					<b>263.00</b>	<b>329.00</b>
<b>Per plant cost for 4th year</b>					<b>2.63</b>	<b>3.29</b>
<b>G. TOTAL of costs for 4 years</b>					<b>2306.00</b>	<b>2803.00</b>
<b>Total cost per Plant</b>					<b>23.06</b>	<b>28.03</b>
<b>4. COST OF RAISING TALL BAN PLANTS IN POLY BAGS IN NURSERY (3½ year old)</b>						
<b>First Financial Year Activities (Seed sowing to March)</b>						
1	Preparing of nursery beds including layout	Sqm	28.70	0.69	25.89	32.36
2	Filling of P/bags of size 5"x9" including collection, carriage, sieving of soil, mixing of manure/humus,	No./100	381.99	1	499.71	624.64
3	Lining of P/bags	No./100	27.30	1	35.72	44.65
4	Sowing of seed in polythene bags	%	23.80	1	31.14	38.93
5	Mulching of polythene bags	%	7.42	1	9.70	12.13
6	Resowing of seed (20%)	%	23.80	0.2	6.23	7.79
7	Hand watering of P/bags (20 days)	No./100	2.52	20	65.93	82.41
8	Cost of vermi compost	Eg	7.00	17	119.00	119.00
9	Cost of insecticide/ pesticide	LS	-	-	15.00	15.00
10	Cost of polythene bags	Eg	160.00	0.3	48.00	48.00
11	Cost of seed	Eg	152.60	0.76	115.98	115.98
12	Cost of procurement of sand including its carriage upto nursery	Cu Mt	500.00	0.039	19.50	19.50
<b>Total Cost in First Financial Year</b>					<b>991.80</b>	<b>1160.39</b>
or say					<b>991.00</b>	<b>1160.00</b>
<b>Per plant cost for 1st year</b>					<b>9.91</b>	<b>11.60</b>

Sr. No.	Activity	Unit	Rate (for Wages @₹210)	Qty.	2020-21	
					Amount (in ₹)	
					For Non Tribal areas	For Tribal Areas
<b>Second Financial Year Activities (April to March)</b>						
1	Hand watering of P/bags (120 days)	No./100	2.52	120	395.59	494.49
2	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	108.06
3	Shifting and grading of plants	No./100	33.60	1	43.96	54.95
<b>Total Cost in Second Financial Year</b>					<b>526.00</b>	<b>657.50</b>
<b>Or say</b>					<b>526.00</b>	<b>657.00</b>
<b>Per plant cost for 2nd year</b>					<b>5.26</b>	<b>6.57</b>
<b>Third Financial Year Activities (April to March)</b>						
1	Preparing of nursery beds including layout for accomodating 9"x16" P/Bags	Sqm	28.70	2.04	76.59	95.74
2	Filling of P/bags of size 9"x16" by collection, sieving and carriage of soil, mixing of Sand/manure/humus/vermicompost/ insecticide/ pesticide including transplanting of plants already grown in 5"x9" P/bags into 9"x16" size P/bag which also include the removal of a part of ball of earth and untwining of roots.	No./100	1111.88	1	1454.54	1813.18
3	Lining of P/bags	No./100	61.21	1	80.07	100.09
4	Hand watering of P/bags (120 days)	No./100	2.52	120	395.59	494.49
5	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	103.06
6	Cost of vermi compost	Eg	7.00	134	938.00	933.00
7	Cost of insecticide/ pesticide	LS	-	-	80.00	80.00
8	Cost of polythene bags	Eg	160.00	2	320.00	320.00
9	Cost of procurement of sand including its carriage upto nursery	Cu Mt	500.00	0.21	105.00	105.00
<b>Total Cost in Third Financial Year</b>					<b>3536.24</b>	<b>4059.56</b>
<b>or Say</b>					<b>3536.00</b>	<b>4059.00</b>
<b>Per plant cost for 3rd year</b>					<b>35.36</b>	<b>40.59</b>
<b>Fourth Financial Year Activities (April to March)</b>						
1	Preparing nursery beds to shift 9"x16" P bags at a spacing of 9" row to row	Sq Mtr	28.70	3.57	134.05	167.56
2	Shifting and Grading of Plants at a spacing of 10" row to row	No./100	186.80	1	244.38	305.48
3	Hand watering of P/bags (120 days)	No./100	2.52	120	395.59	494.49
4	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	108.06
<b>Total Cost in 4th Financial Year</b>					<b>860.47</b>	<b>1075.59</b>
<b>or say</b>					<b>860.00</b>	<b>1075.00</b>
<b>Per plant cost for 4th year</b>					<b>8.60</b>	<b>10.75</b>

Sr. No.	Activity	Unit	Rate (for Wages @₹210)	Qty.	2020-21	
					Amount (in ₹)	
					For Non Tribal areas	For Tribal Areas
<b>Fifth Financial Year Activities (April to June)</b>						
1	Hand watering of P/bags (60 days)	No./100	2.52	60	197.80	247.25
2	Weeding and hoeing of plants (1 time)	No./100	16.52	1	21.62	27.03
3	Shifting and Grading of Plants	No./100	186.80	1	244.38	305.48
	<b>Total Cost in Fifth Financial Year</b>				<b>463.80</b>	<b>579.76</b>
	or say				<b>463.00</b>	<b>579.00</b>
	<b>Per plant cost for 5th year</b>				<b>4.63</b>	<b>5.79</b>
	<b>G. TOTAL of costs for 5 years</b>				<b>6376.00</b>	<b>7530.00</b>
	<b>Total cost per Plant</b>				<b>63.76</b>	<b>75.30</b>
<b>5. COST OF RAISING NORMAL DEODAR PLANTS IN POLY BAGS IN NURSERY (2½ year old)</b>						
<b>First Financial Year Activities (From Sowing to March)</b>						
1	Preparation of nursery beds including layout	Sqm	28.70	1	37.54	45.93
2	Mixing of vermi compost in the gemination bed	Sqm	3.92	1	5.13	6.41
3	Application of insecticide/pesticide in the bed	Sqm	2.80	1	3.66	4.58
4	Line sowing of seed	Sqm	11.62	1	15.20	19.00
5	Hand watering of plants in bed (20 Times)	Sqm	2.52	20	65.93	82.41
6	Mulching in nursery beds	Sqm	5.74	1	7.51	9.39
7	Cost of deodar seed	Eg	372.00	0.025	9.30	9.30
8	Cost of insecticide/ pesticide	LS	-	-	15.00	15.00
9	Cost of vermi compost	Eg	7.00	2.00	14.00	14.00
	<b>Total cost in first Financial year</b>				<b>173.27</b>	<b>207.02</b>
	or say				<b>173.00</b>	<b>207.00</b>
	<b>Per plant cost for 1st year</b>				<b>1.73</b>	<b>2.07</b>
<b>Second Financial Year Activities (April to March)</b>						
1	Preparing of nursery beds including layout for accomodating p bags	Sqm	28.70	0.69	25.89	32.36
2	Filling of P/bags of size 5"x9" including collection carriage sieving of soil, mixing of mannure/humus,	No./100	381.99	1	499.71	624.64
3	Lining of P/bags	No./100	27.30	1	35.72	44.65
4	Pricking and setting of seedlings in P/bags	No./100	76.30	1	99.81	124.76
5	Hand watering of P/bags (100 days)	No./100	2.52	100	329.66	412.08
6	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	108.06
7	Shifting and grading of Plants	No./100	33.60	1	43.96	54.95
8	Cost of vermi compost	Eg	7.00	17	119.00	119.00
9	Cost of insecticide/ pesticide	LS	-	-	15.00	15.00
10	Cost of polythene bags	Eg	160.00	0.3	48.00	48.00
11	Cost of procurement of sand including its carriage upto nursery	Cu Mt	500.00	0.039	19.50	19.50
	<b>Total cost in second Financial year</b>				<b>1322.70</b>	<b>1603.00</b>
	or say				<b>1322.00</b>	<b>1603.00</b>
	<b>Per plant cost for 2nd year</b>				<b>13.22</b>	<b>15.03</b>

Sr. No.	Activity	Unit	Rate (for Wages @₹210)	Qty.	2020-21	
					Amount (in ₹)	
					For Non Tribal areas	For Tribal Areas
<b>Third Financial Year Activities (April to March)</b>						
1	Hand watering of P/bags (100 days)	No./100	2.52	100	329.66	412.08
2	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	103.06
3	Shifting and Grading of plants	No./100	33.60	1	43.96	54.95
<b>Total cost in third Financial year</b>					<b>460.07</b>	<b>575.09</b>
<b>or say</b>					<b>460.00</b>	<b>575.00</b>
<b>Per plant cost for 3rd year</b>					<b>4.60</b>	<b>5.75</b>
<b>Fourth Financial Year Activities (April to June)</b>						
1	Hand watering of P/bags (40 days)	No./100	2.52	40	131.87	164.84
2	Weeding and hoeing of plants (1 time)	No./100	16.52	1	21.62	27.03
3	Shifting and Grading of plants	No./100	33.60	1	43.96	54.95
<b>Total cost in Fourth Financial year</b>					<b>197.45</b>	<b>246.82</b>
<b>or say</b>					<b>197.00</b>	<b>246.00</b>
<b>Per plant cost for 4th year</b>					<b>1.97</b>	<b>2.46</b>
<b>G. TOTAL of costs for 4 years</b>					<b>2152.00</b>	<b>2631.00</b>
<b>Total cost per plant</b>					<b>21.52</b>	<b>25.31</b>
<b>6. COST OF RAISING TALL DEODAR PLANTS IN POLY BAGS IN NURSERY (3½ year old)</b>						
<b>First Financial Year Activities (Sowing to March)</b>						
1	Preparation of nursery beds including layout	Sqm	28.70	1	37.54	46.93
2	Mixing of vermi compost in the germination bed	Sqm	3.92	1	5.13	6.41
3	Application of insecticide/pesticide in the bed	Sqm	2.80	1	3.66	4.58
4	Line sowing of seed	Sqm	11.62	1	15.20	19.00
5	Hand watering of plants in bed 20 Times	Sqm	2.52	20	65.93	82.41
6	Mulching in nursery beds	Sqm	5.74	1	7.51	9.39
7	Cost of vermi compost including carriage upto nursery	Eg	7.00	2	14.00	14.00
8	Cost of seed	Eg	372.00	0.025	9.30	9.30
9	Cost of insecticide/ pesticide	LS	-	-	15.00	15.00
<b>Total cost in first Financial year</b>					<b>173.27</b>	<b>207.02</b>
<b>or say</b>					<b>173.00</b>	<b>207.00</b>
<b>Per plant cost for 1st year</b>					<b>1.73</b>	<b>2.07</b>
<b>Second Financial Year Activities (April to March)</b>						
1	Preparing of nursery beds including layout for accomodating 5"x9" P/Bags	Sqm	28.70	0.69	25.89	32.36
2	Filling of P/bags of size 5"x9" including collection, carriage & sieving of soil, mixing of manure/humus, insecticide/ pesticide including collection & carriage of soil	No./100	381.99	1	499.71	624.64
3	Lining of P/bags	No./100	27.30	1	35.72	44.65
4	Pricking and setting of seedlings in P/bags	No./100	76.30	1	99.81	124.76
5	Hand watering of P/bags (100 days)	No./100	2.52	100	329.66	412.08
6	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	108.06
7	Shifting and grading of Plants	No./100	33.60	1	43.96	54.95
8	Cost of vermi compost	Eg	7.00	17	119.00	119.00
9	Cost of insecticide/ pesticide	LS	-	-	15.00	15.00
10	Cost of polythene bags	Eg	160.00	0.3	48.00	48.00

Sr. No.	Activity	Unit	Rate (for Wages @₹210)	Qty.	2020-21	
					Amount (in ₹)	
					For Non Tribal areas	For Tribal Areas
11	Cost of procurement of sand including its carriage upto nursery	Cu Mt	500.00	0.039	19.50	19.50
<b>Total cost in 2nd Financial year</b>					<b>1322.70</b>	<b>1603.00</b>
<b>or say</b>					<b>1322.00</b>	<b>1603.00</b>
<b>Per plant cost for 2nd year</b>					<b>13.22</b>	<b>16.03</b>
<b>Third Financial Year Activities (April to March)</b>						
1	Preparing of nursery beds including layout for accomodating 9"x16" P/Bags	Sqm	28.70	2.04	76.59	95.74
2	Filling of P/bags of size 9"x16" by collection, carriage sieving of soil, mixing of Sand/manure/humus/vermicompost/ insecticide/ pesticide including transplanting of plants already grown in 5"x9" P/bags into 9"x16" size P/bag which also include the removal of a part of ball of earth and untwining of roots.	No./100	1111.88	1	1454.54	1818.18
3	Lining of P/bags	No./100	61.21	1	80.07	100.09
4	Hand watering of P/bags (100 days)	No./100	2.52	100	329.66	412.08
5	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	108.06
6	Cost of vermi compost	Eg	7.00	134	938.00	938.00
7	Cost of insecticide/ pesticide	LS	-	-	80.00	30.00
8	Cost of polythene bags	Eg	160.00	2	320.00	320.00
9	Cost of procurement of sand including its carriage upto nursery	Cu Mt	500.00	0.21	105.00	105.00
<b>Total cost in third Financial year</b>					<b>3470.31</b>	<b>3977.15</b>
<b>or say</b>					<b>3470.00</b>	<b>3977.00</b>
<b>Per plant cost for 3rd year</b>					<b>34.70</b>	<b>39.77</b>
<b>Fourth Financial Year Activities (April to March)</b>						
1	Preparing nursery beds to increase the spacing of 9"x16" P bags to 9" row to row	Sq Mtr.	28.70	3.57	134.05	167.56
2	Shifting and Grading of Plants at a spacing of 9" row to row	No./100	186.80	1	244.38	305.48
3	Hand watering of P/bags (100 days)	No./100	2.52	100	329.66	412.08
4	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	108.06
<b>Total cost in Fourth Financial year</b>					<b>794.54</b>	<b>993.18</b>
<b>or say</b>					<b>794.00</b>	<b>993.00</b>
<b>Per plant cost for 4th year</b>					<b>7.94</b>	<b>9.93</b>
<b>Fifth Financial Year Activities (April to June)</b>						
1	Hand watering of P/bags (40 days)	No./100	2.52	40	131.87	64.84
2	Weeding and hoeing of plants (1 times)	No./100	16.52	1	21.62	27.03
3	Shifting and Grading of P/Bags	No./100	186.80	1	244.38	305.48
<b>Total cost in 5th Financial year</b>					<b>397.87</b>	<b>497.35</b>
<b>or say</b>					<b>397.00</b>	<b>497.00</b>
<b>Per plant cost for 5th year</b>					<b>3.97</b>	<b>4.97</b>
<b>G. TOTAL of costs for 5 years</b>					<b>6156.00</b>	<b>7277.00</b>
<b>Total cost per plant</b>					<b>61.56</b>	<b>72.77</b>

Sr. No.	Activity	Unit	Rate (for Wages @₹210)	Qty.	2020-21	
					Amount (in ₹)	
					For Non Tribal areas	For Tribal Areas
4	Hand watering of P/bags (100 days)	No./100	2.52	100	329.66	412.08
5	Weeding and hoeing of plants (4 times)	No./100	16.52	4	86.45	108.06
6	Cost of vermi compost	Eg	7.00	74	518.00	518.00
7	Cost of insecticide/ pesticide	LS	-	-	80.00	80.00
8	Cost of polythene bags	Eg	160.00	0.5	80.00	80.00
9	Cost of procurement of sand including its carriage upto nursery	Cu Mt	500.00	0.125	62.50	62.50
<b>Total cost in third Financial year</b>					<b>2100.24</b>	<b>2440.19</b>
<b>or say</b>					<b>2100.00</b>	<b>2440.00</b>
<b>Per plant cost for 3rd year</b>					<b>21.00</b>	<b>24.40</b>
<b>Fifth Financial Year Activities (April to March)</b>						
1	Hand watering of P/bags (100 days)	No./100	2.52	100	329.66	412.08
2	Weeding and hoeing of plants (4 time)	No./100	16.52	4	86.45	108.06
3	Shifting and Grading of plants	No./100	33.60	1	43.96	54.95
<b>Total cost in Fourth Financial year</b>					<b>460.07</b>	<b>575.09</b>
<b>or say</b>					<b>460.00</b>	<b>575.00</b>
<b>Per plant cost for 5th year</b>					<b>4.60</b>	<b>5.75</b>
<b>Sixth Financial Year Activities (April to June)</b>						
1	Hand watering of P/bags (40 days)	No./100	2.52	40	131.87	164.84
2	Weeding and hoeing of plants (1Time)	No./100	16.52	1	21.62	27.03
3	Shifting and Grading of plants	No./100	33.60	1	43.96	54.95
<b>Total cost in 6th Financial year</b>					<b>197.45</b>	<b>246.82</b>
<b>or say</b>					<b>197.00</b>	<b>246.00</b>
<b>Per plant cost for 6th year</b>					<b>1.97</b>	<b>2.46</b>
<b>G. TOTAL of costs for 6 years</b>					<b>4267.00</b>	<b>5100.00</b>
<b>Total cost per plant</b>					<b>42.67</b>	<b>51.09</b>
					 Principal Chief Conservator of Forests(HoFF) Himachal Pradesh	

No. Ft.CAMPA/82/2011/Miyar/HEP/CP  
Himachal Pradesh Forest Department

Dated Shimla-1, the.

From: Principal CCF. H.P. Talland, Shimla.

To: All C.F.S (T and W.L) in H.P.

Subject: Standardization of norms for the Wild life component in the CAT Plans of Hydro Electric Project in the State.

Memo:

The following norms for activities of Wild life component (i.e.5% of total outlay of CAT Plan) for every Hydro Electric Project in the state have since been standardized/approved by Pr.CCF(W.L)/CWLW H.P.

Sr.No.	1.Planning	Percentage.	
		For CAT plans not covering PAs	Fore CAT Plans fully or partial'y covering PAs
1.1	Planning Perspective, Approach and Objectives	2% of Wildlife component funds in first two years.(May be out sourced)	2% of Wildlife component funds in first two years.(May be out sourced)
	Landscape/an Eco regional Perspective.		
	The key issues.		
	Planning approach.		
	Objectives		
	Working with the local communities to reduce /mitigate their dependencies on the natural resources and focus on strategies for coexistence. (Wild life and humans.		
1.2	Assess the strengths and assets of the natural resources dependent community members (with an emphasis on the women of poor households) to establish explicit links between the CAT plan activities and livelihood priorities of these people . Base line surveys.	1%	3% in first two years.
1.3	Facilitate organizing of sustainable community based organizations, user groups of rural poor and women, preferable with strong linkages to the local village councils known as Panchayat. Establish the biodiversity conservation efforts at Pancyayat level through the consultative process of micro planning .	2%	5% In first three years.
	Formation of Self Help Groups.		
	Preparation of CAT Plan		
	2. Implementation.		
2.1	Implementation of developmental or	60%	50%

	income generation programs so that they better address the livelihood priorities of the local people and facilitate conservation of the CAT Plan area biodiversity.		
	Income generation activities based on micro-planning		
	Extension activities for WL awareness.		
	Energy saving devices.		
	Non conventional energy such as solar.		
2.2	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers.	20%	10%
	Herd insurance scheme. L.S. funds for watchman /compensation for animal damage to crops.		
	Chemical Restrain: Traps, Cages.		
2.3	WL Habitat Management: Maintain and protect the natural vegetation communities, populations of large ungulates(with emphasis on Himalyan species), carnivores and pheasants: Protection of unique WL habitats such as gorges, burrowing sites of WL,etc.	5%	25%
3	<del>3</del> Training/		
3.1	Develop competence based training programmes including Monkeys & Wild Life Trapping for the Forest staff and the local community, gun license holder, and NGOs.	5%	2%
4	<del>4</del> Research & Monitoring.		
4.1	Provide facilities and opportunities in natural areas for purposes of formal and informal education, research and the study and the Long Term Ecological (LTEM)		2%
5	<del>5</del> Contingency.		
5.1	Contingency, other interventions.	5%	1%

Therefore, before sending the CAT Plans of Hydro Electric Project to this office, above norms under Wildlife Chapter may be incorporated.

  
 9/3/2011  
 Conservator of Forests (CAT Plans)  
 HP Talland, Shimla.

Encl. No. A III - 52/KAFCA/2011-12/13142-48 Dt. 26-3-12  
 Copy forwarded to A/D For in Charge Circle  
 for information, guidance and n/a action.

9/3/2011  
 (om)  
 28/3

  
 Conservator of Forests  
 HP Talland, Shimla

## **STANDARD PROCEDURE OF MONITORING AND EVALUATION OF DEVELOPMENT WORKS**

Three tier monitoring and evaluation of all development works is being carried out in the H.P. Forest Department as detailed below:

**First tier:** The first tier of monitoring would be done by field functionaries up to the level of CFs as per technical Order No.1/93-94 dated 05.03.1994.

**Second Tier:** Monitoring & evaluation of all developmental works (under all state and centrally sponsored schemes including CAMPA) by M&E Wing of HP. Forest Department as per methodology approved by Pr.CCF H.P. on dated 22.02.2013

**Third Tier:** Third party monitoring will be carried out for externally aided project and CAT Plans through institutions/entities in the State like the Universities forest institute; in their absence by approved/ empanelled consultant.

### **First Tier Monitoring:-**

#### **Monitoring of development works by field functionaries upto level of CFS:-**

Keeping in view the increased thrust of the Govt. for afforestation and soil Conservation work in Himachal Pradesh, it is essential to follow Mandatory Field Inspections by field functionaries. Therefore in view of above, technical standing order No.1/93-94 is issued for Mandatory inspections. The two aspects have been devised, first is the inspections of the area and assessment of survival %age and second is the total physical verification of the area by way of total counting of plants. In this part survival percentage will also be assessed.

The areas to be inspected should be evenly distributed in all over range. It will be ensured that the areas in the interior away from motor road are adequately covered. Before conduction mandatory inspection, random samples should be drawn for checking/inspection at different level. It will be carried out as under:-

## 1. ASSESSMENT OF THE SURVIVAL PERCENTAGE

1.1 Different field functionaries will carry out assessment of survival percentage to under mentioned extent:

<b>FIELD FUNCTIONARY</b>	<b>PERCENTAGE IN RESPECT OF HA. PLANTED.</b>
<b>R.O</b>	<b>100</b>
<b>A.C.F.</b>	<b>50</b>
<b>D.F.O.</b>	<b>20</b>
<b>C.F</b>	<b>5</b>

1.2 First of all it will be ascertained that the area is the name as intended to be inspected. This will be done by taking help of plantation on journal /map/D.H.F. etc.

1.3 The actual counting of plants be confined to 2% of the total number of plants planted in the area to be inspected.

1.4 While counting plants, a cluster of at least 100 plants will be taken at one point which will be selected randomly standing from the N.E. corned and proceeding in anticlockwise direction.

1.5 The cluster will approximate to a circular shape of radius of about 20 m.

1.6 Then the actual counting of pits be done and the plants of B. L. and conifers survival percentage of total be worked out.

## 2. PHYSICAL VERIFICATION AND SURVIVAL PERCENTAGE

2.1 The extent of physical verification and survival %age will be as under. The areas/ samples selected for physical verification has to be different from the areas/ samples selected for survival percentage.

<b><u>FIELD FUNCTIONARY</u></b>	<b><u>PERCENTAGE IN RESPECT of HA. PLANTED.</u></b>
<b>R.O</b>	<b>25</b>
<b>A.C.F</b>	<b>10</b>
<b>D.F.O.</b>	<b>5</b>
<b>C.F.</b>	<b>1</b>

2.2 It will be ascertained that the area being inspected is the same as is intended to be inspected. For this purpose help will be taken of plantation journal map/CHF etc.

2.3 The total counting of plants planted in the area under inspection will be carried out and recorded separately for B.L. and conifers and surviving and dead plants.

2.4 The area will be calculated by the norm of plantation/ha.

3. It is made clear here that suppose in a Division, 1000 ha, plantation has been carried out, then, out of it, area to be inspected by ACF, DFO and CF in case of assessment of survival percentage will be 500, 200, and 50 ha, respectively. If the norm of plantation is 1000 plants per ha, then the actual counting of number of plants by these functionaries will be 2% of the plants planted in these i.e. 10,000, 4,000 and 1,000 respectively, similarly, if 1000 ha, is planted in a Division, then the areas to be checked for physical verification and survival percentage by field functionaries will be 250 ha, for R.O. 100 for ACF, 50 for DFO and 10 for CF. Here cent percent counting for plants planted will be done.

4. The report will be sent separately for monsoon and winter plantings in respect of new plantations both in respect of survival percentage and physical verification as depicted below. The report of monsoon planting should be submitted by 31st December as per norms in respect of about 50% of plantations already raised during monsoons and by 31<sup>st</sup> March in respect of remaining areas.

The report for winter planting will be sent by 30th June as per norms in the following year for about 50% plantations done during winter and by 30th Sept, for remaining areas.

**Dated of submission of report**

Monsoon Planting	31st December. 50%	31st March 50%
Winter Planting	30th June of the following year 50%	30th September of the following year 50%

**5. INSPECTION OF PLANTATION AREAS OF LAST 2 YEARS**

In order to assess the survival % age of the previous two years plantation areas it is desirable that CFs/DFOs should inspect minimum 1% and 5% areas respectively for each year plantations. The procedure for inspection/ selection of the areas and submission of inspection reports shall remain the same as prescribed in earlier paragraphs.

## Second Tier Monitoring

### Monitoring of development works by Monitoring & Evaluation Wing

For carrying out monitoring and evaluation exercise in the state of Himachal Pradesh, the State has been divided into two circles-**North and South**. The North Circle has jurisdiction over Bilaspur, Chamba, Dharamsala and Hamirpur territorial Circles while the jurisdiction of South Circle is spread over Kullu, Mandi, Nahan, Rampur and Shimla territorial Circles.

**Method:** **Multi stage random sampling method** (also called as cluster sampling) will be used for carrying out sampling. In this method random samples are drawn from primary, intermediate and final units (Range, Block and field activity in this case). Selected units will be monitored for 6 months after which fresh samples will be selected.

- Entire population is divided into clusters (**Ranges**) and a random sample of clusters is selected using computer generated random numbers
- Each cluster is mutually exclusive and together the cluster includes the entire population. No unit from non selected clusters is included in the sample.
- Once the clusters are selected then all units within the clusters (**Blocks**) are considered for second stage random selection.
- In final stage, atleast 15% of works from among the selected Blocks are actually monitored in field.

In the second stage, further sample size has been drawn based on the standard deviation of the population (i.e. 108 Blocks falling in these selected 36 Ranges) which is 0.63. Thus the sample size at 90% confidence interval is 38. This amounts to a sampling intensity of 35%. Thus atleast one Block per Range was selected following the random selection method. For this again computer generated random numbers have been used and following blocks have been selected.

Further in third stage, all the works carried out in current financial year are listed and 15% of the works are selected randomly from each Block for actual field inspection and monitoring.

### Third Tier:

Third party monitoring will be carried out for externally aided project and CAT Plans through institutions/entities in the State like the Universities forest institute; in their absence by approved/ empanelled consultant.

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## Annual Plan of Operations (APO)

## I. APO 1: 2021-22

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>1</b>	<b>Biological Measures</b>										
i)	Creation of New Nursery				5,000,000						5,000,000
ii)	Upgradation of Existing Nurseries		6,700,000		2,000,000		1,500,000				10,200,000
	<b>Sub Total</b>		<b>6,700,000</b>		<b>7,000,000</b>		<b>1,500,000</b>				<b>15,200,000</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>										
i)	Moisture Retention Measures (Nos)	9,200	570,400	3,600	223,200					12,800	793,600
ii)	Drainage Line Treatment										
a	Brushwood (Rmt)	1,090	141,700	200	26,000					1,290	167,700
b	Live Hedge (Rmt)	5,270	105,400	1,350	27,000					6,620	132,400
c	Dry Stone Check Dam/ Wall (Nos)	32	306,070	15	261,300					47	567,370
d	Wire Crate Check Dam/ Wall (Nos)	32	993,250	12	555,260					44	1,548,510
e	Water Harvesting Structure (Nos)	2	600,000							2	600,000
f	Farm Pond Small (Nos)	3	30,000							3	30,000
iii)	Landslide and Slip Control Measures										
a	Wire Crate Retaining Wall (Nos)			10	1,241,760					10	1,241,760
iv)	Other Interventions										
a	Water Harvesting Structure (Nos)	1	300,000							1	300,000
b	Farm Pond Big (Nos)	9	225,000							9	225,000
c	Farm Pond Small (Nos)	28	280,000							28	280,000
v)	Silt Monitoring Stations	1	240,000							1	240,000
	<b>Sub Total</b>		<b>3,791,820</b>		<b>2,334,520</b>						<b>6,126,340</b>
<b>3</b>	<b>Infrastructure Development</b>										
i)	Maintenance of departmental buildings		5,825,000		1,700,000		1,950,000		150,000		9,625,000
<b>4</b>	<b>Forest Protection</b>										
i)	Construction of Boundary Pillars		10,000,000		1,100,000		6,750,000				17,850,000
ii)	Purchase of fire fighting equipments		150,000		40,000		100,000		35,000		325,000
iii)	Hiring of vehicles during fire season		500,000		250,000		250,000				1,000,000
iv)	Creation of fire line		3,500,000		250,000						3,750,000
v)	Energy Saving Devices		630,000		30,000		100,000				760,000
vi)	Cultural Operations		150,000		40,000		70,000		40,000		300,000
vii)	Maintenance of roads/ paths		4,820,000		1,500,000						6,320,000
	<b>Sub Total</b>		<b>19,750,000</b>		<b>3,210,000</b>		<b>7,270,000</b>		<b>75,000</b>		<b>30,305,000</b>
<b>5</b>	<b>Wildlife protection, management and conflict resolution</b>										
i)	Modern tools and equipments		2,250,000		803,750		903,125		614,500		4,571,375
ii)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		125,000		171,000		193,750		2,900		492,650
iii)	Planning								14,500		14,500
iv)	Implementation								54,375		54,375

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
v)	Training								5,800		5,800
vi)	Research & Monitoring								5,800		5,800
vii)	Contingency								290		290
	<b>Sub Total</b>		<b>2,375,000</b>		<b>974,750</b>		<b>1,096,875</b>		<b>698,165</b>		<b>5,144,790</b>
<b>6</b>	<b>Operational Support</b>										
i)	Transportation support to forest staff		3,500,000		1,000,000		2,500,000		1,000,000		8,000,000
ii)	Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.		500,000		212,500				25,000		737,500
iii)	Misc. Office furniture Almirahs, File racks etc.		375,000		100,000						475,000
iv)	Maintenance of machinery and equipments		250,000		75,000		175,000		25,000		525,000
v)	Inverter in offices		125,000		75,000						200,000
vi)	Amenities to staff		375,000		87,500		250,000		37,500		750,000
vii)	CCTV Cameras All Ranges & Divisional Office		212,500								212,500
	<b>Sub Total</b>		<b>5,337,500</b>		<b>1,550,000</b>		<b>2,925,000</b>		<b>1,087,500</b>		<b>10,900,000</b>
<b>7</b>	<b>Payment of Environmental Services</b>		2,525,000		700,000		800,000		58,000		4,083,000
<b>8</b>	<b>Eco-tourism</b>		1,400,000		750,000		400,000		50,000		2,600,000
<b>9</b>	<b>Monitoring &amp; Evaluation*</b>		850,000		245,000		309,000		14,500		1,418,500
<b>10</b>	<b>Joint Forest Management &amp; Micro Planning</b>		500,000		50,000		50,000				600,000
<b>11</b>	<b>Contingencies</b>		2,300,000		620,000		740,000		87,000		3,747,000
	<b>Grand Total</b>		<b>51,354,320</b>		<b>19,134,270</b>		<b>17,040,875</b>		<b>2,220,165</b>		<b>89,749,630</b>

**Note: Rs. 198.50 lakh** allocated for Research, Training and Capacity Building component has not been included in the APO as utilization of these funds will be decided by the office of PCCF (HoFF), HPFD

\* = **Rs. 96.00 lakh** allocated for online monitoring under Monitoring & Evaluation component has not been included in the APO as plan for utilization of funds for online monitoring will be prepared by Nodal Officer

**II. APO 2: 2022-23**

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>1</b>	<b>Biological Measures</b>										
i)	Normal Afforestation (ha)	72	6,819,840	6	568,320					78	7,388,160
ii)	Enrichment Plantation (ha)	79	4,680,750	23	1,362,750	38	2,251,500	12	711,000	152	9,006,000
iii)	Energy Plantation (ha)	7	515,690	3	221,010					10	736,700
iv)	Grazing Land Development (ha)	9	663,030							9	663,030
v)	Plantation of Tall Plants (ha)	21	2,051,910							21	2,051,910
	<b>Sub Total</b>	<b>188</b>	<b>14,731,220</b>	<b>32</b>	<b>2,152,080</b>	<b>38</b>	<b>2,251,500</b>	<b>12</b>	<b>711,000</b>	<b>270</b>	<b>19,845,800</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>										
i)	Moisture Retention Measures (Nos)	14,200	880,400	1,800	111,600	6,535	405,170	2,400	148,800	24,935	1,545,970
ii)	Drainage Line Treatment										
a	Brushwood (Rmt)	4,435	576,550	1,300	169,000	580	75,400	240	31,200	6,555	852,150
b	Live Hedge (Rmt)	18,280	365,600	7,800	156,000	4,000	80,000	1,250	25,000	31,330	626,600
c	Dry Stone Check Dam/ Wall (Nos)	159	1,734,880	70	1,219,400	54	1,350,000	9	100,510	292	4,404,790
d	Wire Crate Check Dam/ Wall (Nos)	111	2,721,490	45	2,068,380			13	351,290	169	5,141,160
e	Water Harvesting Structure (Nos)	2	600,000			4	1,200,000			6	1,800,000
f	Farm Pond Big (Nos)					3	75,000			3	75,000
g	Farm Pond Small (Nos)	1	10,000			31	310,000			32	320,000
iii)	Landslide and Slip Control Measures										
a	Wire Crate Retaining Wall (Nos)	4	341,520	13	3,852,680					17	4,194,200
iv)	Other Interventions										
a	Water Harvesting Structure (Nos)	3	900,000							3	900,000
b	Farm Pond Big (Nos)	12	300,000							12	300,000
c	Farm Pond Small (Nos)	52	520,000							52	520,000
v)	Silt Monitoring Stations		140,000								140,000
	<b>Sub Total</b>		<b>9,090,440</b>		<b>7,577,060</b>		<b>3,495,570</b>		<b>656,800</b>		<b>20,819,870</b>
<b>3</b>	<b>Infrastructure Development</b>										
i)	Maintenance of departmental buildings		5,825,000		1,700,000		1,950,000		150,000		9,625,000
<b>4</b>	<b>Forest Protection</b>										
i)	Purchase of fire fighting equipments		150,000		40,000		100,000		35,000		325,000
ii)	Hiring of vehicles during fire season		500,000		250,000		250,000				1,000,000
iii)	Energy Saving Devices		630,000		30,000		100,000				760,000
iv)	Cultural Operations		150,000		40,000		70,000		40,000		300,000
v)	Maintenance of roads/ paths		4,820,000		1,500,000						6,320,000
	<b>Sub Total</b>		<b>6,250,000</b>		<b>1,860,000</b>		<b>520,000</b>		<b>75,000</b>		<b>8,705,000</b>
<b>5</b>	<b>Wildlife protection, management and conflict resolution</b>										
i)	Modern tools and equipments		2,250,000		803,750		903,125		614,500		4,571,375
ii)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		125,000		171,000		193,750		2,900		492,650
iii)	Planning								14,500		14,500
iv)	Implementation								54,375		54,375
v)	Contingency								290		290
	<b>Sub Total</b>		<b>2,375,000</b>		<b>974,750</b>		<b>1,096,875</b>		<b>686,565</b>		<b>5,133,190</b>

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>6</b>	<b>Operational Support</b>										
i)	Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.		500,000		212,500				25,000		<b>737,500</b>
ii)	Misc. Office furniture Almirahs, File racks etc.		375,000		100,000						<b>475,000</b>
iii)	Maintenance of machinery and equipments		250,000		75,000		175,000		25,000		<b>525,000</b>
iv)	Inverter in offices		125,000		75,000						<b>200,000</b>
v)	Amenities to staff		375,000		87,500		250,000		37,500		<b>750,000</b>
vi)	CCTV Cameras All Ranges & Divisional Office		212,500								<b>212,500</b>
	<b>Sub Total</b>		<b>1,837,500</b>		<b>550,000</b>		<b>425,000</b>		<b>87,500</b>		<b>2,900,000</b>
<b>7</b>	<b>Payment of Environmental Services</b>		2,525,000		700,000		800,000		58,000		<b>4,083,000</b>
<b>8</b>	<b>Eco-tourism</b>		1,400,000		750,000		400,000		50,000		<b>2,600,000</b>
<b>9</b>	<b>Monitoring &amp; Evaluation*</b>		850,000		245,000		309,000		14,500		<b>1,418,500</b>
<b>10</b>	<b>Joint Forest Management &amp; Micro Planning</b>		500,000		50,000		50,000				<b>600,000</b>
<b>11</b>	<b>Contingencies</b>		2,300,000		620,000		740,000		87,000		<b>3,747,000</b>
	<b>Grand Total</b>		<b>47,684,160</b>		<b>17,178,890</b>		<b>12,037,945</b>		<b>2,576,365</b>		<b>79,477,360</b>

**Note:** Rs. 198.50 lakh allocated for Research, Training and Capacity Building component has not been included in the APO as utilization of these funds will be decided by the office of PCCF (HoFF), HPFD

\* = Rs. 96.00 lakh allocated for online monitoring under Monitoring & Evaluation component has not been included in the APO as plan for utilization of funds for online monitoring will be prepared by Nodal Officer

**III. APO 3: 2023-24**

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>1</b>	<b>Biological Measures</b>										
i)	<b>Normal Afforestation (ha)</b>	42	3,978,240							42	3,978,240
	1 <sup>st</sup> Year maintenance	72	1,000,080	6	83,340					78	1,083,420
ii)	<b>Enrichment Plantation (ha)</b>	115	6,813,750	6	355,500	22	1,303,500			143	8,472,750
	1 <sup>st</sup> Year maintenance	79	797,900	23	232,300	38	383,800	12	121,200	152	1,535,200
iii)	<b>Energy Plantation (ha)</b>	3	221,010	2	147,340					5	368,350
	1 <sup>st</sup> Year maintenance	7	97,230	3	41,670					10	138,900
iv)	<b>Grazing Land Development (ha)</b>	4	294,680							4	294,680
	1 <sup>st</sup> Year maintenance	9	125,010							9	125,010
v)	<b>Plantation of Tall Plants (ha)</b>	14	1,367,940			52	5,080,920			66	6,448,860
	1 <sup>st</sup> Year maintenance	21	167,475							21	167,475
vi)	<b>Assisted Natural Regeneration (ha)</b>					27	886,140			27	886,140
vii)	<b>Medicinal Plants/ NTFP (ha)</b>					25	2,248,500			25	2,248,500
	<b>Sub Total</b>	<b>366</b>	<b>14,863,315</b>	<b>40</b>	<b>860,150</b>	<b>164</b>	<b>9,902,860</b>	<b>12</b>	<b>121,200</b>	<b>582</b>	<b>25,747,525</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>										
i)	Moisture Retention Measures (Nos)	11,000	682,000			3,600	223,200			14,600	905,200
ii)	Drainage Line Treatment										
a	Brushwood (Rmt)	3,390	440,700	300	39,000	2,305	299,650			5,995	779,350
b	Live Hedge (Rmt)	11,700	234,000	1,800	36,000	13,000	260,000			26,500	530,000
c	Dry Stone Check Dam/ Wall (Nos)	70	719,290	15	261,300	146	3,650,000			231	4,630,590
d	Wire Crate Check Dam/ Wall (Nos)	51	1,111,550	8	364,020					59	1,475,570
e	Water Harvesting Structure (Nos)	1	300,000			4	1,200,000			5	1,500,000
f	Farm Pond Big (Nos)					14	350,000			14	350,000
g	Farm Pond Small (Nos)					109	1,090,000			109	1,090,000
iii)	Landslide and Slip Control Measures										
a	Wire Crate Check Wall (Nos)	22	405,060							22	405,060
iv)	Wire Crate Retaining Wall (Nos)	6	913,200							6	913,200
a	Other Interventions										
b	Farm Pond Big (Nos)	2	50,000							2	50,000
c	Farm Pond Small (Nos)	19	190,000							19	190,000
v)	Silt Monitoring Stations		140,000								140,000
	<b>Sub Total</b>		<b>5,185,800</b>		<b>700,320</b>		<b>7,072,850</b>				<b>12,958,970</b>
<b>3</b>	<b>Forest Protection</b>										
i)	Purchase of fire fighting equipments		150,000		40,000		100,000		35,000		325,000
ii)	Hiring of vehicles during fire season		500,000		250,000		250,000				1,000,000
iii)	Energy Saving Devices		630,000		30,000		100,000				760,000
iv)	Cultural Operations		150,000		40,000		70,000		40,000		300,000
	<b>Sub Total</b>		<b>1,430,000</b>		<b>360,000</b>		<b>520,000</b>		<b>75,000</b>		<b>2,385,000</b>
<b>4</b>	<b>Wildlife protection, management and conflict resolution</b>										
i)	Modern tools and equipments		2,250,000		803,750		903,125		614,500		4,571,375
ii)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		125,000		171,000		193,750		2,900		492,650
iii)	Implementation								54,375		54,375

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
iv)	Contingency								290		290
	<b>Sub Total</b>		<b>2,375,000</b>		<b>974,750</b>		<b>1,096,875</b>		<b>672,065</b>		<b>5,118,690</b>
<b>5</b>	<b>Operational Support</b>										
i)	Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.		500,000		212,500				25,000		<b>737,500</b>
ii)	Misc. Office furniture Almirahs, File racks etc.		375,000		100,000						<b>475,000</b>
iii)	Maintenance of machinery and equipments		250,000		75,000		175,000		25,000		<b>525,000</b>
iv)	Inverter in offices		125,000		75,000						<b>200,000</b>
v)	Amenities to staff		375,000		87,500		250,000		37,500		<b>750,000</b>
vi)	CCTV Cameras All Ranges & Divisional Office		212,500								<b>212,500</b>
	<b>Sub Total</b>		<b>1,837,500</b>		<b>550,000</b>		<b>425,000</b>		<b>87,500</b>		<b>2,900,000</b>
<b>6</b>	<b>Payment of Environmental Services</b>		2,525,000		700,000		800,000		58,000		<b>4,083,000</b>
<b>7</b>	<b>Monitoring &amp; Evaluation*</b>		850,000		245,000		309,000		14,500		<b>1,418,500</b>
<b>8</b>	<b>Joint Forest Management &amp; Micro Planning</b>		500,000		50,000		50,000				<b>600,000</b>
<b>9</b>	<b>Contingencies</b>		2,300,000		620,000		740,000		87,000		<b>3,747,000</b>
	<b>Grand Total</b>		<b>31,866,615</b>		<b>5,060,220</b>		<b>20,916,585</b>		<b>1,115,265</b>		<b>58,958,685</b>

**Note: Rs. 198.50 lakh** allocated for Research, Training and Capacity Building component has not been included in the APO as utilization of these funds will be decided by the office of PCCF (HoFF), HPFD

\* = **Rs. 96.00 lakh** allocated for online monitoring under Monitoring & Evaluation component has not been included in the APO as plan for utilization of funds for online monitoring will be prepared by Nodal Officer

IV. APO 4: 2024-25

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>1</b>	<b>Biological Measures</b>										
i)	<b>Normal Afforestation (ha)</b>										
	1 <sup>st</sup> Year maintenance	42	583,380							42	583,380
	2 <sup>nd</sup> Year maintenance	72	671,760	6	55,980					78	727,740
ii)	<b>Enrichment Plantation (ha)</b>										
	1 <sup>st</sup> Year maintenance	115	1,161,500	6	60,600	22	222,200			143	1,444,300
	2 <sup>nd</sup> Year maintenance	79	537,200	23	156,400	38	258,400	12	81,600	152	1,033,600
iii)	<b>Energy Plantation (ha)</b>										
	1 <sup>st</sup> Year maintenance	3	41,670	2	27,780					5	69,450
	2 <sup>nd</sup> Year maintenance	7	65,310	3	27,990					10	93,300
iv)	<b>Grazing Land Development (ha)</b>										
	1 <sup>st</sup> Year maintenance	4	55,560							4	55,560
	2 <sup>nd</sup> Year maintenance	9	83,970							9	83,970
v)	<b>Plantation of Tall Plants (ha)</b>										
	1 <sup>st</sup> Year maintenance	14	111,650			52	414,700			66	526,350
	2 <sup>nd</sup> Year maintenance	21	92,400							21	92,400
vi)	<b>Assisted Natural Regeneration (ha)</b>										
	1 <sup>st</sup> Year maintenance					27	88,290			27	88,290
vii)	<b>Medicinal Plants/ NTFP (ha)</b>										
	1 <sup>st</sup> Year maintenance					25	156,750			25	156,750
	<b>Sub Total</b>	<b>366</b>	<b>3,404,400</b>	<b>40</b>	<b>328,750</b>	<b>164</b>	<b>1,140,340</b>	<b>12</b>	<b>81,600</b>	<b>582</b>	<b>4,955,090</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>										
i)	Moisture Retention Measures (Nos)	12,800	793,600	1,700	105,400					14,500	899,000
ii)	Drainage Line Treatment										
a	Brushwood (Rmt)	4,500	585,000	625	81,250					5,125	666,250
b	Live Hedge (Rmt)	17,970	359,400	4,350	87,000					22,320	446,400
c	Dry Stone Check Dam/ Wall (Nos)	113	1,117,450	50	871,000					163	1,988,450
d	Wire Crate Check Dam/ Wall (Nos)	74	2,424,210	34	1,570,340					108	3,994,550
e	Farm Pond Small (Nos)	1	10,000							1	10,000
f	Landslide and Slip Control Measures										
g	Wire Crate Check Wall (Nos)	33	1,688,210							33	1,688,210
iii)	Wire Crate Retaining Wall (Nos)	2	505,430							2	505,430
a	Other Interventions										
iv)	Water Harvesting Structure (Nos)	1	300,000							1	300,000
a	Farm Pond Big (Nos)	7	175,000							7	175,000
b	Farm Pond Small (Nos)	46	460,000							46	460,000
c	Silt Monitoring Stations		140,000								140,000
v)	<b>Sub Total</b>		<b>8,558,300</b>		<b>2,714,990</b>						<b>11,273,290</b>
<b>3</b>	<b>Forest Protection</b>										
i)	Purchase of fire fighting equipments		150,000		40,000		100,000		35,000		325,000
ii)	Hiring of vehicles during fire season		500,000		250,000		250,000				1,000,000
iii)	Energy Saving Devices		630,000		30,000		100,000				760,000
iv)	Cultural Operations		150,000		40,000		70,000		40,000		300,000
	<b>Sub Total</b>		<b>1,430,000</b>		<b>360,000</b>		<b>520,000</b>		<b>75,000</b>		<b>2,385,000</b>
<b>4</b>	<b>Wildlife protection, management and conflict resolution</b>										
i)	Modern tools and equipments		2,250,000		803,750		903,125		614,500		4,571,375

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
ii)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		125,000		171,000		193,750		2,900		492,650
iii)	Implementation								54,375		54,375
iv)	Contingency								290		290
	<b>Sub Total</b>		<b>2,375,000</b>		<b>974,750</b>		<b>1,096,875</b>		<b>672,065</b>		<b>5,118,690</b>
<b>5</b>	<b>Operational Support</b>										
i)	Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.		500,000		212,500				25,000		737,500
ii)	Misc. Office furniture Almirahs, File racks etc.		375,000		100,000						475,000
iii)	Maintenance of machinery and equipments		250,000		75,000		175,000		25,000		525,000
iv)	Inverter in offices		125,000		75,000						200,000
v)	Amenities to staff		375,000		87,500		250,000		37,500		750,000
vi)	CCTV Cameras All Ranges & Divisional Office		212,500								212,500
	<b>Sub Total</b>		<b>1,837,500</b>		<b>550,000</b>		<b>425,000</b>		<b>87,500</b>		<b>2,900,000</b>
<b>6</b>	<b>Payment of Environmental Services</b>		2,525,000		700,000		800,000		58,000		4,083,000
<b>7</b>	<b>Monitoring &amp; Evaluation*</b>		850,000		245,000		309,000		14,500		1,418,500
<b>8</b>	<b>Joint Forest Management &amp; Micro Planning</b>		500,000		50,000		50,000				600,000
<b>9</b>	<b>Contingencies</b>		2,300,000		620,000		740,000		87,000		3,747,000
	<b>Grand Total</b>		<b>23,780,200</b>		<b>6,543,490</b>		<b>5,081,215</b>		<b>1,075,665</b>		<b>36,480,570</b>

**Note: Rs. 198.50 lakh** allocated for Research, Training and Capacity Building component has not been included in the APO as utilization of these funds will be decided by the office of PCCF (HoFF), HPFD

\* = **Rs. 96.00 lakh** allocated for online monitoring under Monitoring & Evaluation component has not been included in the APO as plan for utilization of funds for online monitoring will be prepared by Nodal Officer

V. APO 5: 2025-26

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>1</b>	<b>Biological Measures</b>										
i)	<b>Normal Afforestation (ha)</b>										
	2 <sup>nd</sup> Year maintenance	42	391,860							42	391,860
	3 <sup>rd</sup> Year maintenance	72	342,720	6	28,560					78	371,280
ii)	<b>Enrichment Plantation (ha)</b>										
	2 <sup>nd</sup> Year maintenance	115	782,000	6	40,800	22	149,600			143	972,400
	3 <sup>rd</sup> Year maintenance	79	276,500	23	80,500	38	133,000	12	42,000	152	532,000
iii)	<b>Energy Plantation (ha)</b>										
	2 <sup>nd</sup> Year maintenance	3	27,990	2	18,660					5	46,650
	3 <sup>rd</sup> Year maintenance	7	33,320	3	14,280					10	47,600
iv)	<b>Grazing Land Development (ha)</b>										
	2 <sup>nd</sup> Year maintenance	4	37,320							4	37,320
	3 <sup>rd</sup> Year maintenance	9	42,840							9	42,840
v)	<b>Plantation of Tall Plants (ha)</b>										
	2 <sup>nd</sup> Year maintenance	14	61,600			52	228,800			66	290,400
	3 <sup>rd</sup> Year maintenance	21	49,455							21	49,455
vi)	<b>Assisted Natural Regeneration (ha)</b>										
	2 <sup>nd</sup> Year maintenance					27	61,290			27	61,290
vii)	<b>Medicinal Plants/ NTFP (ha)</b>										
	2 <sup>nd</sup> Year maintenance					25	126,500			25	126,500
	<b>Sub Total</b>	<b>366</b>	<b>2,045,605</b>	<b>40</b>	<b>182,800</b>	<b>164</b>	<b>699,190</b>	<b>12</b>	<b>42,000</b>	<b>582</b>	<b>2,969,595</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>										
i)	Silt Monitoring Stations		140,000								140,000
	<b>Sub Total</b>		140,000								140,000
<b>3</b>	<b>Forest Protection</b>										
i)	Purchase of fire fighting equipments		150,000		40,000		100,000		35,000		325,000
ii)	Hiring of vehicles during fire season		500,000		250,000		250,000				1,000,000
iii)	Energy Saving Devices		630,000		30,000		100,000				760,000
iv)	Cultural Operations		150,000		40,000		70,000		40,000		300,000
	<b>Sub Total</b>		<b>1,430,000</b>		<b>360,000</b>		<b>520,000</b>		<b>75,000</b>		<b>2,385,000</b>
<b>4</b>	<b>Wildlife protection, management and conflict resolution</b>										
i)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		125,000		171,000		193,750		2,900		492,650
ii)	Contingency								290		290
	<b>Sub Total</b>		<b>125,000</b>		<b>171,000</b>		<b>193,750</b>		<b>3,190</b>		<b>492,940</b>
<b>5</b>	<b>Payment of Environmental Services</b>		2,525,000		700,000		800,000		58,000		4,083,000
<b>6</b>	<b>Monitoring &amp; Evaluation*</b>		850,000		245,000		309,000		14,500		1,418,500
<b>7</b>	<b>Joint Forest Management &amp; Micro Planning</b>		500,000		50,000		50,000				600,000
<b>8</b>	<b>Contingencies</b>		2,300,000		620,000		740,000		87,000		3,747,000
	<b>Grand Total</b>		<b>9,915,605</b>		<b>2,328,800</b>		<b>3,311,940</b>		<b>279,690</b>		<b>15,836,035</b>

**Note: Rs. 198.50 lakh** allocated for Research, Training and Capacity Building component has not been included in the APO as utilization of these funds will be decided by the office of PCCF (HoFF), HPFD

\* = **Rs. 96.00 lakh** allocated for online monitoring under Monitoring & Evaluation component has not been included in the APO as plan for utilization of funds for online monitoring will be prepared by Nodal Officer

VI. APO 6: 2026-27

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>1</b>	<b>Biological Measures</b>										
i)	<b>Normal Afforestation (ha)</b>										
	3 <sup>rd</sup> Year maintenance	42	199,920							42	199,920
	4 <sup>th</sup> Year maintenance	72	342,720	6	28,560					78	371,280
ii)	<b>Enrichment Plantation (ha)</b>										
	3 <sup>rd</sup> Year maintenance	115	402,500	6	21,000	22	77,000			143	500,500
	4 <sup>th</sup> Year maintenance	79	276,500	23	80,500	38	133,000	12	42,000	152	532,000
iii)	<b>Energy Plantation (ha)</b>										
	3 <sup>rd</sup> Year maintenance	3	14,280	2	9,520					5	23,800
	4 <sup>th</sup> Year maintenance	7	33,320	3	14,280					10	47,600
iv)	<b>Grazing Land Development (ha)</b>										
	3 <sup>rd</sup> Year maintenance	4	19,040							4	19,040
	4 <sup>th</sup> Year maintenance	9	42,840							9	42,840
v)	<b>Plantation of Tall Plants (ha)</b>										
	3 <sup>rd</sup> Year maintenance	14	32,970			52	122,460			66	155,430
	4 <sup>th</sup> Year maintenance	21	49,455							21	49,455
vi)	<b>Assisted Natural Regeneration (ha)</b>										
	3 <sup>rd</sup> Year maintenance					27	32,130			27	32,130
vii)	<b>Medicinal Plants/ NTFP (ha)</b>										
	3 <sup>rd</sup> Year maintenance					25	96,250			25	96,250
	<b>Sub Total</b>	<b>366</b>	<b>1,413,545</b>	<b>40</b>	<b>153,860</b>	<b>164</b>	<b>460,840</b>	<b>12</b>	<b>42,000</b>	<b>582</b>	<b>2,070,245</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>										
i)	Silt Monitoring Stations		140,000								140,000
	<b>Sub Total</b>		140,000								140,000
<b>3</b>	<b>Forest Protection</b>										
i)	Purchase of fire fighting equipments		150,000		40,000		100,000		35,000		325,000
ii)	Hiring of vehicles during fire season		500,000		250,000		250,000				1,000,000
iii)	Energy Saving Devices		630,000		30,000		100,000				760,000
iv)	Cultural Operations		150,000		40,000		70,000		40,000		300,000
	<b>Sub Total</b>		<b>1,430,000</b>		<b>360,000</b>		<b>520,000</b>		<b>75,000</b>		<b>2,385,000</b>
<b>4</b>	<b>Wildlife protection, management and conflict resolution</b>										
i)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		125,000		171,000		193,750		2,900		492,650
ii)	Contingency								290		290
	<b>Sub Total</b>		<b>125,000</b>		<b>171,000</b>		<b>193,750</b>		<b>3,190</b>		<b>492,940</b>
<b>5</b>	<b>Payment of Environmental Services</b>		2,525,000		700,000		800,000		58,000		4,083,000
<b>6</b>	<b>Monitoring &amp; Evaluation*</b>		850,000		245,000		309,000		14,500		1,418,500
<b>7</b>	<b>Joint Forest Management &amp; Micro Planning</b>		500,000		50,000		50,000				600,000
<b>8</b>	<b>Contingencies</b>		2,300,000		620,000		740,000		87,000		3,747,000
	<b>Grand Total</b>		<b>9,283,545</b>		<b>2,299,860</b>		<b>3,073,590</b>		<b>279,690</b>		<b>14,936,685</b>

**Note: Rs. 198.50 lakh** allocated for Research, Training and Capacity Building component has not been included in the APO as utilization of these funds will be decided by the office of PCCF (HoFF), HPFD

\* = **Rs. 96.00 lakh** allocated for online monitoring under Monitoring & Evaluation component has not been included in the APO as plan for utilization of funds for online monitoring will be prepared by Nodal Officer

VII. APO 7: 2027-28

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>1</b>	<b>Biological Measures</b>										
i)	<b>Normal Afforestation (ha)</b>										
	4 <sup>th</sup> Year maintenance	42	199,920							42	199,920
	5 <sup>th</sup> Year maintenance	72	342,720	6	28,560					78	371,280
ii)	<b>Enrichment Plantation (ha)</b>										
	4 <sup>th</sup> Year maintenance	115	402,500	6	21,000	22	77,000			143	500,500
	5 <sup>th</sup> Year maintenance	79	276,500	23	80,500	38	133,000	12	42,000	152	532,000
iii)	<b>Energy Plantation (ha)</b>										
	4 <sup>th</sup> Year maintenance	3	14,280	2	9,520					5	23,800
	5 <sup>th</sup> Year maintenance	7	33,320	3	14,280					10	47,600
iv)	<b>Grazing Land Development (ha)</b>										
	4 <sup>th</sup> Year maintenance	4	19,040							4	19,040
	5 <sup>th</sup> Year maintenance	9	42,840							9	42,840
v)	<b>Plantation of Tall Plants (ha)</b>										
	4 <sup>th</sup> Year maintenance	14	32,970			52	122,460			66	155,430
	5 <sup>th</sup> Year maintenance	21	49,455							21	49,455
vi)	<b>Assisted Natural Regeneration (ha)</b>										
	4 <sup>th</sup> Year maintenance					27	32,130			27	32,130
vii)	<b>Medicinal Plants/ NTFP (ha)</b>										
	4 <sup>th</sup> Year maintenance					25	96,250			25	96,250
	<b>Sub Total</b>	<b>366</b>	<b>1,413,545</b>	<b>40</b>	<b>153,860</b>	<b>164</b>	<b>460,840</b>	<b>12</b>	<b>42,000</b>	<b>582</b>	<b>2,070,245</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>										
i)	Silt Monitoring Stations		140,000								140,000
	<b>Sub Total</b>		140,000								140,000
<b>3</b>	<b>Forest Protection</b>										
i)	Purchase of fire fighting equipments		150,000	40,000		100,000		35,000			325,000
ii)	Hiring of vehicles during fire season		500,000	250,000		250,000					1,000,000
iii)	Energy Saving Devices		630,000	30,000		100,000					760,000
iv)	Cultural Operations		150,000	40,000		70,000		40,000			300,000
	<b>Sub Total</b>		<b>1,430,000</b>	<b>360,000</b>		<b>520,000</b>		<b>75,000</b>			<b>2,385,000</b>
<b>4</b>	<b>Wildlife protection, management and conflict resolution</b>										
i)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		125,000	171,000		193,750		2,900			492,650
ii)	Contingency							290			290
	<b>Sub Total</b>		<b>125,000</b>	<b>171,000</b>		<b>193,750</b>		<b>3,190</b>			<b>492,940</b>
<b>5</b>	<b>Payment of Environmental Services</b>		2,525,000	700,000		800,000		58,000			4,083,000
<b>6</b>	<b>Monitoring &amp; Evaluation*</b>		850,000	245,000		309,000		14,500			1,418,500
<b>7</b>	<b>Joint Forest Management &amp; Micro Planning</b>		500,000	50,000		50,000					600,000
<b>8</b>	<b>Contingencies</b>		2,300,000	620,000		740,000		87,000			3,747,000
	<b>Grand Total</b>		<b>9,283,545</b>	<b>2,299,860</b>		<b>3,073,590</b>		<b>279,690</b>			<b>14,936,685</b>

**Note: Rs. 198.50 lakh** allocated for Research, Training and Capacity Building component has not been included in the APO as utilization of these funds will be decided by the office of PCCF (HoFF), HPFD

\* = **Rs. 96.00 lakh** allocated for online monitoring under Monitoring & Evaluation component has not been included in the APO as plan for utilization of funds for online monitoring will be prepared by Nodal Officer

VIII. APO 8: 2028-29

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>1</b>	<b>Biological Measures</b>										
i)	<b>Normal Afforestation (ha)</b>										
	5 <sup>th</sup> Year maintenance	42	199,920							42	199,920
	6 <sup>th</sup> Year maintenance	72	342,720	6	28,560					78	371,280
ii)	<b>Enrichment Plantation (ha)</b>										
	5 <sup>th</sup> Year maintenance	115	402,500	6	21,000	22	77,000			143	500,500
	6 <sup>th</sup> Year maintenance	79	276,500	23	80,500	38	133,000	12	42,000	152	532,000
iii)	<b>Energy Plantation (ha)</b>										
	5 <sup>th</sup> Year maintenance	3	14,280	2	9,520					5	23,800
	6 <sup>th</sup> Year maintenance	7	33,320	3	14,280					10	47,600
iv)	<b>Grazing Land Development (ha)</b>										
	5 <sup>th</sup> Year maintenance	4	19,040							4	19,040
	6 <sup>th</sup> Year maintenance	9	42,840							9	42,840
v)	<b>Plantation of Tall Plants (ha)</b>										
	5 <sup>th</sup> Year maintenance	14	32,970			52	122,460			66	155,430
	6 <sup>th</sup> Year maintenance	21	49,455							21	49,455
vi)	<b>Assisted Natural Regeneration (ha)</b>										
	5 <sup>th</sup> Year maintenance					27	32,130			27	32,130
vii)	<b>Medicinal Plants/ NTFP (ha)</b>										
	5 <sup>th</sup> Year maintenance					25	96,250			25	96,250
	<b>Sub Total</b>	<b>366</b>	<b>1,413,545</b>	<b>40</b>	<b>153,860</b>	<b>164</b>	<b>460,840</b>	<b>12</b>	<b>42,000</b>	<b>582</b>	<b>2,070,245</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>										
i)	Silt Monitoring Stations		140,000								140,000
	<b>Sub Total</b>		140,000								140,000
<b>3</b>	<b>Forest Protection</b>										
i)	Purchase of fire fighting equipments		150,000	40,000		100,000		35,000			325,000
ii)	Hiring of vehicles during fire season		500,000	250,000		250,000					1,000,000
iii)	Energy Saving Devices		630,000	30,000		100,000					760,000
iv)	Cultural Operations		150,000	40,000		70,000		40,000			300,000
	<b>Sub Total</b>		<b>1,430,000</b>	<b>360,000</b>		<b>520,000</b>		<b>75,000</b>			<b>2,385,000</b>
<b>4</b>	<b>Wildlife protection, management and conflict resolution</b>										
i)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		125,000	171,000		193,750		2,900			492,650
ii)	Contingency							290			290
	<b>Sub Total</b>		<b>125,000</b>	<b>171,000</b>		<b>193,750</b>		<b>3,190</b>			<b>492,940</b>
<b>5</b>	<b>Payment of Environmental Services</b>		2,525,000	700,000		800,000		58,000			4,083,000
<b>6</b>	<b>Monitoring &amp; Evaluation*</b>		850,000	245,000		309,000		14,500			1,418,500
<b>7</b>	<b>Joint Forest Management &amp; Micro Planning</b>		500,000	50,000		50,000					600,000
<b>8</b>	<b>Contingencies</b>		2,300,000	620,000		740,000		87,000			3,747,000
	<b>Grand Total</b>		<b>9,283,545</b>	<b>2,299,860</b>		<b>3,073,590</b>		<b>279,690</b>			<b>14,936,685</b>

**Note: Rs. 198.50 lakh** allocated for Research, Training and Capacity Building component has not been included in the APO as utilization of these funds will be decided by the office of PCCF (HoFF), HPFD

\* = **Rs. 96.00 lakh** allocated for online monitoring under Monitoring & Evaluation component has not been included in the APO as plan for utilization of funds for online monitoring will be prepared by Nodal Officer

## IX. APO 9: 2029-30

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>1</b>	<b>Biological Measures</b>										
i)	<b>Normal Afforestation (ha)</b>										
	6 <sup>th</sup> Year maintenance	42	199,920							42	199,920
	7 <sup>th</sup> Year maintenance	72	342,720	6	28,560					78	371,280
ii)	<b>Enrichment Plantation (ha)</b>										
	6 <sup>th</sup> Year maintenance	115	402,500	6	21,000	22	77,000			143	500,500
	7 <sup>th</sup> Year maintenance	79	276,500	23	80,500	38	133,000	12	42,000	152	532,000
iii)	<b>Energy Plantation (ha)</b>										
	6 <sup>th</sup> Year maintenance	3	14,280	2	9,520					5	23,800
	7 <sup>th</sup> Year maintenance	7	33,320	3	14,280					10	47,600
iv)	<b>Grazing Land Development (ha)</b>										
	6 <sup>th</sup> Year maintenance	4	19,040							4	19,040
	7 <sup>th</sup> Year maintenance	9	42,840							9	42,840
v)	<b>Plantation of Tall Plants (ha)</b>										
	6 <sup>th</sup> Year maintenance	14	32,970			52	122,460			66	155,430
	7 <sup>th</sup> Year maintenance	21	49,455							21	49,455
vi)	<b>Assisted Natural Regeneration (ha)</b>										
	6 <sup>th</sup> Year maintenance					27	32,130			27	32,130
	<b>Sub Total</b>	<b>366</b>	<b>1,413,545</b>	<b>40</b>	<b>153,860</b>	<b>139</b>	<b>364,590</b>	<b>12</b>	<b>42,000</b>	<b>557</b>	<b>1,973,995</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>										
i)	Silt Monitoring Stations		140,000								140,000
	<b>Sub Total</b>		140,000								140,000
<b>3</b>	<b>Forest Protection</b>										
i)	Purchase of fire fighting equipments		150,000		40,000		100,000		35,000		325,000
ii)	Hiring of vehicles during fire season		500,000		250,000		250,000				1,000,000
iii)	Energy Saving Devices		630,000		30,000		100,000				760,000
iv)	Cultural Operations		150,000		40,000		70,000		40,000		300,000
	<b>Sub Total</b>		<b>1,430,000</b>		<b>360,000</b>		<b>520,000</b>		<b>75,000</b>		<b>2,385,000</b>
<b>4</b>	<b>Wildlife protection, management and conflict resolution</b>										
i)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		125,000		171,000		193,750		2,900		492,650
ii)	Contingency								290		290
	<b>Sub Total</b>		<b>125,000</b>		<b>171,000</b>		<b>193,750</b>		<b>3,190</b>		<b>492,940</b>
<b>5</b>	<b>Payment of Environmental Services</b>		2,525,000		700,000		800,000		58,000		4,083,000
<b>6</b>	<b>Monitoring &amp; Evaluation*</b>		850,000		245,000		309,000		14,500		1,418,500
<b>7</b>	<b>Joint Forest Management &amp; Micro Planning</b>		500,000		50,000		50,000				600,000
<b>8</b>	<b>Contingencies</b>		2,300,000		620,000		740,000		87,000		3,747,000
	<b>Grand Total</b>		<b>9,283,545</b>		<b>2,299,860</b>		<b>2,977,340</b>		<b>279,690</b>		<b>14,840,435</b>

**Note: Rs. 198.50 lakh** allocated for Research, Training and Capacity Building component has not been included in the APO as utilization of these funds will be decided by the office of PCCF (HoFF), HPFD

\* = **Rs. 96.00 lakh** allocated for online monitoring under Monitoring & Evaluation component has not been included in the APO as plan for utilization of funds for online monitoring will be prepared by Nodal Officer

**X. APO 10: 2030-31**

S. No.	Year Wise Treatment Plan	Karsog Division		Kotgarh Division		Shimla Division		WL Kullu Division		Total	
		Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)	Phy.	Fin. (Rs)
<b>1</b>	<b>Biological Measures</b>										
i)	<b>Normal Afforestation (ha)</b>										
	7 <sup>th</sup> Year maintenance	42	199,920							42	199,920
ii)	<b>Enrichment Plantation (ha)</b>										
	7 <sup>th</sup> Year maintenance	115	402,500	6	21,000	22	77,000			143	500,500
iii)	<b>Energy Plantation (ha)</b>										
	7 <sup>th</sup> Year maintenance	3	14,280	2	9,520					5	23,800
iv)	<b>Grazing Land Development (ha)</b>										
	7 <sup>th</sup> Year maintenance	4	19,040							4	19,040
v)	<b>Plantation of Tall Plants (ha)</b>										
	7 <sup>th</sup> Year maintenance	14	32,970			52	122,460			66	155,430
vi)	<b>Assisted Natural Regeneration (ha)</b>										
	7 <sup>th</sup> Year maintenance					27	32,130			27	32,130
	<b>Sub Total</b>	<b>178</b>	<b>668,710</b>	<b>8</b>	<b>30,520</b>	<b>101</b>	<b>231,590</b>			<b>287</b>	<b>930,820</b>
<b>2</b>	<b>Soil Conservation Works – Engineering and Bio-Engineering Measures</b>										
i)	Silt Monitoring Stations		140,000								140,000
	<b>Sub Total</b>		140,000								140,000
<b>3</b>	<b>Forest Protection</b>										
i)	Purchase of fire fighting equipments		150,000		40,000		100,000		35,000		325,000
ii)	Hiring of vehicles during fire season		500,000		250,000		250,000				1,000,000
iii)	Energy Saving Devices		630,000		30,000		100,000				760,000
iv)	Cultural Operations		150,000		40,000		70,000		40,000		300,000
	<b>Sub Total</b>		<b>1,430,000</b>		<b>360,000</b>		<b>520,000</b>		<b>75,000</b>		<b>2,385,000</b>
<b>4</b>	<b>Wildlife protection, management and conflict resolution</b>										
i)	Help resolve man-animal conflict with emphasis on social land environmental justice especially for farmers		125,000		171,000		193,750		2,900		492,650
ii)	Contingency								290		290
	<b>Sub Total</b>		<b>125,000</b>		<b>171,000</b>		<b>193,750</b>		<b>3,190</b>		<b>492,940</b>
<b>5</b>	<b>Payment of Environmental Services</b>		2,525,000		700,000		800,000		58,000		4,083,000
<b>6</b>	<b>Monitoring &amp; Evaluation*</b>		850,000		245,000		309,000		14,500		1,418,500
<b>7</b>	<b>Joint Forest Management &amp; Micro Planning</b>		500,000		50,000		50,000				600,000
<b>8</b>	<b>Contingencies</b>		2,300,000		620,000		740,000		87,000		3,747,000
	<b>Grand Total</b>		<b>8,538,710</b>		<b>2,176,520</b>		<b>2,844,340</b>		<b>237,690</b>		<b>13,797,260</b>

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