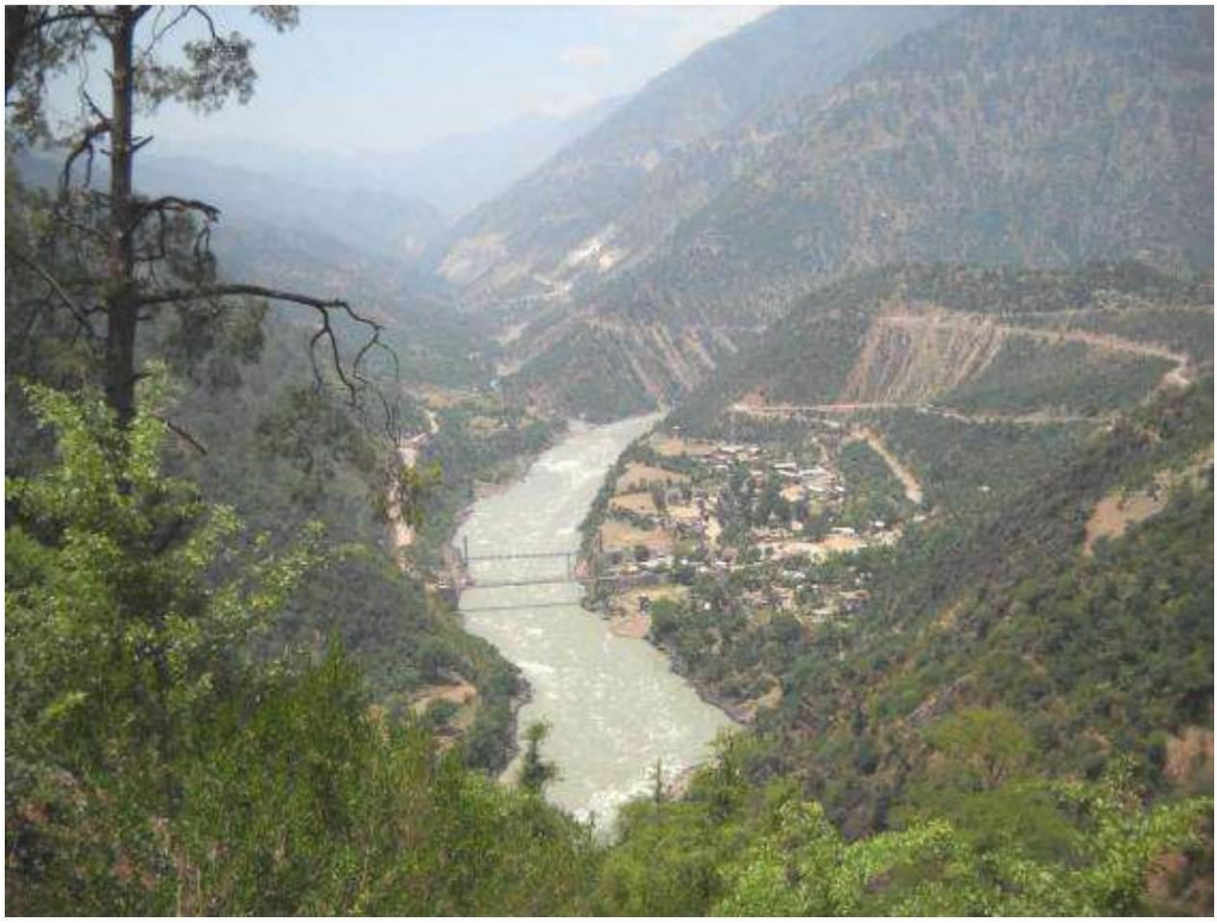
CATCHMENT AREA TREATMENT PLAN

FOR

SAWALKOTE HE PROJECT (1856 MW) DISTRICT RAMBAN, REASI AND UDHAMPUR, UT OF J & K



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1.0 INTRODUCTION

Sawalkote hydroelectric project (6x225 MW & 1x56 MW for Stage I-1406 MW and 2x225 MW for Stage II-450 MW) is a run-of-the-river project that will be using the water of Chenab river in Ramban, Reasi and Udhampur districts of Jammu Kashmir. Location of the project is shown in **Figure 1**. It envisages construction of a 192.5 m high Roller Compacted Concrete (RCC) gravity dam from the deepest foundation level, an upstream short water conductor system, an underground Power house in the left bank downstream of dam axis and a tail race system. In Stage I, the upstream water conductor system consists of two intake structures and two Head Race Tunnels (HRT) and associated Pressure Shafts/ Penstocks. In stage II, an additional intake, an additional HRT and corresponding Pressure Shafts are envisaged besides extension of Power house complex and additional Tail Race Tunnel (TRT). In addition, project envisages construction of three Diversion Tunnels (DT) on the right bank and upstream and downstream Coffer dams. The salient features of the project are given at **Table 1**. The layout map of the project is given at **Figure 2**.

Table 1: Salient Features of Sawalkote HEP

1	**Location**		
	(i)	State	Jammu & Kashmir
	(ii)	Districts	Ramban, Udhampur and Reasi
	(iii)	River	Chenab
	(iv)	Location of dam & Power House site	33°11'N 75°06'E
2	**Hydrology**		
	(i)	Catchment Area	19475 km^2
	(ii)	Design flood (PMF)	18711 cumecs
3	**Reservoir**		
	(i)	Full Reservoir (FRL) /Maximum water level (MWL)	EL.695m
	(ii)	Min. Draw down level	EL.692.8 m
	(iii)	Reservoir Area at FRL/MWL	11 km^2
	(iv)	Gross storage at FRL/MWL	530 MCM
	(v)	Operational Pondage	23.84 MCM
	(vi)	Length of Reservoir at FRL	30 km
	(vii)	Annual Sediment Load	41.38 MCM
4	**Dam**		
	(i)	Type	Roller Compacted Concrete (RCC) gravity dam
	(ii)	Dam top	EL.697.5m
	(iii)	River bed level at dam site	EL.534m
	(iv)	Deepest foundation level	EL.505m
	(v)	Maximum height of dam	192.5 m from deepest foundation level
5	**Diversion Tunnel**		
	(i)	Diameter, nos. & shape	13.5 m (W) X 19 m (H), 3 no. Horse shoe shaped
	(ii)	Length	965m, 1130m, 1280m
	(iii)	Diversion discharge (Monsoon in 25years return flood)	9292 cumecs (Monsoon) 2977 cumecs (Non Monsoon)
6	**Coffer Dam**		
	(i)	Type	Earth & Rock Fill Coffer Dam
	(ii)	Max. height of u/s Coffer Dam	53m
	(iii)	Top of upstream cofferdam	588m

	(iv)	Max. height of d/s Coffer Dam	38m
	(v)	Top of d/s cofferdam	570m
7	**Spillway**		
	(i)	Design flood (PMF)	18711 cumecs
	(ii)	Crest level, No. and Size	• Lower Level - 5 no of size 11 m (W) x 16.5 m (H) with crest at EL. 657 m • Upper Level - 2 no. of size 13 m (W) x 20 m (H) with crest at EL. 675 m
	(iii)	Energy dissipation	Ski jump bucket
	(iv)	Plunge Pool EL	515m
8	**Intake**		
	(i)	Numbers	Two for stage-I & one for stage-II
	(ii)	Invert level	• EL.675.4 m (Intakes 1 & 2) • EL.677.4 m (Intake stage-II)
	(iii)	Design discharge per Intake	• Intake -2: 519.16 m^3/s (including Environmental flow 39.97 cumec) • Intake -1 479.19 m^3/s • Intake Stage-II: 319.46 m^3/s
9	**Head Race Tunnel**		
	(i)	Numbers	Two for stage-I & one for stage-II
	(ii)	Size and type	12.8 m for Stage -I & 10.8 m for Stage-II, Circular type
	(iii)	Design discharge	519.16 m^3/s and 479.19 m^3/s for Stage- I 319.46 m^3/s for Stage-II
	(iv)	Length	About 200m each
10	**Pressure Shaft/Penstock**		
	(i)	Numbers	Six for stage 1 & two for stage 2
	(ii)	Type	Steel lined
	(iii)	Diameter	• 6m dia each except PS6 with 6.7 m dia. • 2.75 m dia Penstock for 56 MW Environmental unit (EU)
	(iv)	Length Inclined Horizontal	 130m to 140m 50m to 115m
11	**Powerhouse Cavern**		
	(i)	Type	Underground
	(ii)	Type of turbine	Vertical Francis
	(iii)	Generating unit in MW	For Stage-I 6x225 MW & 1x56MW For Stage-II 2x225MW
	(iv)	Rated head	154.4m
	(v)	Design discharge	• 159.73 cumecs (for each 225 MW unit) • 39.97 cumecs (for 56 MW Environmental Unit)
	(vi)	Power house cavern size	• 23m(W)X46.5m(H)X218m(L) for stage-I • 23m(W)X46.5m(H)X64m(L) for stage-II
12	**Transformer Cavern**		
	(i)	Size	• 15m(W)x23.5m(H)x211m(L) (Stage-I) • 15m(W)x23.5m(H)x56m(L) (Stage-II)
13	**Surge Gallery**		
	(i)	Size	• 18m(W)x42m(H)x170m(L) combined for units 1,2,3 and 4 • 10m (W)x57m(H)x75m(L) combined for unit 5,6 and EU • 18m (W)x42m(H)x85m(L) combined for units 7

			and 8 of Stage-II
14	**TRT**		
	(i)	Numbers & type	Three for Stage-I & one for Stage-II
	(ii)	Size & Shape	10.5m dia each
	(iii)	Design discharge through each tunnel	319.46 cumecs Additional discharge of 39.97 cumecs in TRT3
	(iv)	Length (excluding outlet structure)	TRT-1= 1743 m TRT-2 = 1720 m TRT-3 = 199 m TRT stage – II = 1915 m
	(v)	Outlet invert level	EL.530m (TRT1,2 and TRT-stage2) EL.532.5m(TRT3)
		• Tail water level at Rated discharge at TRT Outlet (TRT1, 2 and TRT-stage2) • Tail water level at Rated discharge at TRT Outlet (TRT3)	EL.534m EL.537m
15	**Power Generation**		
	(i)	Installed capacity	1406 MW (Stage-I) 450 MW (Stage-II) Total =1856 MW
	(ii)	Design Energy in 90% Dependable year with 95% machine availability: 7994.73 MU (7533.91 MU for main plant both Stage-I & Stage-II and 460.82 MU for auxiliary plant)	

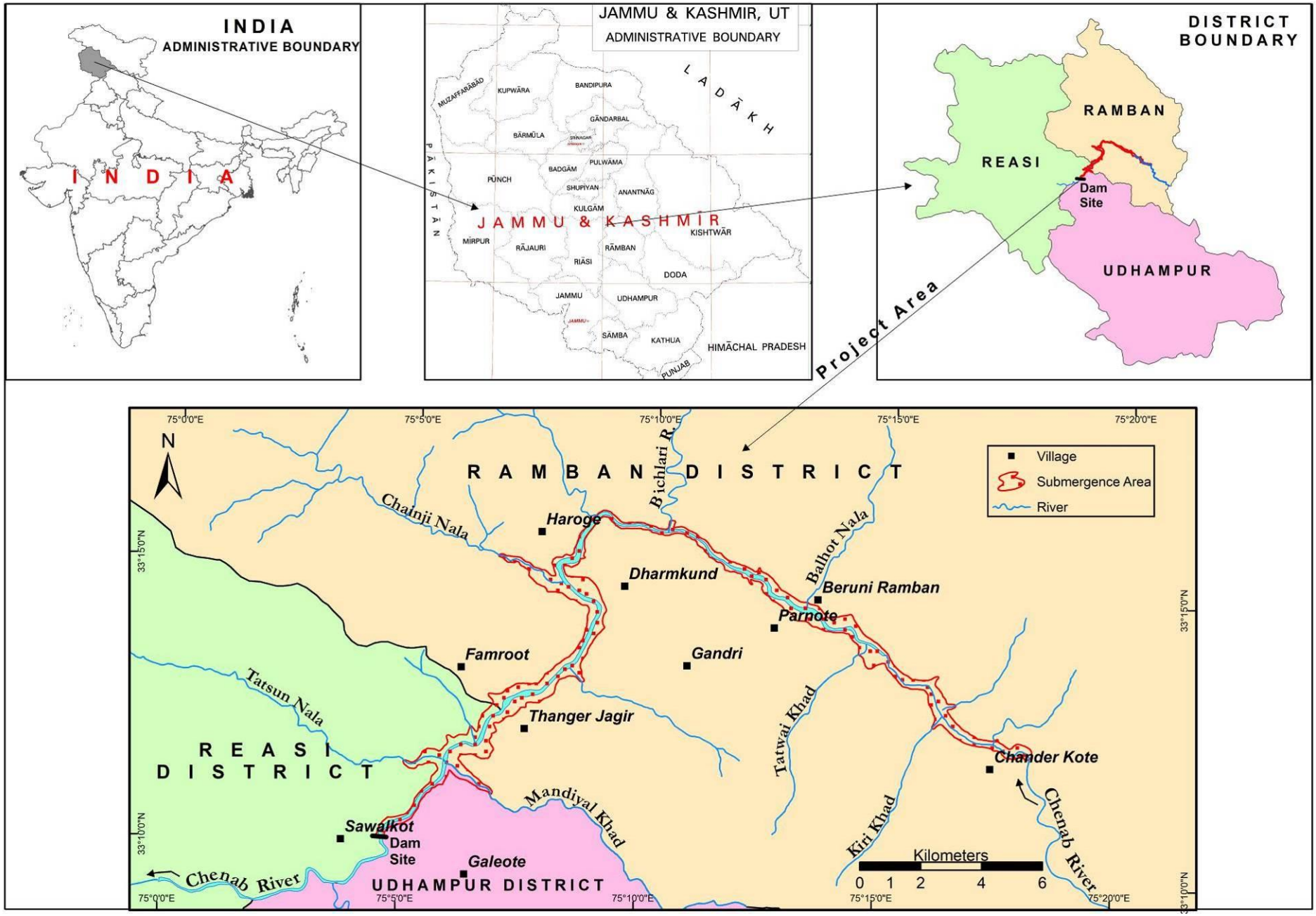


Figure 1: Location Map of Sawalkote HEP

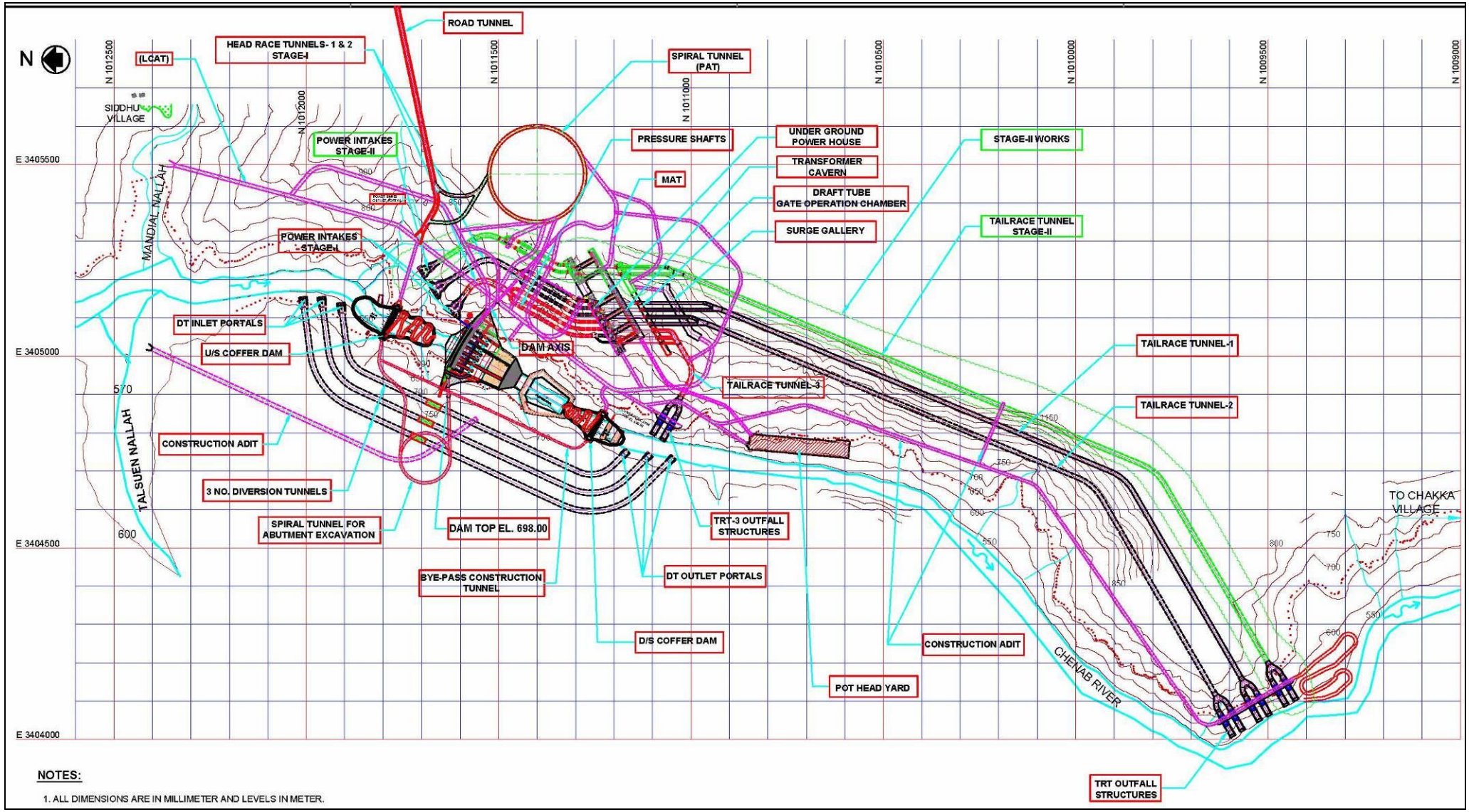


Figure 2: Layout Map of Sawalkote HEP

2.0 NEED FOR CATCHMENT AREA TREATMENT

It is a well-established fact that reservoirs formed by dams on rivers are subjected to sedimentation. 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 affects the water storage capacity for 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 (CAT) Plan is essential to ameliorate the above-mentioned adverse process of soil erosion.

Soil erosion may be defined as the detachment, transportation and deposition of soil particles from one place to other by means of transporting agents like water, air, winds etc. Soil erosion is mainly affected by rainfall intensity, slope gradient, length, soil erodibility and vegetation cover. Therefore, study of erosion and sediment yield from catchment are of great importance. Soil erosion leads to:

- loss in 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.

In the present study, Catchment Area Treatment Plan has been formulated for the free draining catchment i.e. from the diversion site of upstream Baglihar HEP till the proposed diversion site of Sawalkote HEP. The total area of the free draining catchment is 1307.85 sq km.

The catchment area treatment involves

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

2.1 Steps Involved in CAT Plan Preparation

CAT Plan essentially consist of following steps-

i. Identification of highly erodible areas within catchment by calculation of Silt Yield Index (SYI) and sediment load for sub water sheds using GIS.

ii. Prioritizing the areas for treatment.
iii. Planning of suitable erosion control measures.
iv. Cost of CAT Plan.

2.2 Methodology Adopted for the Study

In the present study, Silt Yield Index (SYI) method is used in which terrain is subdivided into various sub water sheds and erodibility is determined on relative basis. SYI method is widely used to provide comparative erodibility criteria of catchment (Low, Moderate, Severe, High etc.). The application of SYI model for prioritization of sub water in sheds in catchment area involves the evaluation of

i. Climatic factor comprising precipitation.
ii. Geomorphic factor comprising land forms, physiography, slope and drainage.
iii. Surface cover factors governing flow hydraulic.
iv. Management factor.

3.0 CATCHMENT AREA

The Chandra and the Bhaga rivers constitute the Chandra Bhaga or the Chenab. They rise from the Himalayas in Lahaul area of Himachal Pradesh. The Chandra originates from a large snow bed on the south-eastern side of Bara Lacha pass at an elevation of 6194 m above mean sea level (msl) and after flowing south-east for about 90 km sweeps round the base of mid-Himalayas, joins the Bhaga at Tandi (RL 2870 m msl) after a course of 140 km. The Bhaga rises in the north-western slopes of Bara Lacha pass and flows in almost southerly direction till confluence with the Chandra. The length of the Bhaga river up to its confluence with Chandra river is about 105 km. The combined stream is then known as Chandra Bhaga or the Chenab river and flows in northwest direction through the Pangi valley of Himachal Pradesh and enters Padan area of Kishtwar, a Tehsil of J&K. At Benjwar near Kishtwar it receives its major tributary, the Marusudar river and then flows in southern direction for about 25 km through a gorge through Pir Panjal range and enters the valley between the Pir Panjal and the Dhaula Dhar ranges. The Pir Panjal, here, dissects the basin in two parts and then becomes and northern boundary of the Chenab-the southern boundary is formed by another mid-Himalayan range, the Dhaula Dhar range. The river then flows almost in westerly direction up to the Salal dam site and then takes a southerly turn and enters into the plains near Akhnoor. The total length of the river up to Akhnoor site is about 650 km and the catchment area is 21,808 sq km. The catchment area of Chenab river up to the diversion site of proposed Sawalkote HEP is approx. 19,475 sq km out of which approx. 7,878 sq km is in Himachal Pradesh (**Figure 3).**

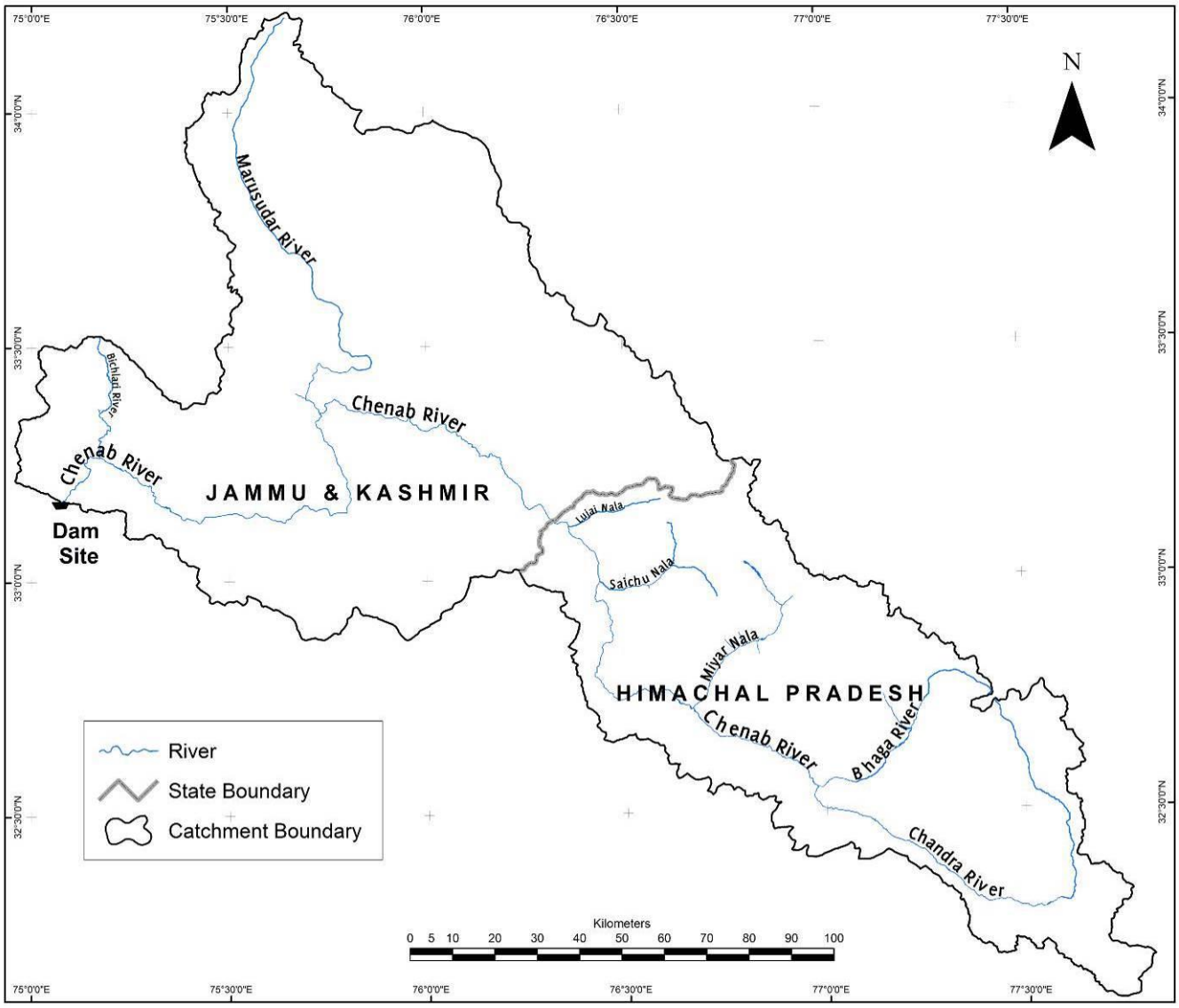


Figure 3: Catchment Area Map of Chenab river up to Sawalkote HEP

3.1 Free Draining Catchment

Free draining catchment has been delineated as intercepting catchment area falling between diversion site of upstream Baglihar HE Project and diversion site of proposed Sawalkote HE Project on Chenab river.

Bichlari is the major river which drains within the free draining catchment of proposed Sawalkote HE project and it joins river Chenab around 7 km downstream to Ramban town. In the free draining catchment area several tributaries and streams joins river Chenab on either banks. The major tributaries joining on the left bank are Nachhar Nala, Pira Nala, Sauni Nala, Kalapani Nala, Balaut Khad, Tatwa Khad, Garol Khad, Branchachali Khad and Manakani Khad whereas, on the right bank the tributaries that join the river are Dharoli Khad, Tanoh Da Nala, Karaole Da Nala, Mulmula Gad, Balhot Nala, Bichlari River, Sombar Nala and Chainj Nala. Map showing the free draining catchment of Sawalkote HEP and stream directly draining into free draining catchment is given in **Figure 4.**

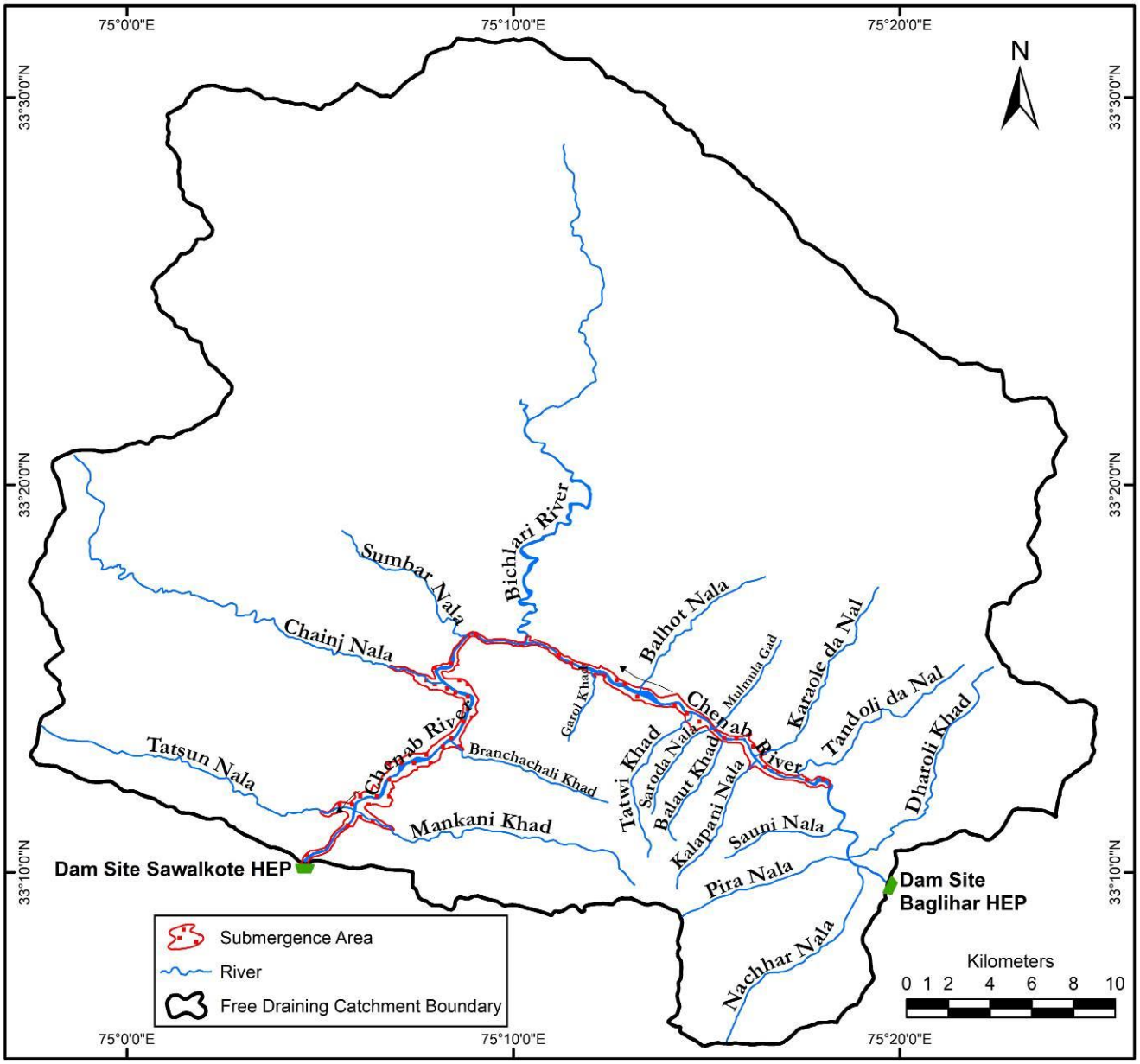


Figure 4: Free Draining Catchment Area Map of Sawalkote HEP

3.2 Delineation of Sub-Watersheds

The delineation of sub-watersheds was done as per the methodology of Digital Watershed Atlas (DWA) prepared by Soil and Land Use Survey of India (SLUSI). The delineation was done in seven stages starting with Water Resource Regions and their subsequent division and subdivisions into Basins, Catchments, Sub-catchments, Watersheds and Sub watersheds in decreasing size of the delineated hydrologic unit.

In order to plan watershed management and to formulate action plans delineation was done up to sub-watershed level. The free draining catchment area of Sawalkote HE Project falls in 20 Subwatersheds, which are part of 5 Watershed, which are part of 1 Subcatchment, which is part of Chenab catchment falling under Chenab basin of Indus region. The detail of Subwatersheds delineated is given below **(Table 2 and Figure 5).**

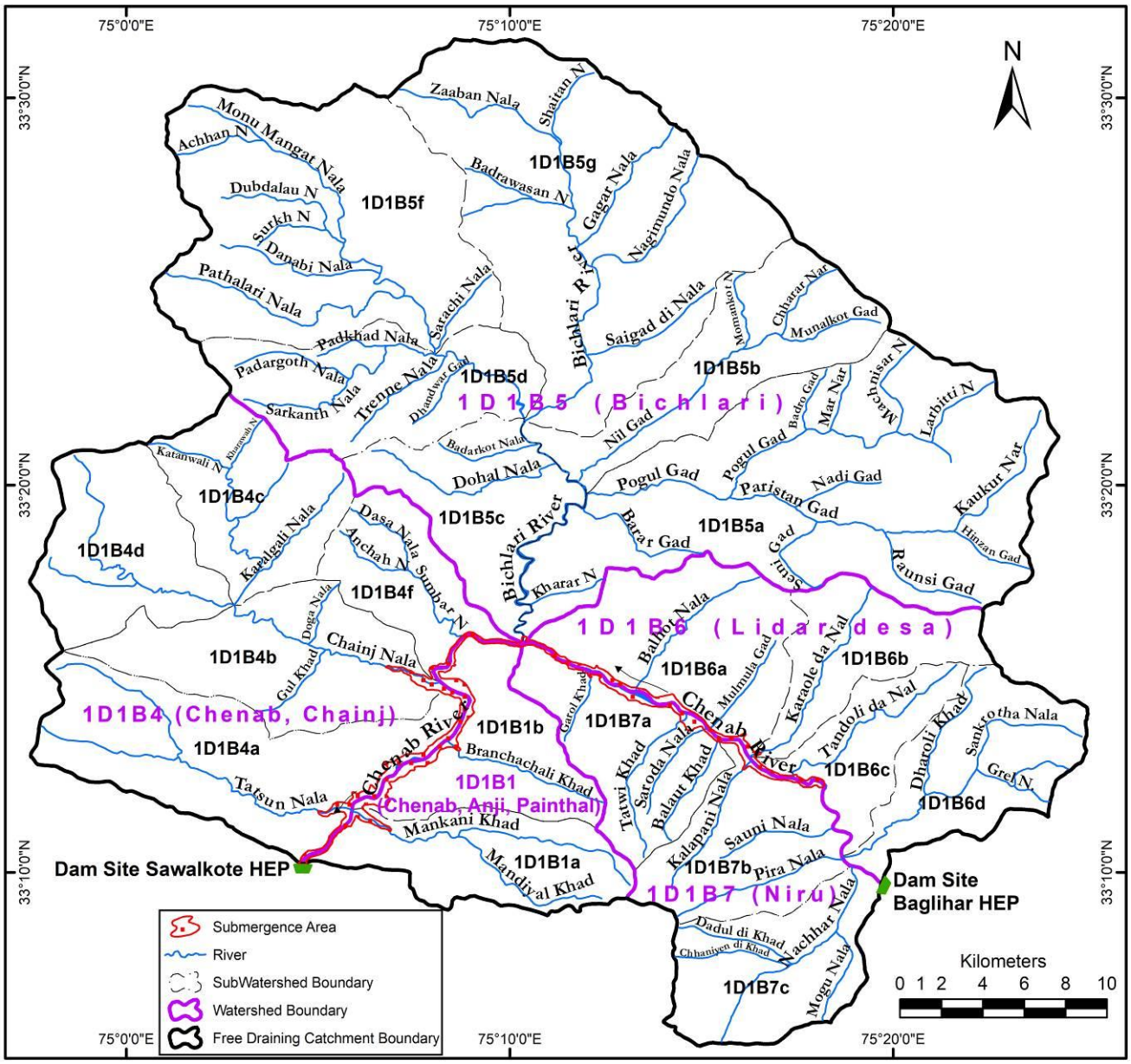


Figure 5: Sub-Watershed Map of Sawalkote HEP Free Draining Catchment Area

Table 2: Names and Codes of Sub-watersheds Delineated in the Free Draining Catchment of Sawalkote HEP

S. No.	Water Resource Region	Basin	Catchment	Sub-Catchment	Watershed	Sub-Watershed	Sub-Watershed Area (Sq km)
1.	Indus (1)	Chenab (1D)	Chenab (1D1)	1D1B	1D1B1 (Chenab, Anji, Painthal)	1D1B1a	44.31
2.						1D1B1b	42.77
3.					1D1B4 (Chenab, Chainj)	1D1B4a	82.53
4.						1D1B4b	61.70
5.						1D1B4c	47.38
6.						1D1B4d	50.65
7.						1D1B4f	32.67
8.					1D1B5 (Bichlari)	1D1B5a	177.19
9.						1D1B5b	58.08
10.						1D1B5c	46.69
11.						1D1B5d	59.82
12.						1D1B5f	132.94

S. No.	Water Resource Region	Basin	Catchment	Sub-Catchment	Watershed	Sub-Watershed	Sub-Watershed Area (Sq km)
13.						1D1B5g	160.58
14.					1D1B6 (Lidar Desa)	1D1B6a	59.78
15.						1D1B6b	36.51
16.						1D1B6c	29.20
17.						1D1B6d	49.08
18.					1D1B7 (Niru)	1D1B7a	43.76
19.						1D1B7b	44.78
20.						1D1B7c	47.43
TOTAL							**1307.85**

4.0 FOREST ADMINISTRATIVE BOUNDARY

Free draining catchment area falls under the administrative control of Ramban Forest Division, Batote Forest Division, Mahore Forest Division and Udhampur Forest Division of Jammu and Kashmir State Forest Department. Out of the total free draining catchment area, 1081.86 sq km (82.72%) falls under Ramban Forest Division, 203.88 sq km (15.59%) falls under Batote Forest Division, 19.15 sq km (1.46%) falls under Udhampur Forest Division and only 2.95 sq km (0.23%) falls under Mahore Forest Division. Out of the total 20 sub-watersheds, 1 sub-watershed (1D1B4a) falls partially under Mahore Forest Division and partially under Ramban Forest Division; 14 sub-watersheds (1D1B4b to 1D1B6d) falls completely under Ramban Forest Division; 1 sub-watershed (1D1B1a) falls partially under Udhampur Forest Division and partially under Batote Forest Division; and 4 sub-watersheds (1D1B1b, 1D1B7a to 1D1B7c) falls completely under Batote Forest Division. Map showing sub-watersheds falling under different Forest Divisions in the free draining catchment area is given as **Figure 6**.

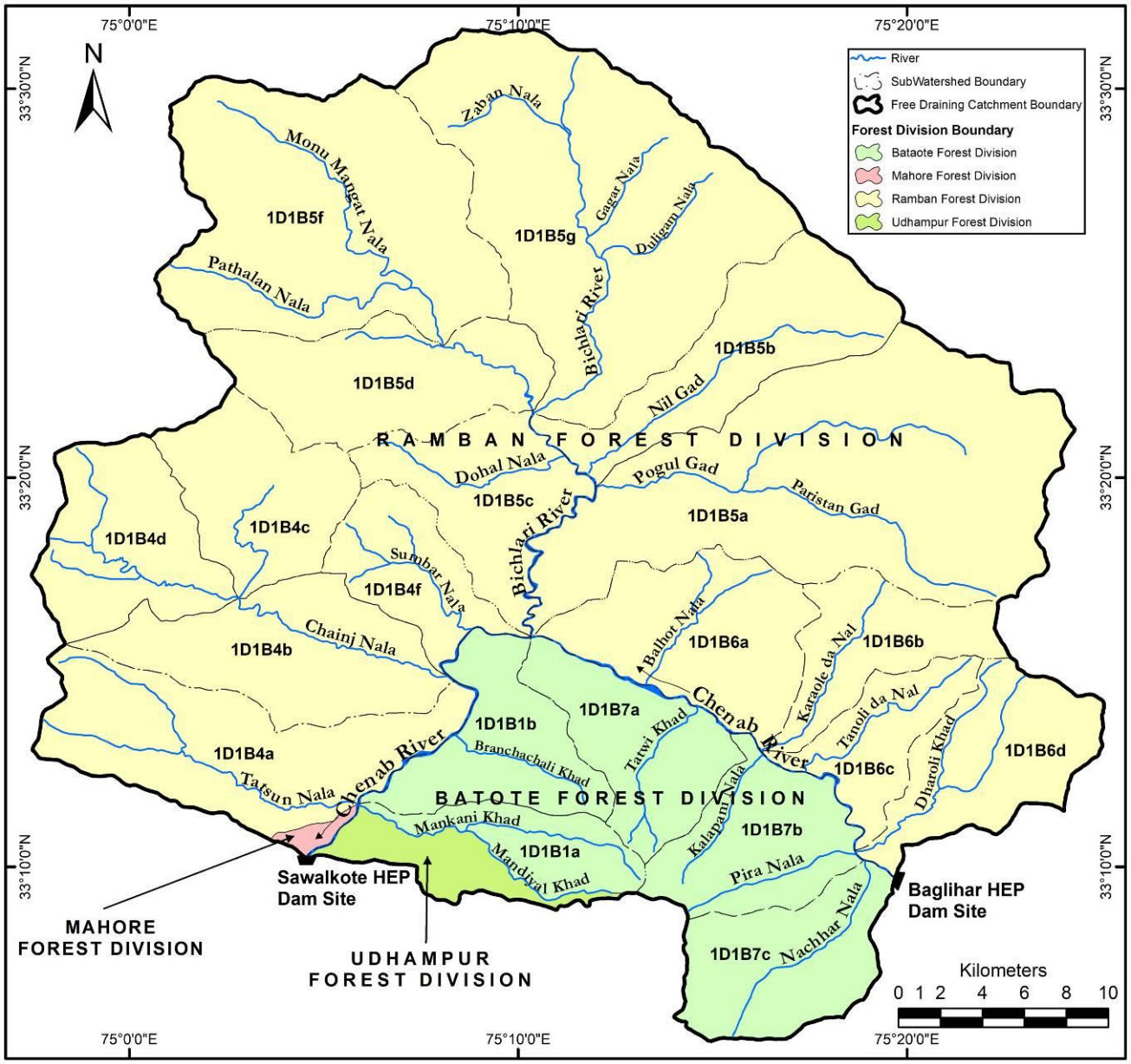


Figure 6: Forest Administrative Units Under Free Draining Catchment Area of Sawalkote HEP

5.0 APPROACH FOR THE STUDY

A detailed database on natural resources, terrain conditions, soil type of the catchment area, socio-economic status, etc. is a pre-requisite to prepare treatment plan keeping in view the concept of sustainable development. Various thematic maps have been used in preparation of the CAT plan. Geographic Information System (GIS) is a computerized resource data base system, which is used to store, analyze and display various spatial data. GIS 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 has been used for deriving land use data. Ground truth studies, too, have been conducted. The various steps, covered in the study, are as follows:

- Definition of the problem
- Definition of data requirement
- Data acquisition and preparation
- Modeling

- Output presentation

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

5.1 Definition of the Data

The requirements of the study were defined and the expected outputs were finalized. The various data layers of the catchment area to be used for the study are as follows:

- Free Draining Catchment Area Map
- Land use Classification Map
- Slope Map
- Soil Map
- Rainfall Intensity

5.2 Data Acquisition and Preparation

The data available from various sources has been collected. The ground maps, contour information, etc. were scanned, digitized and registered as per the requirement. Data was prepared depending on the level of accuracy required and any corrections required were made. All the layers were geo-referenced and brought to a common scale (real co-ordinates), so that overlay could be performed. A computer program using standard modeling techniques was used to estimate the soil loss. The formats of outputs from each layer were formed to match the formats of inputs in the program. Ground truthing and data collection was also included in the procedure.

5.3 Land Use/ Land Cover

For the present study, Land use/ Land cover maps prepared by National Remote Sensing Centre (NRSC), Indian Space Research Organisation (ISRO) of Dept. of Space with Directorate of Ecology, Environment and Remote Sensing, J&K as partner under Natural Resource Census (NRC) project of National Natural Resource Repository (NRR) programme was used. The data was downloaded in raw digital format and was geo-referenced using Survey of India topographical sheets. The geo-referenced data was digitized for the different land use/ land cover classes. A detailed ground truth verification exercise was undertaken as a part of field survey to refinement of different cover classes. The classified land use map of the free draining catchment area, considered for the study, is shown as **Figure 7**. The land use pattern of the free draining catchment area as well as of sub-watersheds is summarized in **Table 3**. The land use/ land cover map of the free draining catchment of Sawalkote HE Project was classified into eight classes. Out of these eight classes, the percent area under dense forest is the highest, closely followed by area under scrub land while settlement in the area is least.

From the highlighted cells in **Table 3** it can be seen that dense forest covers the maximum area in 12 sub-watersheds, scrub land covers the maximum area in 5 sub-watersheds and agricultural land covers the maximum area in 3 sub-watersheds.

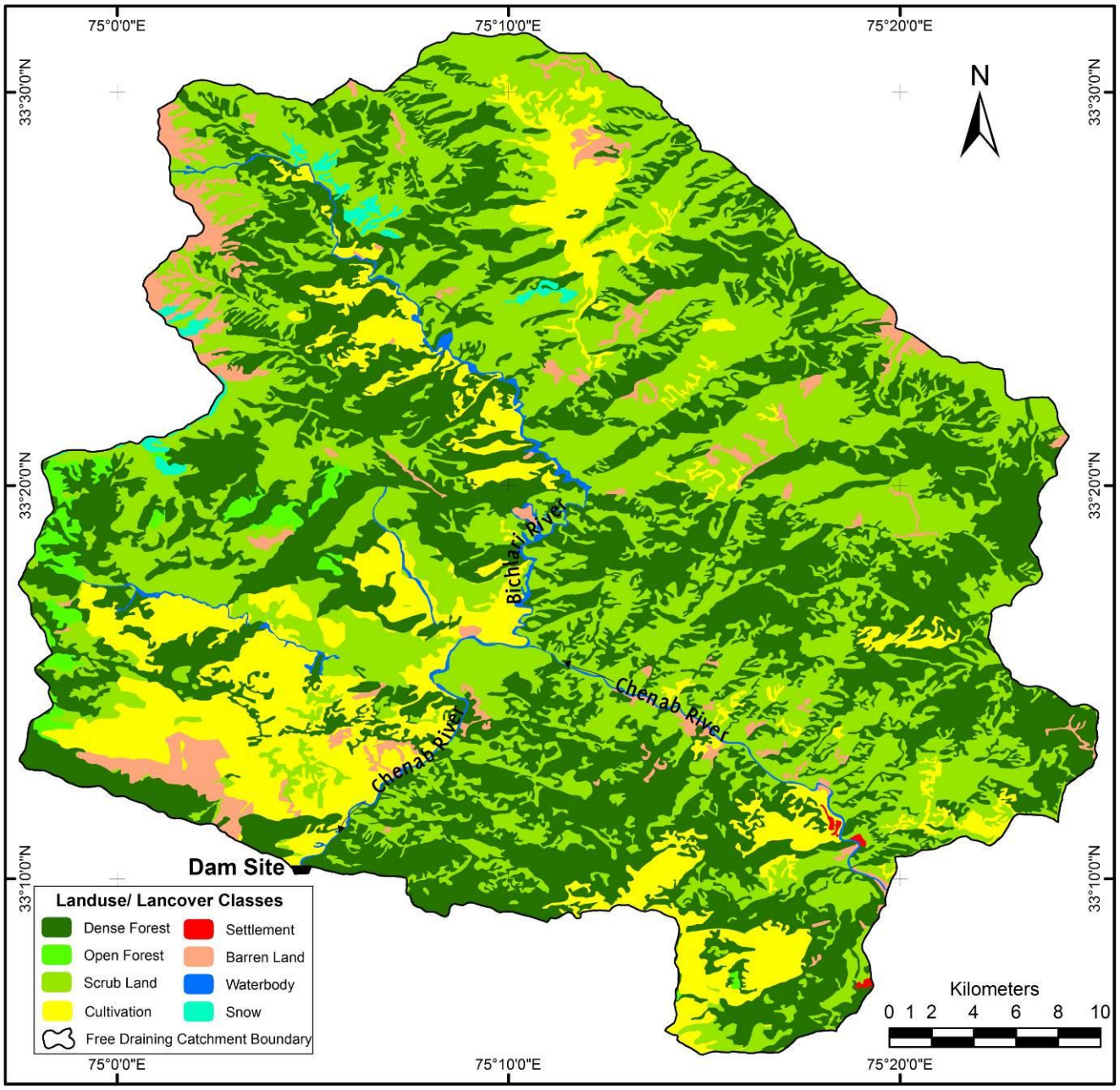


Figure 7: Land Use/ Land Cover Map of Sawalkote HEP Free Draining Catchment Area

5.4 Slope

Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Global Digital Elevation Model (GDEM) data was used for preparation of slope map. The data was downloaded in GeoTIFF format and using ArcGIS software a slope (in degrees) map was prepared. The degree slope was divided into different slope classes as per SLUSI. The areas falling under various slope categories in the Sawalkote HEP free draining catchment and Sub-Watersheds have been tabulated below in **Table 4**. The slope map is shown as **Figure 8**. As seen from the table (**highlighted cells**) and map majority of the area falls under two slope categories i.e. Moderately Steep and Steep. The percentage areas covered by both these sloping categories are in the order of 40%.

Table 3: Land Use/ Land Cover Classification for Sawalkote HEP Free Draining Catchment Area

LULC	Dense Forest		Open Forest		Scrub Land		Agriculture		Settlement		Barren Land		River		Snow		Total	
Sub-Watersheds	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)
1D1B1a	32.07	72.39	0.00	0.00	9.81	22.15	2.20	4.97	0.00	0.00	0.07	0.16	0.15	0.33	0.00	0.00	**44.31**	**100**
1D1B1b	21.58	50.45	0.00	0.00	19.33	45.19	0.05	0.11	0.00	0.00	0.82	1.91	1.00	2.34	0.00	0.00	**42.77**	**100**
1D1B4a	21.29	25.79	1.87	2.27	7.84	9.50	39.75	48.16	0.00	0.00	11.47	13.90	0.31	0.38	0.00	0.00	**82.53**	**100**
1D1B4b	17.20	27.87	0.12	0.19	16.92	27.42	26.41	42.80	0.00	0.00	0.33	0.53	0.73	1.18	0.00	0.00	**61.70**	**100**
1D1B4c	24.74	52.23	3.67	7.75	16.61	35.05	0.06	0.13	0.00	0.00	0.73	1.55	0.01	0.01	1.55	3.28	**47.38**	**100**
1D1B4d	19.34	38.18	6.70	13.22	17.81	35.17	5.79	11.43	0.00	0.00	0.17	0.34	0.69	1.36	0.15	0.30	**50.65**	**100**
1D1B4f	9.07	27.75	0.61	1.86	10.72	32.82	10.99	33.65	0.00	0.00	0.39	1.18	0.90	2.74	0.00	0.00	**32.67**	**100**
1D1B5a	85.09	48.03	0.00	0.00	84.96	47.95	1.48	0.83	0.00	0.00	4.85	2.74	0.80	0.45	0.00	0.00	**177.19**	**100**
1D1B5b	21.95	37.79	0.00	0.00	33.13	57.04	1.41	2.42	0.00	0.00	1.07	1.84	0.53	0.91	0.00	0.00	**58.08**	**100**
1D1B5c	22.47	48.12	0.13	0.27	12.76	27.33	8.96	19.19	0.00	0.00	0.91	1.95	1.46	3.14	0.00	0.00	**46.69**	**100**
1D1B5d	29.44	49.22	0.00	0.00	19.13	31.97	8.14	13.60	0.00	0.00	1.86	3.11	1.11	1.86	0.14	0.23	**59.82**	**100**
1D1B5f	50.11	37.70	0.00	0.00	58.22	43.79	6.55	4.93	0.00	0.00	12.18	9.16	1.75	1.31	4.13	3.11	**132.94**	**100**
1D1B5g	46.93	29.23	0.00	0.00	84.52	52.63	22.64	14.10	0.00	0.00	5.42	3.37	0.01	0.01	1.06	0.66	**160.58**	**100**
1D1B6a	24.09	40.30	0.00	0.00	32.79	54.85	1.53	2.57	0.00	0.00	0.73	1.23	0.63	1.06	0.00	0.00	**59.78**	**100**
1D1B6b	18.68	51.16	0.00	0.00	14.47	39.64	2.97	8.14	0.00	0.00	0.38	1.03	0.01	0.03	0.00	0.00	**36.51**	**100**
1D1B6c	10.83	37.10	0.00	0.00	16.95	58.07	0.19	0.66	0.17	0.59	0.59	2.03	0.45	1.55	0.00	0.00	**29.20**	**100**
1D1B6d	22.93	46.72	0.00	0.00	21.13	43.04	4.17	8.49	0.00	0.00	0.78	1.59	0.07	0.15	0.00	0.00	**49.08**	**100**
1D1B7a	25.04	57.23	0.00	0.00	15.29	34.95	1.29	2.95	0.00	0.00	1.82	4.15	0.31	0.72	0.00	0.00	**43.76**	**100**
1D1B7b	22.32	49.85	0.00	0.00	8.80	19.65	12.74	28.46	0.33	0.74	0.34	0.75	0.24	0.55	0.00	0.00	**44.78**	**100**
1D1B7c	21.15	44.60	0.30	0.63	10.03	21.14	15.20	32.06	0.23	0.48	0.45	0.96	0.06	0.14	0.00	0.00	**47.43**	**100**
Total	**546.35**	**41.77**	**13.40**	**1.02**	**511.22**	**39.09**	**172.52**	**13.19**	**0.73**	**0.06**	**45.36**	**3.47**	**11.23**	**0.86**	**7.04**	**0.54**	**1307.84**	**100**

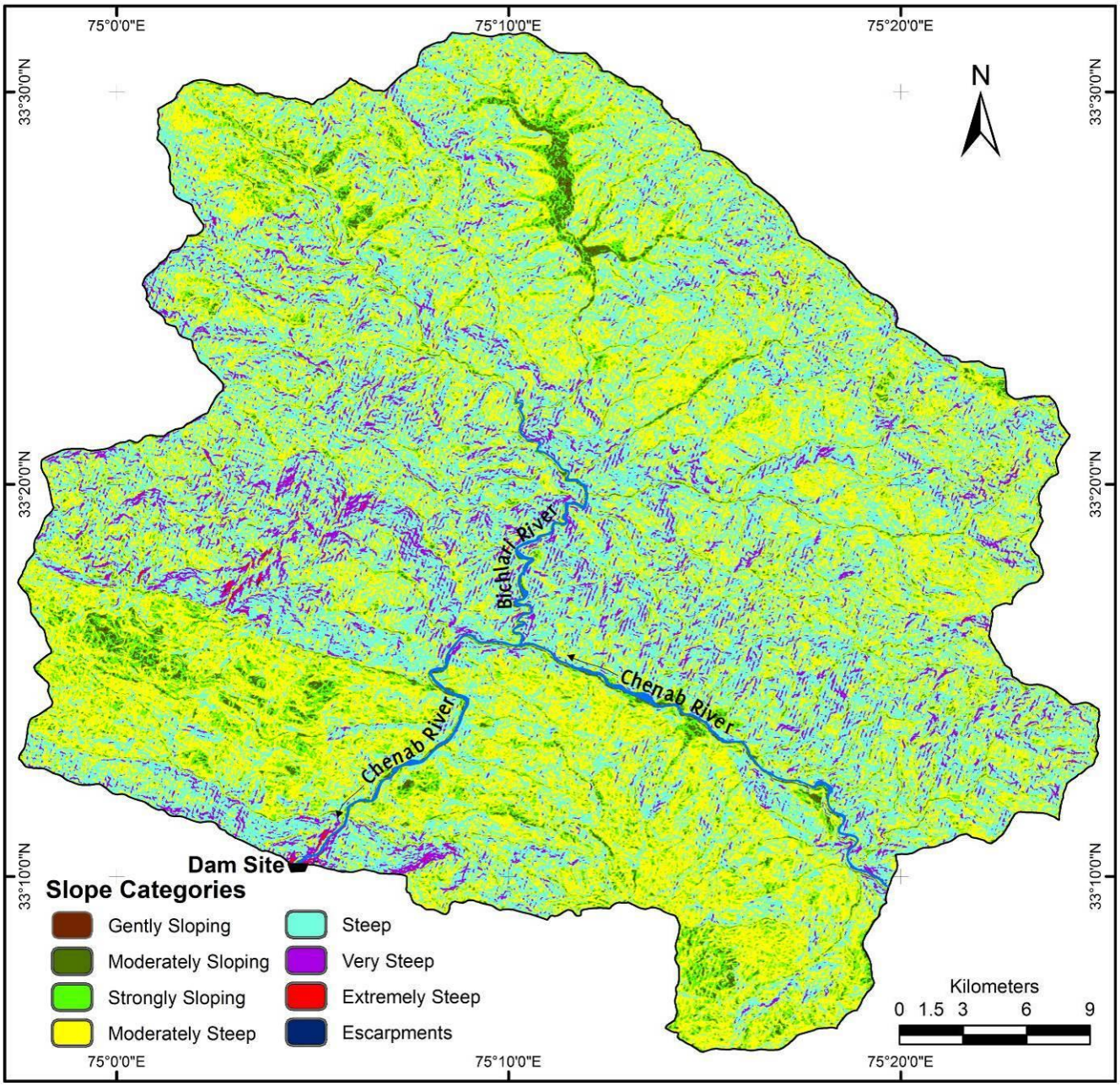


Figure 8: Slope Map of Sawalkote HEP Free Draining Catchment Area

5.5 Soil

Soil map has been digitized and produced using soil maps collected from National Bureau of Soil Survey & Land Use Planning, Regional Centre, New Delhi. Various layers, thus prepared, were used for modeling. Soil map has been shown in **Figure 9.** The legend for soil classes has been given in **Table 5.** As can be seen from the soil map and area under different soil units, maximum percentage area is covered soil unit 105, closely followed by soil unit 88. Majority of the soil type of the catchment area is Shallow to Medium deep, excessively drained, loamy to coarse loamy soils with moderate erosion hazard.

Table 4: Areas Falling Under Different Slope Categories

Sub-Watersheds	Slope Categories (Slope in Degrees)																Total	
	Gently Sloping (Up to 2°)		Moderately Sloping (2°- 8°)		Strongly Sloping (8°- 15°)		Moderately Steep (15°- 30°)		Steep (30°- 45°)		Very Steep (45°- 60°)		Extremely Steep (60°- 70°)		Escarpments (Above 70°)			
	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)
1D1B1a	0.05	0.11	1.10	2.49	3.26	7.36	17.63	39.79	18.50	41.75	3.62	8.17	0.14	0.31	0.01	0.02	**44.31**	**100**
1D1B1b	0.09	0.21	1.37	3.19	4.82	11.27	22.90	53.55	12.84	30.03	0.75	1.75	0.00	0.00	0.00	0.00	**42.77**	**100**
1D1B4a	0.17	0.20	2.13	2.58	8.37	10.14	40.40	48.95	27.60	33.44	3.73	4.52	0.14	0.17	0.00	0.00	**82.53**	**100**
1D1B4b	0.21	0.33	3.70	5.99	10.55	17.10	29.49	47.80	15.58	25.25	2.15	3.49	0.02	0.04	0.00	0.00	**61.70**	**100**
1D1B4c	0.03	0.06	0.49	1.04	1.48	3.12	13.51	28.51	24.27	51.22	7.18	15.15	0.40	0.83	0.03	0.06	**47.38**	**100**
1D1B4d	0.10	0.20	1.65	3.26	4.86	9.59	19.84	39.17	19.38	38.27	4.72	9.32	0.09	0.18	0.00	0.00	**50.65**	**100**
1D1B4f	0.02	0.06	0.33	1.01	0.97	2.96	9.47	29.00	17.12	52.42	4.67	14.29	0.09	0.27	0.00	0.00	**32.67**	**100**
1D1B5a	0.14	0.08	2.42	1.37	8.11	4.58	70.58	39.83	83.86	47.33	11.99	6.76	0.09	0.05	0.00	0.00	**177.19**	**100**
1D1B5b	0.07	0.11	0.91	1.56	2.80	4.82	24.16	41.59	27.09	46.64	3.04	5.24	0.02	0.03	0.00	0.00	**58.08**	**100**
1D1B5c	0.05	0.10	0.66	1.42	1.64	3.50	13.59	29.11	25.64	54.92	5.05	10.83	0.06	0.12	0.00	0.00	**46.69**	**100**
1D1B5d	0.04	0.07	0.71	1.18	2.30	3.85	20.50	34.27	31.01	51.83	5.23	8.74	0.03	0.05	0.00	0.00	**59.82**	**100**
1D1B5f	0.22	0.17	3.82	2.87	11.44	8.61	57.36	43.14	53.44	40.20	6.60	4.97	0.06	0.04	0.00	0.00	**132.94**	**100**
1D1B5g	0.38	0.24	6.19	3.85	12.62	7.86	64.40	40.10	71.16	44.31	5.82	3.62	0.02	0.01	0.00	0.00	**160.58**	**100**
1D1B6a	0.03	0.05	0.77	1.29	2.66	4.46	17.89	29.93	32.96	55.13	5.43	9.09	0.02	0.04	0.00	0.00	**59.78**	**100**
1D1B6b	0.04	0.10	0.47	1.29	1.56	4.28	12.74	34.90	18.69	51.19	2.98	8.15	0.03	0.08	0.00	0.00	**36.51**	**100**
1D1B6c	0.02	0.06	0.39	1.34	1.36	4.67	9.40	32.18	15.65	53.58	2.38	8.14	0.00	0.01	0.00	0.00	**29.20**	**100**
1D1B6d	0.04	0.08	0.72	1.47	2.38	4.85	17.51	35.67	24.48	49.87	3.93	8.00	0.03	0.05	0.00	0.00	**49.08**	**100**
1D1B7a	0.12	0.27	1.57	3.58	4.91	11.22	25.50	58.28	10.99	25.11	0.67	1.54	0.00	0.00	0.00	0.00	**43.76**	**100**
1D1B7b	0.09	0.21	1.27	2.85	4.41	9.85	24.09	53.80	13.67	30.53	1.23	2.74	0.01	0.02	0.00	0.00	**44.78**	**100**
1D1B7c	0.10	0.22	2.25	4.74	9.12	19.23	27.32	57.59	7.88	16.62	0.75	1.59	0.00	0.00	0.00	0.00	**47.43**	**100**
Total	**2.01**	**0.15**	**32.92**	**2.52**	**99.64**	**7.62**	**538.27**	**41.16**	**551.80**	**42.19**	**81.93**	**6.26**	**1.24**	**0.09**	**0.04**	**0.00**	**1307.85**	**100**

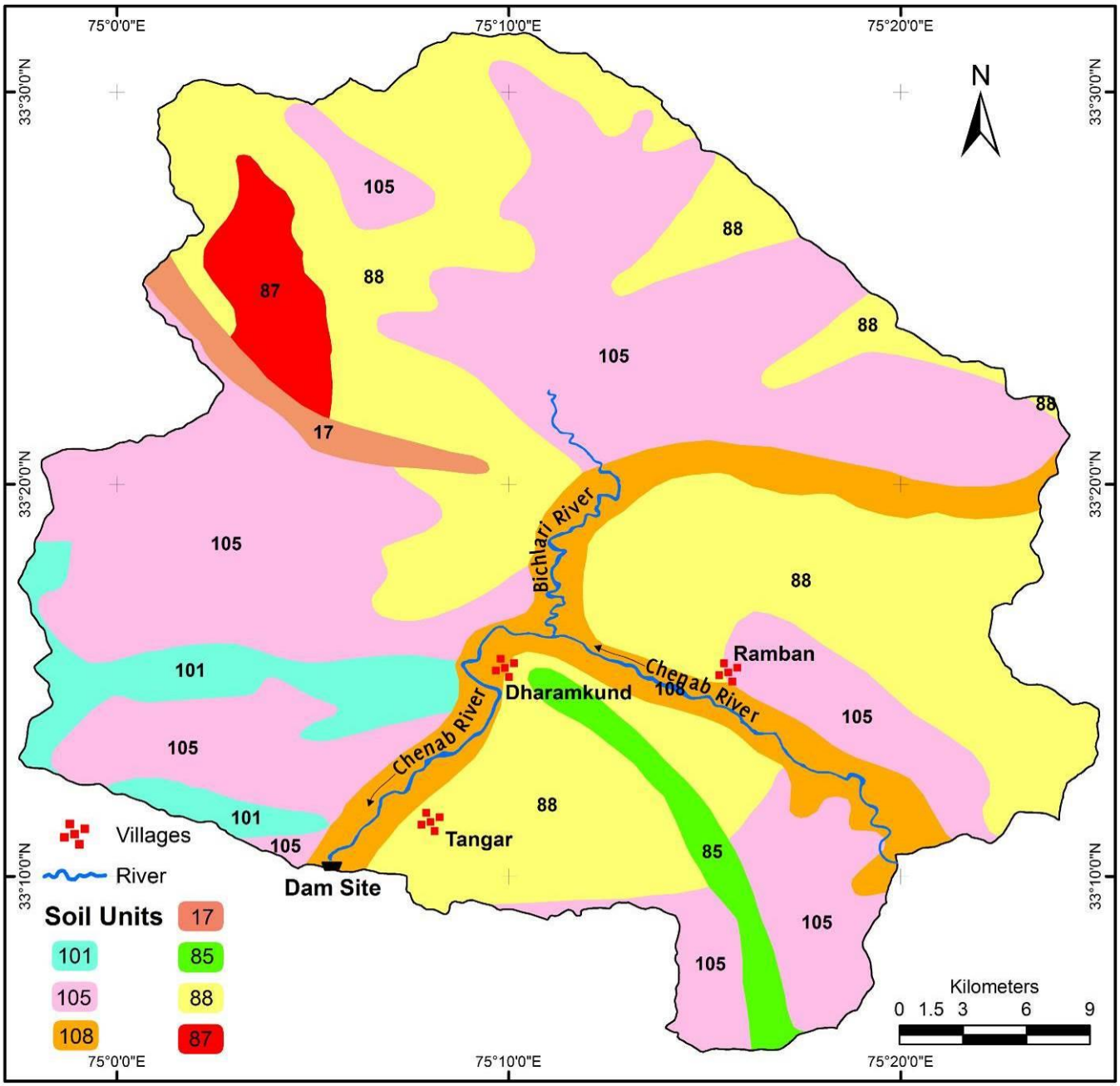


Figure 9: Soil Map of Sawalkote HEP Free Draining Catchment Area

(For details of Soil Unit legend refer Table 5)

Table 5: Soil Classes of Sawalkote HEP Free Draining Catchment Area

Soil Unit	Soil Type		Area (sq km)	Area (%)
17	Dominantly rock outcrops; *associated with*: Shallow, loamy, calcareous soils on steep to very steep slopes with loamy surface, strong stoniness and severe erosion.	Lithic Cryorthents	20.66	1.58
85	Deep, well drained, thermic, fine-loamy, soils on moderately steep slopes with loamy surface, moderate erosion and slight stoniness; *associated with*: Medium deep, well drained, fine-loamy calcareous soils with loamy surface, moderate erosion and slight stoniness	Dystric Eutrochrepts	28.61	2.19
87	Medium deep, somewhat excessively drained, fine-loamy soils on moderately steep slopes with loamy surface, moderate erosion and moderate stoniness;	Typic Udorthents	34.32	2.62

Soil Unit	Soil Type		Area (sq km)	Area (%)
	associated with: Rock outcrops.			
88	Shallow, excessively drained, loamy soils on very steep slopes with loamy surface, severe erosion and moderate stoniness; *associated with:* Medium deep, excessively drained, coarse-loamy soils with loamy surface, moderate erosion and moderate stoniness.	Lithic Udorthents	490.09	37.47
101	Deep, somewhat excessively drained, coarse-loamy soils on steep slopes with loamy surface, moderate erosion and slight stoniness; *associated with:* Medium deep, excessively drained, coarse-loamy soils on steep slopes with loamy surface, severe erosion and moderate stoniness.	Dystric Eutrochrepts	60.98	4.66
105	Medium deep, excessively drained, coarse- loamy soils on steep slopes with loamy surface, severe erosion and moderate stoniness; *associated with*: loamy surface and moderate erosion.	Typic Udorthents	555.43	42.47
108	Deep, somewhat excessively drained, fine-loamy, calcareous soils on moderate slopes with loamy surface, moderate erosion and slight stoniness; *associated with*: Deep, somewhat excessively drained, coarse-loamy soils with loamy surface, moderate erosion and moderate stoniness.	Typic Eutrochrepts	117.74	9.00
	TOTAL		**1307.85**	**100**

5.6 Modeling

Geographical Information System (GIS) approach in integration with Remotely Sensed (RS) digital database is an absolute tool in dealing with problems of estimation of soil erosion intensity in any area. The soil erosion intensity in the free draining catchment of Sawalkote HE Project was estimated by generating Composite Erosion Intensity Unit (CEIU) maps which are then used for determining treatment measures.

Determination of erosion intensity unit is primarily based upon the integration of information on soil characteristics, physiography, rainfall, slope and land use/ land cover. The composite map for delineating different erosion intensity units was prepared through superimposition of thematic maps like soil types, slope, rainfall isohytes and land use/ land cover. The thematic mapping of erosion intensity for entire basin was done using the overlay and union techniques through the raster querying methodology tools like map algebra under Raster Calculator in ArcGIS. For executing these queries all the thematic maps of different attributes and parameters were geo-referenced to maintain the accuracy of the resultant outputs. In case of slope, the raster based queries were undertaken for different slope categories ranging from gently sloping category to escarpments with different soil classes like shallow soils, deep soils, for land use/ land cover different land cover classes like forest, scrub, agriculture, settlements, water bodies, etc. were used (see Table below). Based on ground truth conducted during fieldwork and published data, weightage and values were assigned to

individual classes in the thematic maps and accordingly the resultant outputs were assigned to each erosion intensity category.

The final integration of erosion intensity mapping units has been done based on the total sum of weightages of land use, soil depth and erosion tendency, slope and rainfall. If the summation is above 21, the unit is considered as Very Severe erosion intensity (EI) class (E1), while sum of 18 to 20 gives Severe EI class (E2), sum of 14 to 17 gives Moderate EI class (E3), sum of 11 to 13 gives Slight EI class (E4), sum of 7-10 gives Negligible EI class (E5) and summation up to 4 gives Nil EI class (E6).

Matrix for Composite Erosion Intensity Unit

Slope in Degrees (Weightage)	Land use/ Land Cover (Weightage)	Soil Depth/ Erosivity (Weightage)	Rainfall (Weightage)
Extremely steep to Escarpments and above (6)	Settlements, Cultivation (6)	Shallow with Severe Erosion (6)	High (5)
Very Steep to Extremely Steep (5)	Settlements, Cultivation (5)	Moderately deep, Severe erosion (5)	Moderate to High (4)
Steep to Moderately steep (4)	Barren, Settlements, Cultivation (4)	Moderately deep with moderate erosion (4)	Moderate (3)
Strongly sloping (3)	Open forest, Scrub (3)	Deep with moderate Erosion (3)	Moderate (3)
Strongly sloping to Gently sloping (2)	Dense to Open forest, Snow, Water bodies (2)	Deep with moderate Erosion (2)	Extremely Low (2)
Gently sloping (1)	Dense Forest, Snow, Water bodies (1)	Deep with frigid Conditions (1)	Extremely Low (1)

5.7 Soil Erosion Intensity

A composite Erosion Intensity thematic map of the free draining catchment area was prepared as per the methodology adopted as above and the same is given at **Figure 10** and the area falling under different erosion intensity classes is given in **Table 6**. It can be seen that very small percentage of the area is prone to Severe and Very severe erosion (**see Table 6 highlighted cells**). The sub-watershed wise area under each erosion intensity class is given in **Table 7**.

Table 6: Soil Erosion Ranges for Sawalkote HEP Free Draining Catchment Area

S. No.	Soil Erosion Intensity	Erosion Intensity (EI) Class	Area (ha)	Area (%)
1.	Nil	E6	2443.56	1.87
2.	Negligible	E5	24703.72	18.89
3.	Slight	E4	54977.49	42.04
4.	Moderate	E3	38695.13	29.59

S. No.	Soil Erosion Intensity	Erosion Intensity (EI) Class	Area (ha)	Area (%)
5.	Severe	E2	9700.44	7.42
6.	Very Severe	E1	264.26	0.20
	Total		**130784.61**	**100.00**

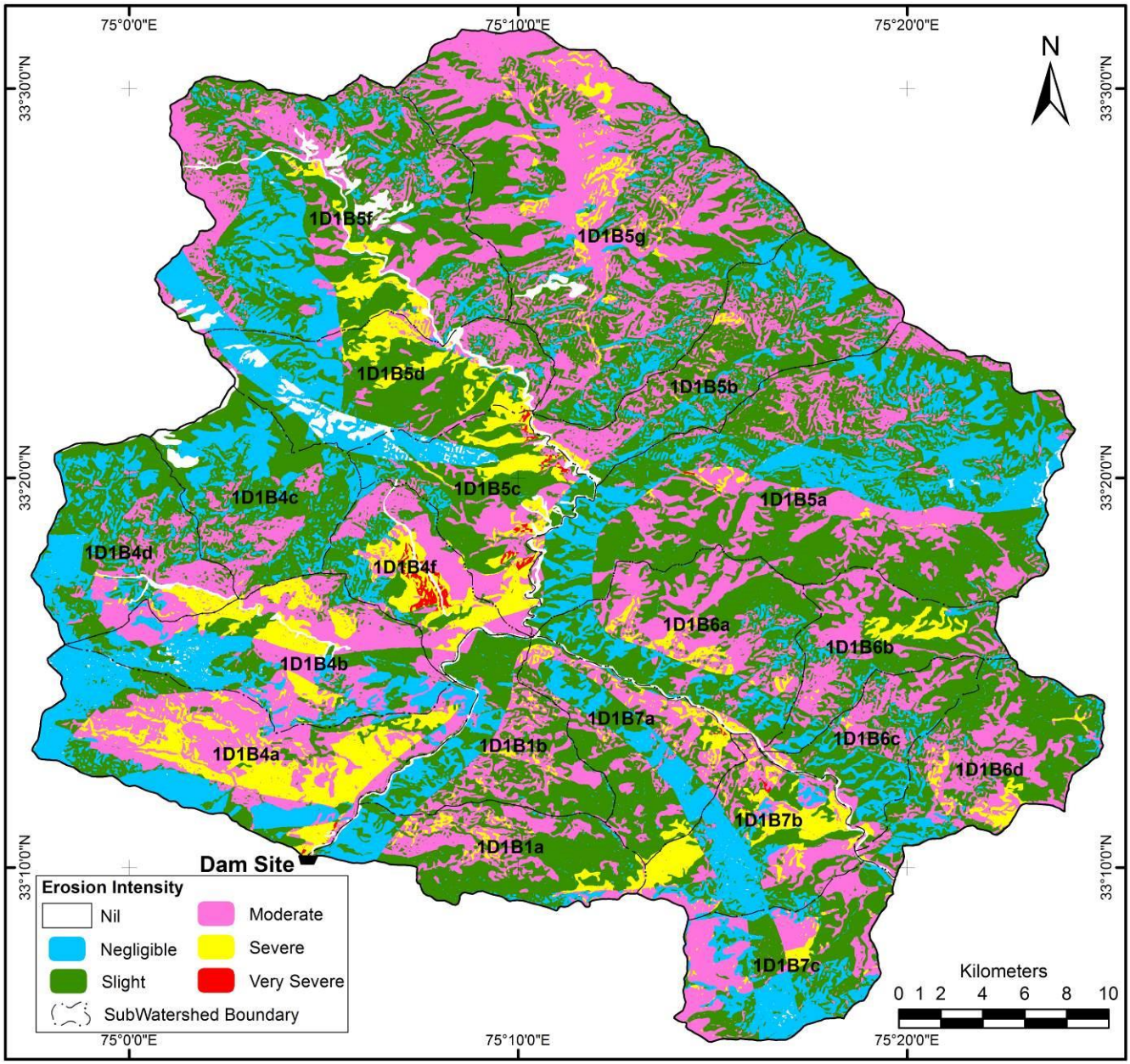


Figure 10: Soil Erosion Intensity Map of Sawalkote HEP Free Draining Catchment Area

Table 7: Sub-Watershed Wise Area Under Each Soil Erosion Category

Soil Erosion	Nil		Negligible		Slight		Moderate		Severe		Very Severe		Total	
Sub-Watersheds	Area (ha)	Area (%)	Area (ha)	Area (%)	Area (ha)	Area (%)	Area (ha)	Area (%)	Area (ha)	Area (%)	Area (ha)	Area (%)	Area (ha)	Area (%)
1D1B1a	15.25	0.34	515.04	11.62	2394.03	54.03	1212.47	27.36	293.51	6.62	0.48	0.01	**4430.78**	**100**
1D1B1b	101.09	2.36	602.64	14.09	2357.48	55.12	1111.73	25.99	104.32	2.44	0.00	0.00	**4277.26**	**100**
1D1B4a	47.84	0.58	2085.19	25.27	1138.03	13.79	2834.05	34.34	2139.78	25.93	7.85	0.10	**8252.75**	**100**
1D1B4b	117.77	1.91	1591.95	25.80	1310.58	21.24	2239.45	36.30	909.81	14.75	0.28	0.00	**6169.84**	**100**
1D1B4c	158.16	3.34	1340.12	28.29	2524.72	53.29	706.27	14.91	8.43	0.18	0.00	0.00	**4737.70**	**100**
1D1B4d	88.58	1.75	1518.84	29.99	2095.36	41.37	1146.49	22.64	215.29	4.25	0.00	0.00	**5064.57**	**100**
1D1B4f	90.25	2.76	309.26	9.46	750.01	22.95	1209.21	37.01	765.83	23.44	142.92	4.37	**3267.48**	**100**
1D1B5a	148.57	0.84	4358.86	24.60	9210.23	51.98	3885.35	21.93	109.84	0.62	5.69	0.03	**17718.54**	**100**
1D1B5b	53.36	0.92	1124.54	19.36	2971.26	51.15	1568.65	27.01	90.27	1.55	0.36	0.01	**5808.44**	**100**
1D1B5c	234.14	5.01	672.05	14.39	1834.07	39.28	966.80	20.71	872.80	18.69	89.52	1.92	**4669.38**	**100**
1D1B5d	480.14	8.03	1415.11	23.65	2663.44	44.52	733.64	12.26	688.20	11.50	1.86	0.03	**5982.40**	**100**
1D1B5f	601.22	4.52	2868.67	21.58	5678.13	42.71	3613.64	27.18	532.56	4.01	0.00	0.00	**13294.22**	**100**
1D1B5g	108.46	0.68	1111.38	6.92	6349.42	39.54	7876.71	49.05	612.22	3.81	0.00	0.00	**16058.18**	**100**
1D1B6a	63.77	1.07	745.00	12.46	2822.74	47.22	2019.61	33.78	326.85	5.47	0.00	0.00	**5977.97**	**100**
1D1B6b	1.13	0.03	274.07	7.51	1872.93	51.29	1224.99	33.55	278.32	7.62	0.00	0.00	**3651.45**	**100**
1D1B6c	46.36	1.59	480.64	16.46	1473.38	50.46	867.04	29.70	52.21	1.79	0.00	0.00	**2919.63**	**100**
1D1B6d	7.55	0.15	438.30	8.93	2578.31	52.53	1631.24	33.24	252.72	5.15	0.00	0.00	**4908.12**	**100**
1D1B7a	32.72	0.75	804.54	18.39	1983.26	45.33	1198.18	27.38	351.75	8.04	5.09	0.12	**4375.55**	**100**
1D1B7b	29.07	0.65	1110.75	24.81	1240.22	27.70	1140.41	25.47	946.98	21.15	10.21	0.23	**4477.63**	**100**
1D1B7c	18.07	0.38	1336.72	28.19	1729.82	36.47	1509.25	31.82	148.68	3.13	0.00	0.00	**4742.53**	**100**
Total	**2443.51**	**1.87**	**24703.67**	**18.89**	**54977.42**	**42.04**	**38695.18**	**29.59**	**9700.36**	**7.42**	**264.26**	**0.20**	**130784.40**	**100**

6.0 PRIORTISATION OF SUB-WATERSHEDS USING SILT YIELD INDEX (SYI) METHOD

`Silt Yield Index' (SYI), method has been used for prioritization of sub-watersheds in the catchment for treatment. 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 (SLUSOI) 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.

Different Erosion Intensity classes are demarcated and defined as per the soil erosion intensity maps prepared above. Various categories, such as Very Severe, Severe, Moderate, Slight, Negligible and Nil were then used to calculate sub-watershed-wise SYI.

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 prioritization of smaller hydrologic units within the vast catchments is based on the Silt Yield Indices (SYI) of the smaller units. The boundary values or range of SYI values for different priority categories are arrived at by studying the frequency distribution of SYI values and locating the suitable breaking points. The watersheds/ sub-watersheds are subsequently rated into various categories corresponding to their respective SYI values.

The application of SYI model for prioritization of sub-watersheds in the catchment areas involves the evaluation of:

a) Climatic factors comprising total precipitation, its frequency and intensity,
b) Geo-morphic factors comprising land forms, physiography, slope and drainage characteristics,
c) Surface cover factors governing the flow hydraulics and
d) Management factors.

The data on climatic factors can be obtained for different locations in the catchment area from the meteorological stations whereas the field investigations are required for estimating the other attributes.

The various steps involved in the application of model are:

- Preparation of a framework of sub-watersheds through systematic delineation
- Rapid reconnaissance surveys on 1:50,000 scale leading to the generation of a map indicating erosion-intensity mapping units.
- Assignment of weightage values to various mapping units based on relative silt-yield potential.
- Computing Silt Yield Index for individual watersheds/sub-watersheds.

- Grading of watersheds/sub-watersheds into very high, high, medium, low and very low priority categories.

The area of each of the mapping units is computed and silt yield indices of individual sub-watersheds are calculated using the equations mentioned above.

6.1 Silt Yield Index

To calculate silt yield index, the methodology developed by Soil & Land Use Survey (Department of Agriculture, Govt. of India) has been followed, where 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.

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. Area of each composite unit in each sub-watershed was then estimated. Silt yield index (SYI) was calculated using following empirical formula:

$$SYI = \frac{\sum (Ai * Wi) * Di * 100}{Aw} ; \quad \text{where } i = 1 \text{ to } n$$

where,

Ai = Area of i^{th} unit (EIMU)
Wi = Weightage value of i^{th} mapping unit
n = No. of mapping units
Aw = Total area of sub-watershed.
Di = Delivery ratio

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

Weightage values are assigned to the erosion intensity unit depending upon the soil erosion intensity and delivery ratio in a sub-watershed. Higher the soil erosion intensity and delivery

ratio in the sub-watershed higher is the weightage value assigned to the erosion mapping unit. The weightage value assigned to erosion mapping unit in a sub-watershed ranges from 11-20. The SYI values for classification of various categories of priority are given in **Table 8**. The SYI index as per erosion category of various sub-watersheds in the catchment area has been estimated and given in **Annexure I**.

Table 8: Criteria for Priority Categories

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

The objective of the SYI method is to prioritize sub-watershed in a catchment area for treatment. The sub-watersheds with very high and high priority category in the catchment are required to be treated on priority basis; however, the area under severe and very severe soil erosion category in all the sub-watersheds would be taken up for treatment measures. Thus, the prioritization will help in understanding which sub-watershed to be taken for priority during the 14 years CAT plan comprising of 2 years of implementation and 10 years of maintenance.

Hence, under the present CAT plan implementation, the sub-watersheds would be treated as per the priority defined in **Table 9** i.e. the sub-watersheds falling in the high and medium category would be taken up in the second year and sub-watersheds falling in the low and very low would be taken up in the third year (**Figure 11**).

Table 9: Prioritization of Sub-Watershed Falling in Sawalkote HEP Free Draining Catchment Area

Sub-Watershed	EIMU Area (ha)	SYI	Priority Number
High Priority (1200-1299)			
1D1B4f	3267	1228	1
	3267 (2.50%)		
Medium Priority (1100-1199)			
1D1B4a	8253	1175	2
1D1B5g	16058	1139	3
1D1B7b	4478	1131	4
1D1B5c	4669	1125	5
1D1B6b	3651	1122	6
1D1B4b	6170	1116	7
1D1B6d	4908	1105	8
	48187 (36.84%)		
Low Priority (1000-1099)			
1D1B6a	5978	1097	9
1D1B1a	4431	1092	10
1D1B7a	4376	1083	11

Sub-Watershed	EIMU Area (ha)	SYI	Priority Number
1D1B6c	2920	1057	12
1D1B1b	4277	1054	13
1D1B7c	4743	1048	14
1D1B5b	5808	1046	15
1D1B5f	13294	1039	16
1D1B4d	5065	1022	17
1D1B5d	5982	1021	18
1D1B5a	17719	1018	19
	74593 (57.04%)		
Very Low Priority (< 1000)			
1D1B4c	4738	980	20
	4738 (3.62%)		

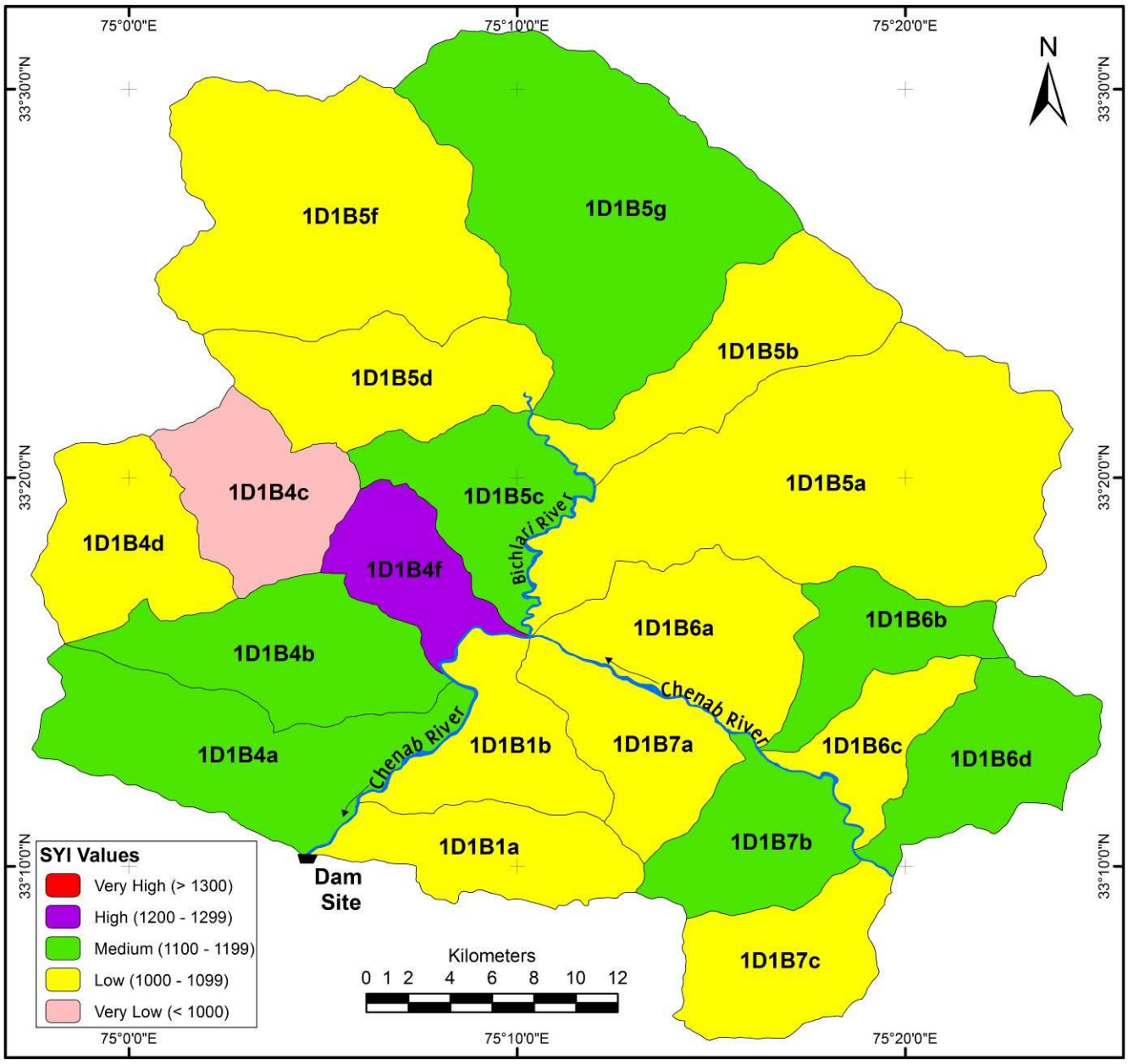


Figure 11: Sub-Watershed Prioritization of Sawalkote HEP Free Draining Catchment Area

7.0 TREATABLE AREA

Areas under moderate, severe and very severe erosion intensity category in all the 20 Subwatersheds will be taken up for treatment. To arrive at such an area, first of all areas under moderate, severe and very severe erosion intensity category were extracted for each Subwatershed, which comes out to be **48659.84 ha (**refer **Table 6).** Thereafter, areas under moderate, severe and very severe erosion intensity category falling above 3000 m of elevation and beyond 45 degree of slope were removed, which comes out to be **43043.91 ha**. Lastly, areas under moderate, severe and very severe erosion intensity category upto 3000 m of elevation and upto 45 degree of slope falling under dense forest, cultivated land, settlements and river/ waterbody classes of land use/ land cover have been excluded. The Subwatershed wise and land use/ land cover wise area thus arrived at and considered as treatable area is **24945.45 ha (or say 24945 ha)** and is presented below in **Table 10.**

8.0 WATERSHED MANAGEMENT – AVAILABLE TECHNIQUES

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.

Following Engineering and Biological measures shall be suggested for the catchment area treatment depending upon the requirement and suitability:

8.1 Biological Measures

The biological measures will be undertaken under four different schemes as detailed below to make them specific to the needs of the areas being treated. The estimate for each of the four schemes has been prepared based on the Forest Schedule of Rates notified by Circular No. 06 of 2022 dated 18.05.2022 issued by the Office of the Pr. Chief Conservator of Forests & HoFF, Govt. of J&K, refer (**Annexure II**).

- Afforestation
- Enrichment
- Pasture development
- Assisted Natural Regeneration

Supplemented by

- Plant Production
- Maintenance of PB raised conifer saplings in nurseries
- Maintenance of NR saplings in nurseries
- Engagement of Labours as Watch and Ward

Table 10: Sub-watershed wise area under Moderate, Severe and Very Severe Erosion Category under Open Forest, Scrub land and Barren Land

Sub-Watershed	Open Forest			Scrub Land			Barren Land			Total		
	Moderate	Severe	Very Severe	Moderate	Severe	Very Severe	Moderate	Severe	Very Severe	Moderate	Severe	Very Severe
1D1B1a	0.00	0.00	0.00	604.65	128.42	0.00	4.04	0.00	0.00	**608.70**	**128.42**	**0.00**
1D1B1b	0.00	0.00	0.00	722.25	90.03	0.00	34.05	0.00	0.00	**756.30**	**90.03**	**0.00**
1D1B4a	0.05	0.00	0.00	243.07	18.93	0.00	712.59	209.98	0.00	**955.70**	**228.91**	**0.00**
1D1B4b	0.00	0.00	0.00	756.41	13.89	0.00	2.74	0.00	0.00	**759.15**	**13.89**	**0.00**
1D1B4c	2.20	0.00	0.00	410.15	0.06	0.00	60.84	0.00	0.00	**473.19**	**0.06**	**0.00**
1D1B4d	1.16	0.00	0.00	555.55	0.02	0.00	15.12	0.00	0.00	**571.83**	**0.02**	**0.00**
1D1B4f	0.00	0.06	0.00	664.49	37.91	3.16	5.41	19.15	0.00	**669.90**	**57.12**	**3.16**
1D1B5a	0.00	0.00	0.00	2900.10	28.55	0.32	124.39	25.97	0.00	**3024.49**	**54.53**	**0.32**
1D1B5b	0.00	0.00	0.00	1088.46	35.24	0.00	31.04	0.00	0.00	**1119.50**	**35.24**	**0.00**
1D1B5c	0.00	0.00	0.00	568.83	77.86	1.31	10.73	38.60	0.00	**579.56**	**116.46**	**1.31**
1D1B5d	0.00	0.00	0.00	458.17	0.00	0.00	3.78	2.29	0.00	**461.94**	**2.29**	**0.00**
1D1B5f	0.00	0.00	0.00	1809.11	0.31	0.00	43.30	6.38	0.00	**1852.41**	**6.69**	**0.00**
1D1B5g	0.00	0.00	0.00	4919.84	34.16	0.00	467.67	38.39	0.00	**5387.51**	**72.55**	**0.00**
1D1B6a	0.00	0.00	0.00	1487.96	229.21	0.00	33.91	9.01	0.00	**1521.87**	**238.22**	**0.00**
1D1B6b	0.00	0.00	0.00	986.08	4.03	0.00	25.05	4.08	0.00	**1011.14**	**8.11**	**0.00**
1D1B6c	0.00	0.00	0.00	712.09	18.39	0.00	29.55	3.96	0.00	**741.64**	**22.35**	**0.00**
1D1B6d	0.00	0.00	0.00	1181.05	13.51	0.00	18.61	19.30	0.00	**1199.66**	**32.80**	**0.00**
1D1B7a	0.00	0.00	0.00	835.66	136.16	0.00	55.37	85.43	0.00	**891.03**	**221.60**	**0.00**
1D1B7b	0.00	0.00	0.00	536.70	54.24	0.00	8.21	10.17	0.00	**544.91**	**64.41**	**0.00**
1D1B7c	0.77	0.08	0.00	384.08	0.40	0.00	22.87	8.36	0.00	**407.72**	**8.85**	**0.00**
Total	**4.17**	**0.14**	**0.00**	**21824.71**	**921.30**	**4.78**	**1709.25**	**481.08**	**0.00**	**23538.14**	**1402.52**	**4.78**

8.1.1 Normal Afforestation

A well-stocked forest plays a very important in control of soil erosion. Thus, it is proposed to increase the vegetal cover in the area. This will include raising of multi-tier mixed vegetation of suitable local species on steep and sensitive catchment areas of rivers/streams with the objective of keeping such areas under permanent vegetative cover. 1100 plants per ha are proposed to be planted under this scheme. PCC Fence Posts at spacing of 10 feet and 5 strands of GI Wire with criss cross have been proposed to safeguard the plantation sites. The cost for afforestation excluding plant production cost has been taken as Rs. 1,31,040/- per ha including Rs. 28,390/- for maintenance for a period of 10 years. A total of 2040 ha area has been proposed under this scheme, out of which, 1255 ha has been proposed in Ramban Forest Division, 685 ha has been proposed in Batote Forest Division and 100 ha has been proposed in Udhampur Forest Division. Detailed estimate prepared for the scheme is given as **Annexure III**. The area to be brought under afforestation programme in different sub-watersheds is given at **Table 11**.

8.1.2 Enrichment

In areas where natural trees exist but are depleted due to excessive pressure of local population for timber, fuelwood and fodder are to be undertaken under enrichment. 800 plants per ha are proposed to be planted under this scheme. PCC Fence Posts at spacing of 10 feet and 5 strands of GI Wire with criss cross have been proposed to safeguard the plantation sites. The cost for enrichment excluding plant production cost has been taken as Rs. 1,11,080/- per ha including Rs. 21,280/- for maintenance for a period of 10 years. A total of 919 ha area has been proposed under this scheme, out of which, 604 ha has been proposed in Ramban Forest Division, 290 ha has been proposed in Batote Forest Division and 25 ha has been proposed in Udhampur Forest Division. Detailed estimate prepared for the scheme is given as **Annexure III**. The area to be brought under enrichment in different sub-watersheds is given at **Table 11**.

8.1.3 Pasture Development

As there are degraded patches of pasture in the area, this measure will be adopted to encourage development of new and healthy pastures for use of cattle of the area. Barren land with greater slopes has been recommended to be treated by developing pastures over them. Under this treatment, suitable species of grasses and leguminous plant species be planted in the land area earmarked for the purpose. 200 plants and 1000 grass slips in patches @ per ha are proposed to be planted under this scheme. PCC Fence Posts at spacing of 10 feet and 5 strands of GI Wire with criss cross have been proposed to safeguard the plantation sites. The cost for pasture development excluding plant production cost has been taken as Rs. 83,510/- per ha including Rs. 14,300/- for maintenance for a period of 10 years. A total of 915 ha area has been proposed under this scheme, out of which, 650 ha has been proposed in Ramban Forest Division, 240 ha has been proposed in Batote Forest Division and 25 ha has been proposed in Udhampur Forest Division. Detailed estimate prepared for the scheme is given as

Annexure III. The area to be brought under pasture development in different sub-watersheds is given at **Table 11**.

8.1.4 Assisted Natural Regeneration

It is important to enhance the establishment of secondary forest from degraded grassland and shrub vegetation by protecting and nurturing the mother trees and their wildlings inherently present in the area. Assisted natural regeneration is proposed to accelerate, rather than replace, natural successional processes by removing or reducing barriers to natural forest regeneration such as soil degradation, competition with weedy species, and recurring disturbances (e.g., fire, grazing, and wood harvesting). 400 plants per ha are proposed to be planted under this scheme. PCC Fence Posts at spacing of 10 feet and 5 strands of GI Wire with criss cross have been proposed to safeguard the plantation sites. Cost for Assisted natural regeneration excluding plant production cost has been taken as Rs. 84,775/- per ha including Rs. 13,425/- for maintenance for a period of 10 years. A total of 562 ha area has been proposed under this scheme, out of which, 417 ha has been proposed in Ramban Forest Division, 130 ha has been proposed in Batote Forest Division and 15 ha has been proposed in Udhampur Forest Division. Detailed estimate prepared for the scheme is given as **Annexure III**. The area to be brought under assisted natural regeneration in different sub-watersheds is given at **Table 11**.

Table 11: Sub-watershed wise Biological Treatment Measures

S. No.	Sub-Watershed	Division	Normal Afforestation (ha)	Enrichment (ha)	Pasture Development (ha)	Assisted Natural Regeneration (ha)
1	1D1B1a	Udhampur	100	25	25	15
	1D1B1a	Batote	125	25	25	25
2	1D1B1b	Batote	135	50	25	15
3	1D1B4a	Ramban	275	125	210	75
4	1D1B4b	Ramban	25	15	0	30
5	1D1B4c	Ramban	5	2	0	2
6	1D1B4d	Ramban	5	2	0	10
7	1D1B4f	Ramban	100	75	25	35
8	1D1B5a	Ramban	75	35	30	15
9	1D1B5b	Ramban	75	0	35	10
10	1D1B5c	Ramban	225	75	75	60
11	1D1B5d	Ramban	10	0	0	30
12	1D1B5f	Ramban	25	0	0	30
13	1D1B5g	Ramban	85	50	50	35
14	1D1B6a	Ramban	250	200	200	40
15	1D1B6b	Ramban	25	0	0	15
16	1D1B6c	Ramban	25	0	25	10
17	1D1B6d	Ramban	50	25	0	20
18	1D1B7a	Batote	225	160	150	40
19	1D1B7b	Batote	100	50	35	40
20	1D1B7c	Batote	100	5	5	10
Total			**2040**	**919**	**915**	**562**

8.1.5 Plant Production

Having sufficient stock of plants is a pre requisite for undertaking all the biological measures suggested above. Therefore, in order to ensure sufficient stock of plant following measures are proposed to be undertaken:

- Formation of new permanent nursery
- Raising of sapling in poly bag of size (9" x 6")
- Raising of naked root sapling

i. Formation of New Permanent Nursery

Nursery is defined as an area where plants are raised for eventual planting out in the forest area or elsewhere selected for plantation in field. In order to cater to the needs of biological treatment measures, 4 (four) new nurseries of 1 ha each are proposed to be developed at Gool, Gandri, Banihal and Ramban. As per the discussions held with the officials of state forest department, cost for the formation of nursery has been taken as Rs. 15,00,000/- per nursery.

ii. Raising of Sapling in Poly Bag

The total plants raised in poly bags to be planted in pits under different biological measures schemes are 16,93,500 (@ 550 plants/ ha for normal afforestation, 400 plants/ ha for enrichment, 100 plants/ ha for pasture development and 200 plants / ha for assisted natural regeneration). Before planting on sites, these plants will be raised as saplings in poly bag in the newly formed nurseries as mentioned above. Considering that all the saplings may not survive, 20% more saplings will be raised, which comes out to be 20,32,200. Therefore, total 20,32,200 saplings are proposed to be raised in poly bag of size (9" x 6"). Out of the total, 12,96,300 saplings are proposed to be raised in Ramban Forest Division, 6,51,300 saplings are proposed to be raised in Batote Forest Division and 84,600 saplings are proposed to be raised in Udhampur Forest Division. The unit cost considered for raising sapling in poly bag is Rs. 8.03/ plant. The unit cost considered is as given at Sr. No. b under Plant Production of Forest Rate Schedule Tariff for Forestry, Soil Conservation and related works notified by Circular No. 06 of 2022 dated 18.05.2022 issued by the Office of the Pr. Chief Conservator of Forests & HoFF, Govt. of J&K (refer **Annexure II**).

iii. Raising of Naked Root Saplings

Similarly, total naked root plants to be planted in pits under different biological measures schemes are 16,93,500 (@ 550 plants/ ha for normal afforestation, 400 plants/ ha for enrichment, 100 plants/ ha for pasture development and 200 plants / ha for assisted natural regeneration). Before planting on sites, these plants will be raised as saplings in poly bag in the newly formed nurseries as mentioned above. Considering that all the saplings may not survive, 20% more saplings will be raised, which comes out to be 20,32,400. Therefore, total 20,32,400 saplings are proposed to be raised in poly bag of size (9" x 6"). Out of the total, 12,96,300 saplings are proposed to be raised in Ramban Forest Division, 6,51,300 saplings are proposed to be raised in Batote Forest Division and 84,600 saplings are proposed to be raised in Udhampur Forest Division. The unit cost considered for raising naked root sapling is Rs.

7.44/ plant. The unit cost considered is as given at Sr. No. d under Plant Production of Forest Rate Schedule Tariff for Forestry, Soil Conservation and related works notified by Circular No. 06 of 2022 dated 18.05.2022 issued by the Office of the Pr. Chief Conservator of Forests & HoFF, Govt. of J&K (refer **Annexure II**).

8.1.6 Maintenance of PB raised Saplings in Nurseries

As 10 years maintenance has been proposed for all the plantation sites, therefore, it is necessary to ensure continuous supply of saplings raised in poly bags during this maintenance period. The total poly bag raised saplings proposed for maintenance in nurseries are 16,25,760. Out of which, 5,08,050 saplings (@25% of total 20,32,200 saplings raised in newly formed nurseries) will be maintained during 1st year of planting. 3,04,830 saplings (@15% of total 20,32,200 saplings raised in newly formed nurseries) will be maintained during 2nd year of planting. 1,01,610 saplings (@5% of total 20,32,200 saplings raised in newly formed nurseries) will be maintained per year from 3rd year to 10th year of planting.

The total poly bag raised saplings proposed for maintenance in nurseries in Ramban Forest Division are 10,37,040. Out of which, 3,24,075 saplings (@25% of total 12,96,300 saplings raised in newly formed nurseries) will be maintained during 1st year of planting. 1,94,445 saplings (@15% of total 12,96,300 saplings raised in newly formed nurseries) will be maintained during 2nd year of planting. 64,815 saplings (@5% of total 12,96,300 saplings raised in newly formed nurseries) will be maintained per year from 3rd year to 10th year of planting.

The total poly bag raised saplings proposed for maintenance in nurseries in Batote Forest Division are 5,21,040. Out of which, 1,62,825 saplings (@25% of total 6,51,300 saplings raised in newly formed nurseries) will be maintained during 1st year of planting. 97,695 saplings (@15% of total 6,51,300 saplings raised in newly formed nurseries) will be maintained during 2nd year of planting. 32,565 saplings (@5% of total 6,51,300 saplings raised in newly formed nurseries) will be maintained per year from 3rd year to 10th year of planting.

The total poly bag raised saplings proposed for maintenance in nurseries in Udhampur Forest Division are 67,680. Out of which, 21,150 saplings (@25% of total 84,600 saplings raised in newly formed nurseries) will be maintained during 1st year of planting. 12,690 saplings (@15% of total 84,600 saplings raised in newly formed nurseries) will be maintained during 2nd year of planting. 4,230 saplings (@5% of total 84,600 saplings raised in newly formed nurseries) will be maintained per year from 3rd year to 10th year of planting.

The unit cost considered for maintenance of poly bag raised sapling is Rs. 2.66/ plant during 1st and 2nd year of planting and Rs. 3.83/ plant from 3rd year to 10th year of planting. The unit cost considered is as given at Sr. No. e under Plant Production of Forest Rate Schedule Tariff for Forestry, Soil Conservation and related works notified by Circular No. 06 of 2022 dated

18.05.2022 issued by the Office of the Pr. Chief Conservator of Forests & HoFF, Govt. of J&K (refer **Annexure II**).

8.1.7 Maintenance of NR raised Saplings in Nurseries

Since naked root (NR) saplings are being maintained for 1 year, therefore it is proposed to maintain 5,08,050 NR saplings (@25% of total 20,32,200 saplings raised in newly formed nurseries). NR sapling proposed to be maintained in Ramban Forest Division are 3,24,075 (@25% of total 12,96,300 saplings raised in newly formed nurseries). NR sapling proposed to be maintained in Batote Forest Division are 1,62,825 (@25% of total 6,51,300 saplings raised in newly formed nurseries). NR sapling proposed to be maintained in Udhampur Forest Division are 21,150 (@25% of total 84,600 saplings raised in newly formed nurseries). The unit cost considered for maintenance of NR sapling is Rs. 2.48/ plant.

8.1.8 Engagement of Labours as Watch and Ward

It is proposed to engage local people of labours to assist regular staff for the protection of the plantation sites. As per the discussions held with the officials of state forest department, it is proposed to engage 1 labour for every 15 ha of plantation area, therefore, total 296 labours per year for a period of 11 years are proposed under this CAT Plan. In view of this, it is proposed to engage 195 labours in Ramban Forest Division, 90 labours in Batote Forest Division and 11 labours in Udhampur Forest Division. The total period for the engagement shall be 11 years i.e. planting year and subsequent 10 maintenance years. The rate for engagement of the labour is Rs. 330 per day for the current year. Considering per year revision in the wage rate, an enhancement @ 7.76% per year on the previous year has been applied for calculating the wage rate enhancement. The base wage rate has been taken as per Plant Production of Forest Rate Schedule Tariff for Forestry, Soil Conservation and related works notified by Circular No. 06 of 2022 dated 18.05.2022 issued by the Office of the Pr. Chief Conservator of Forests & HoFF, Govt. of J&K (refer **Annexure II**).

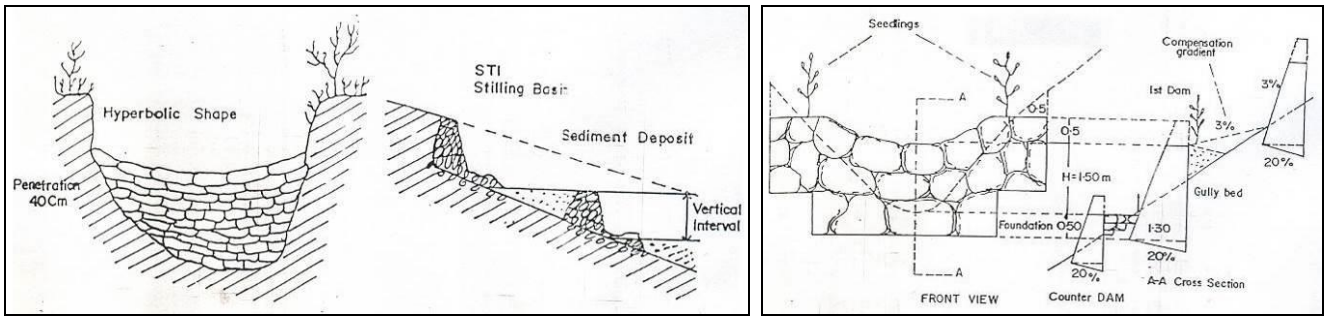
8.2 Engineering Measures

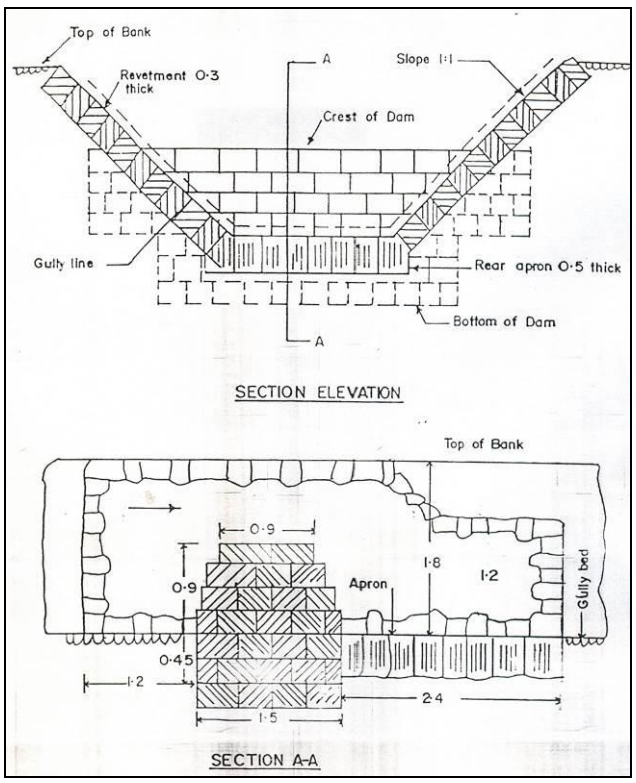
Engineering measures are more effective in conserving soil and water when they are supplemented by vegetative methods. But in certain situations, only engineering measures can be proposed. Various engineering measures have been suggested for landslides/ landslips, treatment of nalas and soil and water conservation in private/ irrigated land in the catchment area. The engineering structures suggested are as follows:

- Dry Stone Masonry Check walls and Check dams
- Crate wire Check walls and Check dams
- Gabion Check walls and Check dams
- Geotextile Mating
- Catch Water Drains
- Silt Observation Points

8.2.1 Dry Stone Masonry Structures

Dry stone masonry structures can be made of boulders piled up across the gulley if they are locally available. Structures for damming a gulley or a stream to refine the flow velocity are called check dams. Total 1,06,400 cum of dry stone masonry structures has been proposed, out of which, 86,400 cum has been proposed in Ramban Forest Division, 18,500 cum has been proposed in Batote Forest Division and 1,500 cum has been proposed in Udhampur Forest Division. In order to maintain the structures, 25% of the total cost has been kept as maintenance cost after 5 years of implementation of the structures. The unit cost of construction of such structure is Rs. 1099/- per cum (refer Sr. No. i under Engineering Works of Forest Rate Schedule Tariff for Forestry, Soil Conservation and related works notified by Circular No. 06 of 2022 dated 18.05.2022 issued by the Office of the Pr. Chief Conservator of Forests & HoFF, Govt. of J&K, given as **Annexure II**). The total quantity of DRSM structures suggested for each sub-watershed is given at **Table 12**.



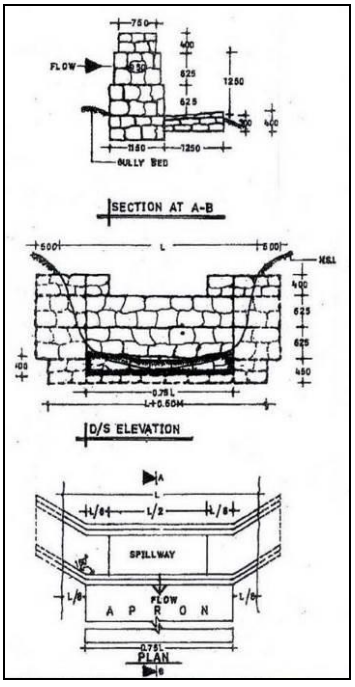


Layout of Dry Stone Check Dam

8.2.2 Crate Wire Structures

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). The average size of crate wire structure used in the state is 20 ft x 4 ft x 4 ft.

Total 47,600 cum of crate wire structures has been proposed, out of which, 38,275 cum has been proposed in Ramban Forest Division, 8,725 cum has been proposed in Batote Forest Division and 600 cum has been proposed in Udhampur Forest Division. In order to maintain the structures, 25% of the total cost has been kept as maintenance cost after 5 years of implementation of the structures. As per the discussions held with the staff of state forest department, unit cost of construction of such structure has been considered as Rs. 2208/- per cum. The total quantity of crate wire structures suggested for each sub-watershed is given at **Table 12**.



Layout of Crate Wire Check Dam

8.2.3 Gabion Structures

If loose boulders are considered not to be stable in a particular reach of the stream, Gabion structures can be installed. These structures are not that easy to get erected as compared to DRSM structures because the terrain is stiff and the wire used for making gabion boxes has to be carried by human labour. Carrying the wire will be tedious and time consuming. Therefore, with proper judgment about the site conditions, these structures may be installed. Total 34,200 cum of gabion structures has been proposed, out of which, 27,475 cum has been proposed in Ramban Forest Division, 6,275 cum has been proposed in Batote Forest Division, and 450 cum has been proposed in Udhampur Forest Division. In order to maintain the structures, 25% of the total cost has been kept as maintenance cost after 5 years of implementation of the structures. Since rate of gabion structures are not included in the Forest Rate Schedule Tariff for Forestry, Soil Conservation and related works, therefore, rate given at Code No. 16.98 of Jammu & Kashmir Schedule of Rates, issued by the Public Works (R&B) Department, Govt. of J&K vide File No. PWD-ACCT/90/2022 dated 04.04.2022 has been considered. The unit cost of these structures has been taken as Rs. 3071.50/- per cum. The total quantity of gabion structures suggested for each sub-watershed is given at **Table 12**.

8.2.4 Geotextile Mats

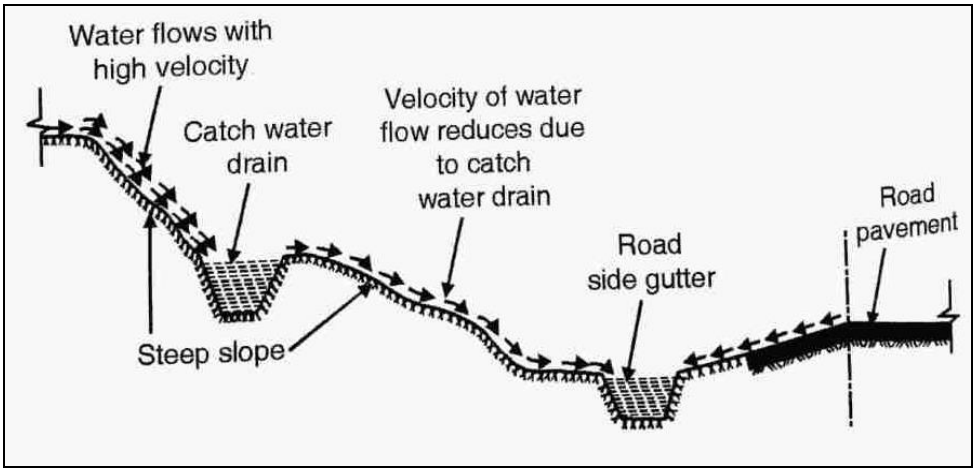
Geotextile mat are blanket mats or nets made from woven or non-woven jute, coir or straw materials for slope protection. Woven geotextile mats are manufactured by blending and weaving fibers together on a loom forming one uniform length. Non-woven geotextile mats are produced by entangling fibers, long or short together either through needle punching or needle punch coir felt with double side PP netting. These erosion control matting are designed using coir fiber materials to create strong mat for stabilization and erosion control along slopes, hillsides etc. Benefits of geotextile mat includes, prevention of soil erosion, faster binding of soil, excellent air and water permeability, promotes natural vegetation, 100% biodegradable and environment friendly. Life span of geotextile mat ranges from 4 to 5 years.

Total 22,50,000 sqm of geotextile mats/ sheets has been proposed, out of which, 18,46,675 sqm has been proposed in Ramban Forest Division, 3,75,175 sqm has been proposed in Batote Forest Division and 28,150 sqm has been proposed in Udhampur Forest Division. In order to maintain the mats, 25% of the total cost has been kept as maintenance cost after 5 years of implementation of the mats. As per the discussions held with the staff of state forest department, unit cost of geotextile mat has been considered as Rs. 30 per sqm. The total quantity of geotextile mat suggested for each sub-watershed is given at **Table 12**.

Example of Geotextile Mats

8.2.5 Catch Water Drains

Among the most effective, practical, and the least expensive measures of landslide hazard management is construction of catch-water drains for run-off and surface waters in the identified hazard-prone zone so that no or little water is able to infiltrate into the ground. All the streams and minor water courses are diverted around the crown of the slide or the potentially hazardous area through catch water drains with an adequate gradient. The catch water drain when provided restricts the runoff to pass over such vulnerable areas and water is guided through these drains on foothill or along the kuchcha/pucca roads. The ground surface of threatened area is leveled out to eliminate all depressions where water can accumulate. Total 60,900 cum of catch water drains has been proposed, out of which, 45,670 cum has been proposed in Ramban Forest Division, 13,570 cum has been proposed in Batote Forest Division and 1,160 cum has been proposed in Udhampur Forest Division. In order to maintain the drains, 25% of the total cost has been kept as maintenance cost after 5 years of implementation of the drains. Since rate of catch water drains are not included in the Forest Rate Schedule Tariff for Forestry, Soil Conservation and related works, therefore, rate given at Code No. 2.8.1 of Jammu & Kashmir Schedule of Rates, issued by the Public Works (R&B) Department, Govt. of J&K vide File No. PWD-ACCT/90/2022 dated 04.04.2022 has been considered. The unit cost of catch water drain has been taken as Rs. 656.55/- per Cum. The total quantity of catch water drains suggested for each sub-watershed is given at **Table 12**.



Example of Catch Water Drain

Table 12: Sub-watershed wise Engineering Treatment Measures

S. No.	Sub-Watershed	Name of Forest Division	DRSM Structures (Cum)	Crate Wire Structures (Cum)	Gabion Structure (Cum)	Geotextile Sheets (Sqm)	Catch Water Drain (Cum)
1	1D1B1a	Udhampur	1500	600	450	28150	1660
		Batote	2000	800	575	36975	2150
2	1D1B1b	Batote	1100	550	400	24175	1900
3	1D1B4a	Ramban	9100	5650	3975	325425	7600
4	1D1B4b	Ramban	9100	4250	3050	185975	5710
5	1D1B4c	Ramban	0	125	50	2825	0
6	1D1B4d	Ramban	1800	850	625	97675	0
7	1D1B4f	Ramban	9100	4250	3050	186000	5710
8	1D1B5a	Ramban	1800	850	625	32550	1900
9	1D1B5b	Ramban	1300	550	400	30175	1900
10	1D1B5c	Ramban	9100	4250	3050	185975	5710
11	1D1B5d	Ramban	11300	4250	3050	185975	3810
12	1D1B5f	Ramban	9100	2825	2050	151225	0
13	1D1B5g	Ramban	11300	4225	3050	185975	0
14	1D1B6a	Ramban	4500	2275	1625	93100	3810
15	1D1B6b	Ramban	4500	2275	1625	93100	3810
16	1D1B6c	Ramban	900	250	225	16275	1900
17	1D1B6d	Ramban	3500	1400	1025	74425	3810
18	1D1B7a	Batote	4500	2275	1625	93100	3810
19	1D1B7b	Batote	9100	4250	3050	185975	3810
20	1D1B7c	Batote	1800	850	625	34950	1900
	Total		**106400**	**47600**	**34200**	**2250000**	**60900**

8.2.6 Silt Observation Points

Four silt observation locations for regular monitoring of silt load coming in tributaries have been suggested which should be established in consultation with state forest department. Suggested tributaries are Bichlari River and Tatsun/ Chainj Nala in Ramban Forest Division, Branchachali Khad in Batote Forest Division and Mankani Khad in Udhampur Forest Division. This would ensure monitoring efficacy of implementation various treatments measures suggested as in CAT plan. Monitoring would be undertaken for a period of 13 years. Cost towards this should be kept in project estimates and could be taken as below:

Cost of one laboratory = Rs. 10.00 lakh*

One hut at each site (@ Rs. 200,000/- lakh) = Rs. 8.00 lakh

Cost for hiring services of persons (@ two persons per site) = Rs. 207.03 lakh*

Consumables for the measurement Rs. 2.00 lakh per year for 13 years = 26.00 lakh

Total Cost = Rs. 251.03 lakh

**Location of laboratory has been suggested at Tangar, Batote Forest Division.*

***The rate for engagement of the labour is Rs. 330 per day for the current year. Considering per year revision in the wage rate, an enhancement @ 7.76% per year on the previous year has been applied for the next 12 years for calculating the wage rate enhancement.*

8.3 Other Components

Apart from the biological and engineering treatment measures in the catchment area there are other aspects of the CAT Plan to be addressed and their cost included in the overall cost estimate of the plan. The other components forming the integral ingredients which have to be considered and included while formulating the CAT plans are:

- Micro Planning
- Entry Point Activity
- Infrastructure Development
- Socio-economic
- Administrative Expenditure
- Capacity Building and Extension Education
- Monitoring & Evaluation
- Contingencies

8.3.1 Provision for Micro Plans

Based on the ground truth reality in each of the sub-watershed comprehensive micro plan for execution of the work has to be prepared as per norms. For this purpose a provision of **Rs. 50.00 lakh** is being made. Since majority of the free draining catchment area falls under Ramban Forest Division, therefore, funds for micro plans has been considered in Ramban Forest Division.

8.3.2 Entry Point Activities

The Entry Phase in any development project is a stage of the project management where efforts are made to introduce the facilitating/ executing agency and the village community. Recognizing the importance of involving people in their projects, the stress on Entry Point Activities (EPA) as a means of winning people's trust and building people's confidence has increased. People's participation means identifying, planning, budgeting, implementing, monitoring, and maintenance by the people. The entry phase serves as a foundation of any programme.

As a means to build goodwill with the communities, EPAs are proposed depending upon the need of the community, as identified during various meetings. The activities undertaken under this programme should not benefit an individual or a group but should be for the good of the entire village community. EPA is intended for community mobilization at the initial stages of the project implementation.

The activities to be taken up under EPA shall be decided by the community in the course of preparation of the Micro- Plan. To enhance the community engagement in the EPA, people must be mobilized to contribute to the cause in the form of labour or fund. It is important that the facilitator does not play the lead role in organizing this common action but motivate the various groups to take the initiative, to plan and implement the programme.

Under EPA, the communities will select small infrastructure related activities based on their immediate need. The selection of the EPA should be made in a manner whose results are visible quite early to the community. EPA should include creation of community assets to be maintained by the communities for example:

- JFMC office cum meeting Hall
- Community Hall cum Store
- Provision of drinking water
- Water harvesting structure
- Rest shed
- Market shed
- Rural electrification using solar power/Solar light
- Creation of roads and culverts, all-weather pathways inside the habitation etc., And
- Energy saving and energy alternative devices
- Construction of Drainage channel for waste-water disposal
- Construction of toilets

The above is an indicative list and other activities, as may be necessary, as per the local conditions and requirements. A budgetary provision of **Rs. 679.55 lakh** has been kept under this component. Out of which, Rs. 475.70 lakh has been proposed in Ramban Forest Division, Rs. 181.15 lakh has been proposed in Batote Forest Division and Rs. 22.70 lakh has been proposed in Udhampur Forest Division.

8.3.3 Infrastructure Development

The component includes construction/ maintenance of departmental buildings and inspection paths etc. For an efficient management of forest resources, it is essential that infrastructure of the Forest Department is adequately developed and maintained. Various types of buildings and inspection paths have been constructed in the past. However, there is necessity of maintenance of these buildings and inspection paths. Most of the field staff huts have been damaged and needs to be repaired. The existing forest rest houses also need maintenance. The buildings and inspection paths to be taken up for construction/ maintenance may be decided by the respective DFO/ CF/ CCF. Also, provision has been made in the CAT Plan to provide support to the implementing agency in the form of vehicle, which again may be decided by the respective DFO/ CF/ CCF.

A budgetary provision of **Rs. 849.44 lakh** has been kept under this component. Out of which, Rs. 594.63 lakh has been proposed in Ramban Forest Division, Rs. 226.44 lakh has been proposed in Batote Forest Division and Rs. 28.38 lakh has been proposed in Udhampur Forest Division.

8.3.4 Socio-economic

The following measures would help in rejuvenating the ecosystem and in reducing the soil erosion in the region. It shall be carried out for local villages in free draining catchment area of Sawalkote Project.

i. Plan for plantation in the village area.
ii. Avenue plantation using fuel wood trees with suitable fencing in the villages.
iii. Technical & Financial support for using alternate energy sources.
iv. Maintenance of hygiene in the villages.
v. Establishment of training, awareness programmes for water and soil conservation in the village areas
vi. Establishing a rural technology support program
vii. Awareness program for conservation of wildlife and natural resource.

A budgetary provision of **Rs. 509.66 lakh** has been kept under this component. Out of which, Rs. 356.78 lakh has been proposed in Ramban Forest Division, Rs. 135.86 lakh has been proposed in Batote Forest Division and Rs. 17.03 lakh has been proposed in Udhampur Forest Division.

8.3.5 Administrative Expenditure

For an efficient management of forest resources, it is essential that operational support to the implementing agency is adequately developed. The component includes logistic support to forest staff and operational support to staff. Provision has been made in the CAT Plan to provide operational support to the implementing agency in the form of Computers with printer and Fax Machine, Photocopy Machine, Scanner etc.; Office furniture; Maintenance of machinery and equipments; Amenities to staff, support for formation of Project management Unit (if felt necessary by state forest department), salaries of additional manpower/ experts needed in Project Management Unit (if felt necessary by state forest department) etc. for better implementation of CAT Plan.

A budgetary provision of **Rs. 849.44 lakh** has been kept under this component. Out of which, Rs. 594.63 lakh has been proposed in Ramban Forest Division, Rs. 226.44 lakh has been proposed in Batote Forest Division and Rs. 28.38 lakh has been proposed in Udhampur Forest Division.

8.3.6 Capacity Building and Extension Education

The component includes participatory action research for adaptive building management, site/issue specific research/ study/ survey, training and capacity building of staff and communities and Information dissemination. Training and Capacity building of forest staff shall be an integral part of such studies. Some of the indicative activities includes:

Study tour within India: The specialized training and study tours within India for forest officials/ officers, who are executing the plan will be provided. The objective of this training

component would be to provide the officers and the staff to augment their skills, professional knowledge, capacity building to be effective and efficient. Study tour within India includes tours at recognized national level institutes.

Publicity Awareness Camp and Workshops: Emphasis should also be laid on the visual publicity of the work proposed under the plan and work carried out on annual basis so that transparency is maintained and the proper documentation of the work is also carried out for future reference and testing the efficacy of the work in due course of time. Workshops will be conducted at various levels to share the experiences for developing sustainable institutions, processes and practices for judicious natural resource use and for bringing livelihood improvement through it. Workshops will mainly be conducted for learning from failures and successes in order to churn ideas for best implementation practices from the ground that could be scaled up both in terms of quality and in terms of quantity to give way to policy backing.

Training on Soil Conservation, Information technology, Environment to Forest Staff: Project will give maximum emphasis on catchment treatment through plantation, soil and water conservation works. Treatment of land slide areas, improvement of habitat of wild animals and conserving biodiversity treatment of agricultural field of stake holders, which are sensitive to soil and water erosion to improve the life standard of the local people through Eco development works and ensure people participation. Training will form an integral part for a sound project process leading to sustainability of the interventions made.

Publication: Project needs to bring out wide range of publication and dissemination material aimed at awareness and education of the local community and building their capacity for sustainable natural resource management in the catchment. The valuable experience aimed by the project in terms of sustainable livelihood approach to catchment treatment will be documented and shared with the other organization. Project will also need to produce a number of reports at different times. The documentation would inter alia include implementation report, progress reports, photography, videography etc.

A budgetary provision of **Rs. 400.00 lakh** has been kept under this component. Out of which, Rs. 332.00 lakh has been proposed in Ramban Forest Division, Rs. 62.00 lakh has been proposed in Batote Forest Division and Rs. 6.00 lakh has been proposed in Udhampur Forest Division.

8.3.7 Monitoring & Evaluation

Monitoring and evaluation will be developed as in-built part of the project management. Thus, a process of self-evaluation at specified intervals of time will ensure the field worthiness and efficacy of the CAT Plan. The emphasis would be on Monitoring and impact studies of the works done under the plan. A sum of **Rs. 500.00 lakh** has been provided for monitoring and evaluation. Out of which, Rs. 415.00 lakh has been proposed in Ramban Forest Division, Rs.

77.50 lakh has been proposed in Batote Forest Division and Rs. 7.50 lakh has been proposed in Udhampur Forest Division.

8.3.8 Contingencies

A provision of **Rs. 1698.88 lakh** has been kept under this component for some leeway to adjust any unforeseen expenditure. Out of which, Rs. 1189.25 lakh has been proposed in Ramban Forest Division, Rs. 452.87 lakh has been proposed in Batote Forest Division and Rs. 56.75 lakh has been proposed in Udhampur Forest Division.

9.0 COST ESTIMATE

The cost estimated for Catchment Area Treatment is **Rs. 22525.77 lakh**. Out of which, **Rs. 15900.83 lakh** is estimated for Ramban Forest Division, **Rs. 5891.00 lakh** is estimated for Batote Forest Division and **Rs. 734.24 lakh** is estimated for Udhampur Forest Division. The details are given in **Tables 13**. The year wise physical and financial targets for free draining catchment area and respective forest divisions are given in from **Table 14** to **Table 17.** Sub-Watershed wise yearly physical and financial targets of proposed biological as well as engineering treatment measures are given in from **Table 18 to Table 26**.

Table 13: Cost Estimate for Catchment Area Treatment of Sawalkote HEP

S. No.	Item	Rate (Rs)	Unit	Physical and Financial Targets							
				Ramban Forest Division		Batote Forest Division		Udhampur Forest Division		Total	
				Phy.	Fin. (Rs in lakh)	Phy.	Fin. (Rs in lakh)	Phy.	Fin. (Rs in lakh)	Phy.	Fin. (Rs in lakh)
A	**Biological Measures**										
1	Normal Afforestation including maintenance	1,31,040	ha	1255	1644.55	685	897.62	100	131.04	**2040**	**2673.22**
2	Enrichment Plantations including maintenance	1,11,080	ha	604	670.92	290	322.13	25	27.77	**919**	**1020.83**
3	Pasture Development including maintenance	83,510	ha	650	542.82	240	200.42	25	20.88	**915**	**764.12**
4	Assisted Natural Regeneration including maintenance	84,775	ha	417	353.51	130	110.21	15	12.72	**562**	**476.44**
5	Plant Production										
a	Formation of New Permanent Nursery	15,00,000	ha	3	45.00	1	15.00	0	0.00	**4**	**60.00**
b	Raising of sapling in PB of size (9" x 6")	8.03	/plant	1296300	104.09	651300	52.30	84600	6.79	**2032200**	**163.19**
c	Raising of NR sapling	7.44	/plant	1296300	96.44	651300	48.46	84600	6.29	**2032200**	**151.20**
6	Maintenance of PB raised conifer saplings in nurseries of size (9" x 6")										
a	During 1st year of raising of plants	2.66	/plant	324075	8.62	162825	4.33	21150	0.56	**508050**	**13.51**
b	During 2nd year of raising of plants	2.66	/plant	194445	5.17	97695	2.60	12690	0.34	**304830**	**8.11**
c	During 3rd year of raising of plants	3.83	/plant	64815	2.48	32565	1.25	4230	0.16	**101610**	**3.89**
d	During 4th year of raising of plants	3.83	/plant	64815	2.48	32565	1.25	4230	0.16	**101610**	**3.89**
e	During 5th year of raising of plants	3.83	/plant	64815	2.48	32565	1.25	4230	0.16	**101610**	**3.89**
f	During 6th year of raising of plants	3.83	/plant	64815	2.48	32565	1.25	4230	0.16	**101610**	**3.89**
g	During 7th year of raising of plants	3.83	/plant	64815	2.48	32565	1.25	4230	0.16	**101610**	**3.89**
h	During 8th year of raising of plants	3.83	/plant	64815	2.48	32565	1.25	4230	0.16	**101610**	**3.89**
i	During 9th year of raising of plants	3.83	/plant	64815	2.48	32565	1.25	4230	0.16	**101610**	**3.89**
j	During 10th year of raising of plants	3.83	/plant	64815	2.48	32565	1.25	4230	0.16	**101610**	**3.89**
7	Maintenance of NR sapling										
a	During 1st year of raising of plants	2.48	/plant	324075	8.04	162825	4.04	21150	0.52	**508050**	**12.60**
8	Engagement of Labours as Watch and Ward										
a	During Planting Year	330	/day	195	234.88	90	108.41	11	13.25	**296**	**356.53**
b	During 1st year of maintenance	355	/day	195	252.67	90	116.62	11	14.25	**296**	**383.54**
c	During 2nd year of maintenance	385	/day	195	274.02	90	126.47	11	15.46	**296**	**415.95**
d	During 3rd year of maintenance	415	/day	195	295.38	90	136.33	11	16.66	**296**	**448.37**
e	During 4th year of maintenance	450	/day	195	320.29	90	147.83	11	18.07	**296**	**486.18**
f	During 5th year of maintenance	485	/day	195	345.20	90	159.32	11	19.47	**296**	**523.99**
g	During 6th year of maintenance	525	/day	195	373.67	90	172.46	11	21.08	**296**	**567.21**

S. No.	Item	Rate (Rs)	Unit	Physical and Financial Targets							
				Ramban Forest Division		Batote Forest Division		Udhampur Forest Division		Total	
				Phy.	Fin. (Rs in lakh)	Phy.	Fin. (Rs in lakh)	Phy.	Fin. (Rs in lakh)	Phy.	Fin. (Rs in lakh)
h	During 7th year of maintenance	565	/day	195	402.14	90	185.60	11	22.68	**296**	**610.43**
i	During 8th year of maintenance	610	/day	195	434.17	90	200.39	11	24.49	**296**	**659.04**
j	During 9th year of maintenance	660	/day	195	469.76	90	216.81	11	26.50	**296**	**713.06**
k	During 10th year of maintenance	710	/day	195	505.34	90	233.24	11	28.51	**296**	**767.08**
	Sub Total A				**7406.54**		**3470.55**		**428.64**		**11305.73**
B	**Engineering Measures**										
9	DRSM Structures	1,099.00	Cum.	86400	949.54	18500	203.32	1500	16.49	**106400**	**1169.34**
a	Maintenance cost @ 25%				237.38		50.83		4.12		**292.33**
10	Crate Wire Structures	2,208.00	Cum.	38275	845.11	8725	192.65	600	13.25	**47600**	**1051.01**
a	Maintenance cost @ 25%				211.28		48.16		3.31		**262.75**
11	Gabion Structures	3,071.50	Cum.	27475	843.89	6275	192.74	450	13.82	**34200**	**1050.45**
a	Maintenance cost @ 25%				210.97		48.18		3.46		**262.61**
12	Geotextile Sheets	30.00	Sqm.	1846675	554.00	375175	112.55	28150	8.45	**2250000**	**675.00**
a	Maintenance cost @ 25%				138.50		28.14		2.11		**168.75**
13	Catch Water Drain	656.55	Cum.	45670	299.85	13570	89.09	1660	10.90	**60900**	**399.84**
a	Maintenance cost @ 25%				74.96		22.27		2.72		**99.96**
14	Silt Observation Points		Nos.	2	120.51	1	70.26	1	60.26	**4**	**251.03**
	Sub Total B				**4486.00**		**1058.19**		**138.88**		**5683.07**
I	**Total I (Sub Total A + Sub Total B)**				**11,892.54**		**4,528.74**		**567.52**		**16988.80**
II	**Other Components**										
15	Micro Planning Cost				50.00						**50.00**
16	Entry Point Activity Cost @4% of Total I				475.70		181.15		22.70		**679.55**
17	Infrastructure Development Cost @5% of Total I				594.63		226.44		28.38		**849.44**
18	Socio-economic Cost @3% of Total I				356.78		135.86		17.03		**509.66**
19	Administrative Expenditure Cost @5% of Total I				594.63		226.44		28.38		**849.44**
20	Capacity Building and Extension Education				332.00		62.00		6.00		**400.00**
21	Monitoring & Evaluation				415.00		77.50		7.50		**500.00**
22	Contingency Cost @10% of Total I				1189.25		452.87		56.75		**1698.88**
	Total II				**4007.99**		**1362.26**		**166.73**		**5536.98**
	Grand Total				**15,900.53**		**5,891.00**		**734.24**		**22525.77**

Table 14: Year Wise Targets (Physical and Financial) for Catchment Area Treatment Plan

S. No.	Measures	Year I		Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Year XIV		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
A	**Biological Measures**																														
1	Afforestation (ha)			885	908.45	1155	1185.61																							**2040**	**2094.06**
	1st Year maintenance					885	64.12	1155	83.68																					**2040**	**147.80**
	2nd Year maintenance							885	38.59	1155	50.36																			**2040**	**88.94**
	3rd Year maintenance									885	27.83	1155	36.32																	**2040**	**64.16**
	4th Year maintenance											885	13.01	1155	16.98															**2040**	**29.99**
	5th Year maintenance													885	42.66	1155	55.67													**2040**	**98.33**
	6th Year maintenance															885	13.01	1155	16.98											**2040**	**29.99**
	7th Year maintenance																	885	13.01	1155	16.98									**2040**	**29.99**
	8th Year maintenance																			885	13.01	1155	16.98							**2040**	**29.99**
	9th Year maintenance																					885	13.01	1155	16.98					**2040**	**29.99**
	10th Year maintenance																							885	13.01	1155	16.98			**2040**	**29.99**
2	Enrichment Plantations (ha)			415	370.43	504	449.87																							**919**	**820.30**
	1st Year maintenance					415	21.79	504	26.46																					**919**	**48.25**
	2nd Year maintenance							415	13.07	504	15.88																			**919**	**28.95**
	3rd Year maintenance									415	11.29	504	13.71																	**919**	**25.00**
	4th Year maintenance											415	4.36	504	5.29															**919**	**9.65**
	5th Year maintenance													415	18.26	504	22.18													**919**	**40.44**
	6th Year maintenance															415	4.36	504	5.29											**919**	**9.65**
	7th Year maintenance																	415	4.36	504	5.29									**919**	**9.65**
	8th Year maintenance																			415	4.36	504	5.29							**919**	**9.65**
	9th Year maintenance																					415	4.36	504	5.29					**919**	**9.65**
	10th Year maintenance																							415	4.36	504	5.29			**919**	**9.65**
3	Pasture development (ha)			395	273.38	520	359.89																							**915**	**633.27**
	1st Year maintenance					395	11.46	520	15.08																					**915**	**26.54**
	2nd Year maintenance							395	6.87	520	9.05																			**915**	**15.92**
	3rd Year maintenance									395	8.89	520	11.70																	**915**	**20.59**
	4th Year maintenance											395	2.29	520	3.02															**915**	**5.31**
	5th Year maintenance													395	15.52	520	20.44													**915**	**35.96**
	6th Year maintenance															395	2.29	520	3.02											**915**	**5.31**
	7th Year maintenance																	395	2.29	520	3.02									**915**	**5.31**
	8th Year maintenance																			395	2.29	520	3.02							**915**	**5.31**
	9th Year maintenance																					395	2.29	520	3.02					**915**	**5.31**
	10th Year maintenance																							395	2.29	520	3.02			**915**	**5.31**
4	Assisted Natural Regeneration (ha)			310	221.19	252	179.80																							**562**	**400.99**
	1st Year maintenance					310	8.15	252	6.63																					**562**	**14.78**
	2nd Year maintenance							310	4.88	252	3.97																			**562**	**8.85**
	3rd Year maintenance									310	6.82	252	5.54																	**562**	**12.36**
	4th Year maintenance											310	1.63	252	1.32															**562**	**2.95**
	5th Year maintenance													310	12.00	252	9.75													**562**	**21.75**
	6th Year maintenance															310	1.63	252	1.32											**562**	**2.95**
	7th Year maintenance																	310	1.63	252	1.32									**562**	**2.95**
	8th Year maintenance																			310	1.63	252	1.32							**562**	**2.95**
	9th Year maintenance																					310	1.63	252	1.32					**562**	**2.95**
	10th Year maintenance																							310	1.63	252	1.32			**562**	**2.95**
5	Plant Production																														
	Formation of New Permanent Nursery	4	60.00																											**4**	**60.00**
	Raising of sapling in PB of size (9" x 6")	905100	72.68	1127100	90.51																									**2032200**	**163.19**
	Raising of NR sapling	905100	67.34	1127100	83.86																									**2032200**	**151.20**
6	Maintenance of PB raised conifer saplings in nurseries of size (9" x 6")																														
	During 1st year of raising of plants			226275	6.02	281775	7.50																							**508050**	**13.51**
	During 2nd year of raising of plants					135765	3.61	169065	4.50																					**304830**	**8.11**
	During 3rd year of raising of plants							45255	1.73	56355	2.16																			**101610**	**3.89**
	During 4th year of raising of plants									45255	1.73	56355	2.16																	**101610**	**3.89**
	During 5th year of raising of plants											45255	1.73	56355	2.16															**101610**	**3.89**
	During 6th year of raising of plants													45255	1.73	56355	2.16													**101610**	**3.89**

S. No.	Measures	Year I		Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Year XIV		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	During 7th year of raising of plants															45255	1.73	56355	2.16											**101610**	**3.89**
	During 8th year of raising of plants																	45255	1.73	56355	2.16									**101610**	**3.89**
	During 9th year of raising of plants																			45255	1.73	56355	2.16							**101610**	**3.89**
	During 10th year of raising of plants																					45255	1.73	56355	2.16					**101610**	**3.89**
7	Maintenance of NR sapling																														
	During 1st year of raising of plants			226275	5.61	281775	6.99																							**508050**	**12.60**
8	Engagement of Labours as Watch and Ward																														
	During Planting Year			134	161.40	162	195.13																							**296**	**356.53**
	During 1st year of maintenance					134	173.63	162	209.91																					**296**	**383.54**
	During 2nd year of maintenance							134	188.30	162	227.65																			**296**	**415.95**
	During 3rd year of maintenance									134	202.98	162	245.39																	**296**	**448.37**
	During 4th year of maintenance											134	220.10	162	266.09															**296**	**486.18**
	During 5th year of maintenance													134	237.21	162	286.78													**296**	**523.99**
	During 6th year of maintenance															134	256.78	162	310.43											**296**	**567.21**
	During 7th year of maintenance																	134	276.34	162	334.08									**296**	**610.43**
	During 8th year of maintenance																			134	298.35	162	360.69							**296**	**659.04**
	During 9th year of maintenance																					134	322.81	162	390.26					**296**	**713.06**
	During 10th year of maintenance																							134	347.26	162	419.82			**296**	**767.08**
	Sub Total A		**200.02**		**2120.84**		**2667.54**		**599.71**		**568.60**		**557.94**		**622.24**		**676.77**		**638.56**		**684.22**		**735.29**		**787.57**		**446.43**				**11305.73**
B	**Engineering measures**																														
9	DRSM Structures (cum)			64800	712.15	41600	457.18																							**106400**	**1169.34**
a	Maintenance cost @ 25%																178.04		114.30												**292.33**
10	Crate Wire Structures (cum)			30550	674.54	17050	376.46																							**47600**	**1051.01**
a	Maintenance cost @ 25%																168.64		94.12												**262.75**
11	Gabion Structures (cum)			21875	671.89	12325	378.56																							**34200**	**1050.45**
a	Maintenance cost @ 25%																167.97		94.64												**262.61**
12	Geotextile Sheets (sqm)			1422850	426.86	827150	248.15																							**2250000**	**675.00**
a	Maintenance cost @ 25%																106.71		62.04												**168.75**
13	Catch Water Drain (cum)			36160	237.41	24740	162.43																							**60900**	**399.84**
a	Maintenance cost @ 25%																59.35		40.61												**99.96**
14	Silt Observation Points (no.)	4	29.64		12.37		13.24		14.12		15.14		16.16		17.33		18.50		19.81		21.27		22.73		24.48		26.24			**4**	**251.03**
	Sub Total B		**29.64**		**2735.22**		**1636.03**		**14.12**		**15.14**		**16.16**		**17.33**		**699.21**		**425.51**		**21.27**		**22.73**		**24.48**		**26.24**				**5683.08**
I	**Total A and B**		**229.66**		**4856.06**		**4303.57**		**613.82**		**583.74**		**574.10**		**639.57**		**1375.98**		**1064.07**		**705.49**		**758.02**		**812.06**		**472.67**				**16988.80**
II	**Other Components**																														
15	Micro Planning Cost		50.00																												**50.00**
16	Entry Point Activity Cost @4% of Total I		339.78		339.78																										**679.55**
17	Infrastructure Development Cost @5% of Total I		424.72		424.72																										**849.44**
18	Socio-economic Cost @3% of Total I		169.89		169.89		169.89																								**509.66**
19	Administrative Expenditure Cost @5% of Total I		11.48		242.80		215.18		30.69		29.19		28.71		31.98		68.80		53.20		35.27		37.90		40.60		23.63				**849.44**
20	Capacity Building and Extension Education		200.00		200.00																										**400.00**
21	Monitoring & Evaluation				43.50		43.00		39.00		37.50		37.50		37.50		37.50		37.50		37.50		37.50		37.50		37.50		37.00		**500.00**
22	Contingency Cost @ 10% of Total I		22.97		485.61		430.36		61.38		58.37		57.41		63.96		137.60		106.41		70.55		75.80		81.21		47.27				**1698.88**
	Total II		**1218.83**		**1906.29**		**858.42**		**131.07**		**125.06**		**123.62**		**133.44**		**243.90**		**197.11**		**143.32**		**151.20**		**159.31**		**108.40**		**37.00**		**5536.98**
	Grand Total (I and II)		**1448.49**		**6762.35**		**5161.99**		**744.90**		**708.80**		**697.72**		**773.00**		**1619.88**		**1261.18**		**848.82**		**909.22**		**971.36**		**581.07**		**37.00**		**22525.78**

Note: Amount is in lakh

Table 15: Year Wise Targets (Physical and Financial) for Ramban Forest Division

S. No.	Measures	Year I		Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Year XIV		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
A	**Biological Measures**																														
1	Afforestation (ha)			785	805.80	470	482.46																							**1255**	**1288.26**
	1st Year maintenance					785	56.87	470	34.05																					**1255**	**90.92**
	2nd Year maintenance							785	34.23	470	20.49																			**1255**	**54.72**
	3rd Year maintenance									785	24.69	470	14.78																	**1255**	**39.47**
	4th Year maintenance											785	11.54	470	6.91															**1255**	**18.45**
	5th Year maintenance													785	37.84	470	22.65													**1255**	**60.49**
	6th Year maintenance															785	11.54	470	6.91											**1255**	**18.45**
	7th Year maintenance																	785	11.54	470	6.91									**1255**	**18.45**
	8th Year maintenance																			785	11.54	470	6.91							**1255**	**18.45**
	9th Year maintenance																					785	11.54	470	6.91					**1255**	**18.45**
	10th Year maintenance																							785	11.54	470	6.91			**1255**	**18.45**
2	Enrichment Plantations (ha)			365	325.80	239	213.33																							**604**	**539.13**
	1st Year maintenance					365	19.16	239	12.55																					**604**	**31.71**
	2nd Year maintenance							365	11.50	239	7.53																			**604**	**19.03**
	3rd Year maintenance									365	9.93	239	6.50																	**604**	**16.43**
	4th Year maintenance											365	3.83	239	2.51															**604**	**6.34**
	5th Year maintenance													365	16.06	239	10.52													**604**	**26.58**
	6th Year maintenance															365	3.83	239	2.51											**604**	**6.34**
	7th Year maintenance																	365	3.83	239	2.51									**604**	**6.34**
	8th Year maintenance																			365	3.83	239	2.51							**604**	**6.34**
	9th Year maintenance																					365	3.83	239	2.51					**604**	**6.34**
	10th Year maintenance																							365	3.83	239	2.51			**604**	**6.34**
3	Pasture development (ha)			360	249.16	290	200.71																							**650**	**449.87**
	1st Year maintenance					360	10.44	290	8.41																					**650**	**18.85**
	2nd Year maintenance							360	6.26	290	5.05																			**650**	**11.31**
	3rd Year maintenance									360	8.10	290	6.53																	**650**	**14.63**
	4th Year maintenance											360	2.09	290	1.68															**650**	**3.77**
	5th Year maintenance													360	14.15	290	11.40													**650**	**25.55**
	6th Year maintenance															360	2.09	290	1.68											**650**	**3.77**
	7th Year maintenance																	360	2.09	290	1.68									**650**	**3.77**
	8th Year maintenance																			360	2.09	290	1.68							**650**	**3.77**
	9th Year maintenance																					360	2.09	290	1.68					**650**	**3.77**
	10th Year maintenance																							360	2.09	290	1.68			**650**	**3.77**
4	Assisted Natural Regeneration (ha)			270	192.65	147	104.88																							**417**	**297.53**
	1st Year maintenance					270	7.10	147	3.87																					**417**	**10.97**
	2nd Year maintenance							270	4.25	147	2.32																			**417**	**6.57**
	3rd Year maintenance									270	5.94	147	3.23																	**417**	**9.17**
	4th Year maintenance											270	1.42	147	0.77															**417**	**2.19**
	5th Year maintenance													270	10.45	147	5.69													**417**	**16.14**
	6th Year maintenance															270	1.42	147	0.77											**417**	**2.19**
	7th Year maintenance																	270	1.42	147	0.77									**417**	**2.19**
	8th Year maintenance																			270	1.42	147	0.77							**417**	**2.19**
	9th Year maintenance																					270	1.42	147	0.77					**417**	**2.19**
	10th Year maintenance																							270	1.42	147	0.77			**417**	**2.19**
5	Plant Production																														
	Formation of New Permanent Nursery	3	45.00																											**3**	**45.00**
	Raising of sapling in PB of size (9" x 6")	801300	64.34	495000	39.75																									**1296300**	**104.09**
	Raising of NR sapling	801300	59.62	495000	36.83																									**1296300**	**96.44**
6	Maintenance of PB raised conifer saplings in nurseries of size (9" x 6")																														
	During 1st year of raising of plants			200325	5.33	123750	3.29																							**324075**	**8.62**
	During 2nd year of raising of plants					120195	3.20	74250	1.98																					**194445**	**5.17**
	During 3rd year of raising of plants							40065	1.53	24750	0.95																			**64815**	**2.48**
	During 4th year of raising of plants									40065	1.53	24750	0.95																	**64815**	**2.48**
	During 5th year of raising of plants											40065	1.53	24750	0.95															**64815**	**2.48**
	During 6th year of raising of plants													40065	1.53	24750	0.95													**64815**	**2.48**

S. No.	Measures	Year I		Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Year XIV		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	During 7th year of raising of plants															40065	1.53	24750	0.95											**64815**	**2.48**
	During 8th year of raising of plants																	40065	1.53	24750	0.95									**64815**	**2.48**
	During 9th year of raising of plants																			40065	1.53	24750	0.95							**64815**	**2.48**
	During 10th year of raising of plants																					40065	1.53	24750	0.95					**64815**	**2.48**
7	Maintenance of NR sapling																														
	During 1st year of raising of plants			200325	4.97	123750	3.07																							**324075**	**8.04**
8	Engagement of Labours as Watch and Ward																														
	During Planting Year			119	143.34	76	91.54																							**195**	**234.88**
	During 1st year of maintenance					119	154.19	76	98.48																					**195**	**252.67**
	During 2nd year of maintenance							119	167.22	76	106.80																			**195**	**274.02**
	During 3rd year of maintenance									119	180.26	76	115.12																	**195**	**295.38**
	During 4th year of maintenance											119	195.46	76	124.83															**195**	**320.29**
	During 5th year of maintenance													119	210.66	76	134.54													**195**	**345.20**
	During 6th year of maintenance															119	228.03	76	145.64											**195**	**373.67**
	During 7th year of maintenance																	119	245.41	76	156.73									**195**	**402.14**
	During 8th year of maintenance																			119	264.95	76	169.21							**195**	**434.17**
	During 9th year of maintenance																					119	286.67	76	183.08					**195**	**469.76**
	During 10th year of maintenance																							119	308.39	76	196.95			**195**	**505.34**
	Sub Total A		**168.96**		**1803.61**		**1350.25**		**384.33**		**373.57**		**362.98**		**428.34**		**434.19**		**424.27**		**454.92**		**489.12**		**523.17**		**208.83**				**7406.54**
B	**Engineering measures**																														
9	DRSM Structures (cum)			55700	612.14	30700	337.39																							**86400**	**949.54**
a	Maintenance cost @ 25%																153.04		84.35												**237.38**
10	Crate Wire Structures (cum)			26300	580.70	11975	264.41																							**38275**	**845.11**
a	Maintenance cost @ 25%																145.18		66.10												**211.28**
11	Gabion Structures (cum)			18825	578.21	8650	265.68																							**27475**	**843.89**
a	Maintenance cost @ 25%																144.55		66.42												**210.97**
12	Geotextile Sheets (sqm)			1236875	371.06	609800	182.94																							**1846675**	**554.00**
a	Maintenance cost @ 25%																92.77		45.74												**138.50**
13	Catch Water Drain (cum)			32350	212.39	13320	87.45																							**45670**	**299.85**
a	Maintenance cost @ 25%																53.10		21.86												**74.96**
14	Silt Observation Points (no.)	2	9.82		6.18		6.62		7.06		7.57		8.08		8.67		9.25		9.91		10.64		11.37		12.24		13.12			**2**	**120.51**
	Sub Total B		**9.82**		**2360.70**		**1144.50**		**7.06**		**7.57**		**8.08**		**8.67**		**597.88**		**294.38**		**10.64**		**11.37**		**12.24**		**13.12**				**4486.00**
I	**Total A and B**		**178.78**		**4164.31**		**2494.75**		**391.39**		**381.14**		**371.06**		**437.00**		**1032.07**		**718.65**		**465.55**		**500.48**		**535.41**		**221.94**				**11892.54**
II	**Other Components**																														
15	Micro Planning Cost		50.00																												**50.00**
16	Entry Point Activity Cost @4% of Total I		237.85		237.85																										**475.70**
17	Infrastructure Development Cost @5% of Total I		297.31		297.31																										**594.63**
18	Socio-economic Cost @3% of Total I		118.93		118.93		118.93																								**356.78**
19	Administrative Expenditure Cost @5% of Total I		8.94		208.22		124.74		19.57		19.06		18.55		21.85		51.60		35.93		23.28		25.02		26.77		11.10				**594.63**
20	Capacity Building and Extension Education		166.00		166.00																										**332.00**
21	Monitoring & Evaluation				37.00		36.00		32.00		31.00		31.00		31.00		31.00		31.00		31.00		31.00		31.00		31.00		31.00		**415.00**
22	Contingency Cost @ 10% of Total I		17.88		416.43		249.48		39.14		38.11		37.11		43.70		103.21		71.87		46.56		50.05		53.54		22.19				**1189.25**
	Total II		**896.91**		**1481.74**		**529.14**		**90.71**		**88.17**		**86.66**		**96.55**		**185.81**		**138.80**		**100.83**		**106.07**		**111.31**		**64.29**		**31.00**		**4007.99**
	Grand Total (I and II)		**1075.69**		**5646.04**		**3023.89**		**482.09**		**469.32**		**457.72**		**533.55**		**1217.88**		**857.45**		**566.39**		**606.56**		**646.72**		**286.24**		**31.00**		**15900.53**

Note: Amount is in lakh

Table 16: Year Wise Targets (Physical and Financial) for Batote Forest Division

S. No.	Measures	Year I		Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Year XIV		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
A	**Biological Measures**																														
1	Afforestation (ha)			100	102.65	585	600.50																							**685**	**703.15**
	1st Year maintenance					100	7.25	585	42.38																					**685**	**49.63**
	2nd Year maintenance							100	4.36	585	25.51																			**685**	**29.87**
	3rd Year maintenance									100	3.15	585	18.40																	**685**	**21.54**
	4th Year maintenance											100	1.47	585	8.60															**685**	**10.07**
	5th Year maintenance													100	4.82	585	28.20													**685**	**33.02**
	6th Year maintenance															100	1.47	585	8.60											**685**	**10.07**
	7th Year maintenance																	100	1.47	585	8.60									**685**	**10.07**
	8th Year maintenance																			100	1.47	585	8.60							**685**	**10.07**
	9th Year maintenance																					100	1.47	585	8.60					**685**	**10.07**
	10th Year maintenance																							100	1.47	585	8.60			**685**	**10.07**
2	Enrichment Plantations (ha)			50	44.63	240	214.22																							**290**	**258.85**
	1st Year maintenance					50	2.63	240	12.60																					**290**	**15.23**
	2nd Year maintenance							50	1.58	240	7.56																			**290**	**9.14**
	3rd Year maintenance									50	1.36	240	6.53																	**290**	**7.89**
	4th Year maintenance											50	0.53	240	2.52															**290**	**3.05**
	5th Year maintenance													50	2.20	240	10.56													**290**	**12.76**
	6th Year maintenance															50	0.53	240	2.52											**290**	**3.05**
	7th Year maintenance																	50	0.53	240	2.52									**290**	**3.05**
	8th Year maintenance																			50	0.53	240	2.52							**290**	**3.05**
	9th Year maintenance																					50	0.53	240	2.52					**290**	**3.05**
	10th Year maintenance																							50	0.53	240	2.52			**290**	**3.05**
3	Pasture development (ha)			35	24.22	205	141.88																							**240**	**166.10**
	1st Year maintenance					35	1.02	205	5.95																					**240**	**6.96**
	2nd Year maintenance							35	0.61	205	3.57																			**240**	**4.18**
	3rd Year maintenance									35	0.79	205	4.61																	**240**	**5.40**
	4th Year maintenance											35	0.20	205	1.19															**240**	**1.39**
	5th Year maintenance													35	1.38	205	8.06													**240**	**9.43**
	6th Year maintenance															35	0.20	205	1.19											**240**	**1.39**
	7th Year maintenance																	35	0.20	205	1.19									**240**	**1.39**
	8th Year maintenance																			35	0.20	205	1.19							**240**	**1.39**
	9th Year maintenance																					35	0.20	205	1.19					**240**	**1.39**
	10th Year maintenance																							35	0.20	205	1.19			**240**	**1.39**
4	Assisted Natural Regeneration (ha)			40	28.54	90	64.22																							**130**	**92.76**
	1st Year maintenance					40	1.05	90	2.37																					**130**	**3.42**
	2nd Year maintenance							40	0.63	90	1.42																			**130**	**2.05**
	3rd Year maintenance									40	0.88	90	1.98																	**130**	**2.86**
	4th Year maintenance											40	0.21	90	0.47															**130**	**0.68**
	5th Year maintenance													40	1.55	90	3.48													**130**	**5.03**
	6th Year maintenance															40	0.21	90	0.47											**130**	**0.68**
	7th Year maintenance																	40	0.21	90	0.47									**130**	**0.68**
	8th Year maintenance																			40	0.21	90	0.47							**130**	**0.68**
	9th Year maintenance																					40	0.21	90	0.47					**130**	**0.68**
	10th Year maintenance																							40	0.21	90	0.47			**130**	**0.68**
5	Plant Production																														
	Formation of New Permanent Nursery	1	15.00																											**1**	**15.00**
	Raising of sapling in PB of size (9" x 6")	103800	8.34	547500	43.96																									**651300**	**52.30**
	Raising of NR sapling	103800	7.72	547500	40.73																									**651300**	**48.46**
6	Maintenance of PB raised conifer saplings in nurseries of size (9" x 6")																														
	During 1st year of raising of plants			25950	0.69	136875	3.64																							**162825**	**4.33**
	During 2nd year of raising of plants					15570	0.41	82125	2.18																					**97695**	**2.60**
	During 3rd year of raising of plants							5190	0.20	27375	1.05																			**32565**	**1.25**
	During 4th year of raising of plants									5190	0.20	27375	1.05																	**32565**	**1.25**
	During 5th year of raising of plants											5190	0.20	27375	1.05															**32565**	**1.25**
	During 6th year of raising of plants													5190	0.20	27375	1.05													**32565**	**1.25**

S. No.	Measures	Year I		Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Year XIV		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	During 7th year of raising of plants															5190	0.20	27375	1.05											**32565**	**1.25**
	During 8th year of raising of plants																	5190	0.20	27375	1.05									**32565**	**1.25**
	During 9th year of raising of plants																			5190	0.20	27375	1.05							**32565**	**1.25**
	During 10th year of raising of plants																					5190	0.20	27375	1.05					**32565**	**1.25**
7	Maintenance of NR sapling																														
	During 1st year of raising of plants			25950	0.64	136875	3.39																							**162825**	**4.04**
8	Engagement of Labours as Watch and Ward																														
	During Planting Year			15	18.07	75	90.34																							**90**	**108.41**
	During 1st year of maintenance					15	19.44	75	97.18																					**90**	**116.62**
	During 2nd year of maintenance							15	21.08	75	105.39																			**90**	**126.47**
	During 3rd year of maintenance									15	22.72	75	113.61																	**90**	**136.33**
	During 4th year of maintenance											15	24.64	75	123.19															**90**	**147.83**
	During 5th year of maintenance													15	26.55	75	132.77													**90**	**159.32**
	During 6th year of maintenance															15	28.74	75	143.72											**90**	**172.46**
	During 7th year of maintenance																	15	30.93	75	154.67									**90**	**185.60**
	During 8th year of maintenance																			15	33.40	75	166.99							**90**	**200.39**
	During 9th year of maintenance																					15	36.14	75	180.68					**90**	**216.81**
	During 10th year of maintenance																							15	38.87	75	194.36			**90**	**233.24**
	Sub Total A		**31.06**		**304.14**		**1149.98**		**191.11**		**173.59**		**173.42**		**173.71**		**215.46**		**191.09**		**204.50**		**219.56**		**235.78**		**207.14**				**3470.55**
B	**Engineering measures**																														
9	DRSM Structures (cum)			9100	100.01	9400	103.31																							**18500**	**203.32**
a	Maintenance cost @ 25%																25.00		25.83												**50.83**
10	Crate Wire Structures (cum)			4250	93.84	4475	98.81																							**8725**	**192.65**
a	Maintenance cost @ 25%																23.46		24.70												**48.16**
11	Gabion Structures (cum)			3050	93.68	3225	99.06																							**6275**	**192.74**
a	Maintenance cost @ 25%																23.42		24.76												**48.18**
12	Geotextile Sheets (sqm)			185975	55.79	189200	56.76																							**375175**	**112.55**
a	Maintenance cost @ 25%																13.95		14.19												**28.14**
13	Catch Water Drain (cum)			3810	25.01	9760	64.08																							**13570**	**89.09**
a	Maintenance cost @ 25%																6.25		16.02												**22.27**
14	Silt Observation Points (no.)	1	14.91		3.09		3.31		3.53		3.79		4.04		4.33		4.62		4.95		5.32		5.68		6.12		6.56			**1**	**70.26**
	Sub Total B		**14.91**		**371.43**		**425.32**		**3.53**		**3.79**		**4.04**		**4.33**		**96.71**		**110.46**		**5.32**		**5.68**		**6.12**		**6.56**				**1058.19**
I	**Total A and B**		**45.97**		**675.57**		**1575.30**		**194.64**		**177.37**		**177.46**		**178.05**		**312.17**		**301.54**		**209.82**		**225.24**		**241.91**		**213.70**				**4528.74**
II	**Other Components**																														
15	Entry Point Activity Cost @4% of Total I		90.57		90.57																										**181.15**
16	Infrastructure Development Cost @5% of Total I		113.22		113.22																										**226.44**
17	Socio-economic Cost @3% of Total I		45.29		45.29		45.29																								**135.86**
18	Administrative Expenditure Cost @5% of Total I		2.30		33.78		78.77		9.73		8.87		8.87		8.90		15.61		15.08		10.49		11.26		12.10		10.69				**226.44**
19	Capacity Building and Extension Education		31.00		31.00																										**62.00**
20	Monitoring & Evaluation				6.00		6.00		6.00		6.00		6.00		6.00		6.00		6.00		6.00		6.00		6.00		6.00		5.50		**77.50**
21	Contingency Cost @ 10% of Total I		4.60		67.56		157.53		19.46		17.74		17.75		17.80		31.22		30.15		20.98		22.52		24.19		21.37				**452.87**
	Total II		**286.98**		**387.42**		**287.58**		**35.20**		**32.61**		**32.62**		**32.71**		**52.83**		**51.23**		**37.47**		**39.79**		**42.29**		**38.06**		**5.50**		**1362.26**
	Grand Total (I and II)		**332.94**		**1062.99**		**1862.88**		**229.84**		**209.98**		**210.08**		**210.75**		**365.00**		**352.78**		**247.29**		**265.03**		**284.19**		**251.76**		**5.50**		**5891.00**

Note: Amount is in lakh

Table 17: Year Wise Targets (Physical and Financial) for Udhampur Forest Division

S. No.	Measures	Year I		Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Year XIV		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
A	**Biological Measures**																														
1	Afforestation (ha)					100	102.65																							**100**	**102.65**
	1st Year maintenance							100	7.25																					**100**	**7.25**
	2nd Year maintenance									100	4.36																			**100**	**4.36**
	3rd Year maintenance											100	3.15																	**100**	**3.15**
	4th Year maintenance													100	1.47															**100**	**1.47**
	5th Year maintenance															100	4.82													**100**	**4.82**
	6th Year maintenance																	100	1.47											**100**	**1.47**
	7th Year maintenance																			100	1.47									**100**	**1.47**
	8th Year maintenance																					100	1.47							**100**	**1.47**
	9th Year maintenance																							100	1.47					**100**	**1.47**
	10th Year maintenance																									100	1.47			**100**	**1.47**
2	Enrichment Plantations (ha)					25	22.32																							**25**	**22.32**
	1st Year maintenance							25	1.31																					**25**	**1.31**
	2nd Year maintenance									25	0.79																			**25**	**0.79**
	3rd Year maintenance											25	0.68																	**25**	**0.68**
	4th Year maintenance													25	0.26															**25**	**0.26**
	5th Year maintenance															25	1.10													**25**	**1.10**
	6th Year maintenance																	25	0.26											**25**	**0.26**
	7th Year maintenance																			25	0.26									**25**	**0.26**
	8th Year maintenance																					25	0.26							**25**	**0.26**
	9th Year maintenance																							25	0.26					**25**	**0.26**
	10th Year maintenance																									25	0.26			**25**	**0.26**
3	Pasture development (ha)					25	17.30																							**25**	**17.30**
	1st Year maintenance							25	0.73																					**25**	**0.73**
	2nd Year maintenance									25	0.44																			**25**	**0.44**
	3rd Year maintenance											25	0.56																	**25**	**0.56**
	4th Year maintenance													25	0.15															**25**	**0.15**
	5th Year maintenance															25	0.98													**25**	**0.98**
	6th Year maintenance																	25	0.15											**25**	**0.15**
	7th Year maintenance																			25	0.15									**25**	**0.15**
	8th Year maintenance																					25	0.15							**25**	**0.15**
	9th Year maintenance																							25	0.15					**25**	**0.15**
	10th Year maintenance																									25	0.15			**25**	**0.15**
4	Assisted Natural Regeneration (ha)					15	10.70																							**15**	**10.70**
	1st Year maintenance							15	0.39																					**15**	**0.39**
	2nd Year maintenance									15	0.24																			**15**	**0.24**
	3rd Year maintenance											15	0.33																	**15**	**0.33**
	4th Year maintenance													15	0.08															**15**	**0.08**
	5th Year maintenance															15	0.58													**15**	**0.58**
	6th Year maintenance																	15	0.08											**15**	**0.08**
	7th Year maintenance																			15	0.08									**15**	**0.08**
	8th Year maintenance																					15	0.08							**15**	**0.08**
	9th Year maintenance																							15	0.08					**15**	**0.08**
	10th Year maintenance																									15	0.08			**15**	**0.08**
5	Plant Production																														
	Raising of sapling in PB of size (9" x 6")			84600	6.79																									**84600**	**6.79**
	Raising of NR sapling			84600	6.29																									**84600**	**6.29**
6	Maintenance of PB raised conifer saplings in nurseries of size (9" x 6")																														
	During 1st year of raising of plants					21150	0.56																							**21150**	**0.56**
	During 2nd year of raising of plants							12690	0.34																					**12690**	**0.34**
	During 3rd year of raising of plants									4230	0.16																			**4230**	**0.16**
	During 4th year of raising of plants											4230	0.16																	**4230**	**0.16**
	During 5th year of raising of plants													4230	0.16															**4230**	**0.16**
	During 6th year of raising of plants															4230	0.16													**4230**	**0.16**
	During 7th year of raising of plants																	4230	0.16											**4230**	**0.16**

S. No.	Measures	Year I		Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Year XIV		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	During 8th year of raising of plants																			4230	0.16									**4230**	**0.16**
	During 9th year of raising of plants																					4230	0.16							**4230**	**0.16**
	During 10th year of raising of plants																							4230	0.16					**4230**	**0.16**
7	Maintenance of NR sapling																														
	During 1st year of raising of plants					21150	0.52																							**21150**	**0.52**
8	Engagement of Labours as Watch and Ward																														
	During Planting Year					11	13.25																							**11**	**13.25**
	During 1st year of maintenance							11	14.25																					**11**	**14.25**
	During 2nd year of maintenance									11	15.46																			**11**	**15.46**
	During 3rd year of maintenance											11	16.66																	**11**	**16.66**
	During 4th year of maintenance													11	18.07															**11**	**18.07**
	During 5th year of maintenance															11	19.47													**11**	**19.47**
	During 6th year of maintenance																	11	21.08											**11**	**21.08**
	During 7th year of maintenance																			11	22.68									**11**	**22.68**
	During 8th year of maintenance																					11	24.49							**11**	**24.49**
	During 9th year of maintenance																							11	26.50					**11**	**26.50**
	During 10th year of maintenance																									11	28.51			**11**	**28.51**
	Sub Total A				**13.09**		**167.31**		**24.27**		**21.44**		**21.54**		**20.19**		**27.12**		**23.20**		**24.80**		**26.61**		**28.62**		**30.46**				**428.64**
B	**Engineering measures**																														
9	DRSM Structures (cum)					1500	16.49																							**1500**	**16.49**
a	Maintenance cost @ 25%																		4.12												**4.12**
10	Crate Wire Structures (cum)					600	13.25																							**600**	**13.25**
a	Maintenance cost @ 25%																		3.31												**3.31**
11	Gabion Structures (cum)					450	13.82																							**450**	**13.82**
a	Maintenance cost @ 25%																		3.46												**3.46**
12	Geotextile Sheets (sqm)					28150	8.45																							**28150**	**8.45**
a	Maintenance cost @ 25%																		2.11												**2.11**
13	Catch Water Drain (cum)					1660	10.90																							**1660**	**10.90**
a	Maintenance cost @ 25%																		2.72												**2.72**
14	Silt Observation Points (no.)	1	4.91		3.09		3.31		3.53		3.79		4.04		4.33		4.62		4.95		5.32		5.68		6.12		6.56			**1**	**60.26**
	Sub Total B		**4.91**		**3.09**		**66.21**		**3.53**		**3.79**		**4.04**		**4.33**		**4.62**		**20.68**		**5.32**		**5.68**		**6.12**		**6.56**				**138.88**
I	**Total A and B**		**4.91**		**16.18**		**233.52**		**27.80**		**25.22**		**25.58**		**24.52**		**31.74**		**43.87**		**30.12**		**32.29**		**34.74**		**37.02**				**567.52**
II	**Other Components**																														
15	Entry Point Activity Cost @4% of Total I		11.35		11.35																										**22.70**
16	Infrastructure Development Cost @5% of Total I		14.19		14.19																										**28.38**
17	Socio-economic Cost @3% of Total I		5.68		5.68		5.68																								**17.03**
18	Administrative Expenditure Cost @5% of Total I		0.25		0.81		11.68		1.39		1.26		1.28		1.23		1.59		2.19		1.51		1.61		1.74		1.85				**28.38**
19	Capacity Building and Extension Education		3.00		3.00																										**6.00**
20	Monitoring & Evaluation				0.50		1.00		1.00		0.50		0.50		0.50		0.50		0.50		0.50		0.50		0.50		0.50		0.50		**7.50**
21	Contingency Cost @ 10% of Total I		0.49		1.62		23.35		2.78		2.52		2.56		2.45		3.17		4.39		3.01		3.23		3.47		3.70				**56.75**
	Total II		**34.95**		**37.14**		**41.70**		**5.17**		**4.28**		**4.34**		**4.18**		**5.26**		**7.08**		**5.02**		**5.34**		**5.71**		**6.05**		**0.50**		**166.73**
	Grand Total (I and II)		**39.86**		**53.32**		**275.22**		**32.97**		**29.51**		**29.92**		**28.70**		**37.00**		**50.96**		**35.14**		**37.64**		**40.45**		**43.08**		**0.50**		**734.24**

Note: Amount is in lakh

Table 18: Year-Wise Physical and Financial Targets of Afforestation to be Undertaken in Sub-Watersheds

S. No.	Sub-Watershed	Name of Forest Division	Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Total	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	1D1B1a	Udhampur			100	102.65	100	7.25	100	4.36	100	3.15	100	1.47	100	4.82	100	1.47	100	1.47	100	1.47	100	1.47	100	1.47	**1100**	**131.04**
		Batote			125	128.31	125	9.06	125	5.45	125	3.93	125	1.84	125	6.03	125	1.84	125	1.84	125	1.84	125	1.84	125	1.84	**1375**	**163.80**
2	1D1B1b	Batote			135	138.58	135	9.78	135	5.89	135	4.25	135	1.98	135	6.51	135	1.98	135	1.98	135	1.98	135	1.98	135	1.98	**1485**	**176.90**
3	1D1B4a	Ramban	275	282.29	275	19.92	275	11.99	275	8.65	275	4.04	275	13.26	275	4.04	275	4.04	275	4.04	275	4.04	275	4.04			**3025**	**360.36**
4	1D1B4b	Ramban	25	25.66	25	1.81	25	1.09	25	0.79	25	0.37	25	1.21	25	0.37	25	0.37	25	0.37	25	0.37	25	0.37			**275**	**32.76**
5	1D1B4c	Ramban			5	5.13	5	0.36	5	0.22	5	0.16	5	0.07	5	0.24	5	0.07	5	0.07	5	0.07	5	0.07	5	0.07	**55**	**6.55**
6	1D1B4d	Ramban			5	5.13	5	0.36	5	0.22	5	0.16	5	0.07	5	0.24	5	0.07	5	0.07	5	0.07	5	0.07	5	0.07	**55**	**6.55**
7	1D1B4f	Ramban	100	102.65	100	7.25	100	4.36	100	3.15	100	1.47	100	4.82	100	1.47	100	1.47	100	1.47	100	1.47	100	1.47			**1100**	**131.04**
8	1D1B5a	Ramban			75	76.99	75	5.43	75	3.27	75	2.36	75	1.10	75	3.62	75	1.10	75	1.10	75	1.10	75	1.10	75	1.10	**825**	**98.28**
9	1D1B5b	Ramban			75	76.99	75	5.43	75	3.27	75	2.36	75	1.10	75	3.62	75	1.10	75	1.10	75	1.10	75	1.10	75	1.10	**825**	**98.28**
10	1D1B5c	Ramban	225	230.96	225	16.30	225	9.81	225	7.08	225	3.31	225	10.85	225	3.31	225	3.31	225	3.31	225	3.31	225	3.31			**2475**	**294.84**
11	1D1B5d	Ramban			10	10.27	10	0.72	10	0.44	10	0.31	10	0.15	10	0.48	10	0.15	10	0.15	10	0.15	10	0.15	10	0.15	**110**	**13.10**
12	1D1B5f	Ramban			25	25.66	25	1.81	25	1.09	25	0.79	25	0.37	25	1.21	25	0.37	25	0.37	25	0.37	25	0.37	25	0.37	**275**	**32.76**
13	1D1B5g	Ramban	85	87.25	85	6.16	85	3.71	85	2.67	85	1.25	85	4.10	85	1.25	85	1.25	85	1.25	85	1.25	85	1.25			**935**	**111.38**
14	1D1B6a	Ramban			250	256.63	250	18.11	250	10.90	250	7.86	250	3.68	250	12.05	250	3.68	250	3.68	250	3.68	250	3.68	250	3.68	**2750**	**327.60**
15	1D1B6b	Ramban	25	25.66	25	1.81	25	1.09	25	0.79	25	0.37	25	1.21	25	0.37	25	0.37	25	0.37	25	0.37	25	0.37			**275**	**32.76**
16	1D1B6c	Ramban			25	25.66	25	1.81	25	1.09	25	0.79	25	0.37	25	1.21	25	0.37	25	0.37	25	0.37	25	0.37	25	0.37	**275**	**32.76**
17	1D1B6d	Ramban	50	51.33	50	3.62	50	2.18	50	1.57	50	0.74	50	2.41	50	0.74	50	0.74	50	0.74	50	0.74	50	0.74			**550**	**65.52**
18	1D1B7a	Batote			225	230.96	225	16.30	225	9.81	225	7.08	225	3.31	225	10.85	225	3.31	225	3.31	225	3.31	225	3.31	225	3.31	**2475**	**294.84**
19	1D1B7b	Batote	100	102.65	100	7.25	100	4.36	100	3.15	100	1.47	100	4.82	100	1.47	100	1.47	100	1.47	100	1.47	100	1.47			**1100**	**131.04**
20	1D1B7c	Batote			100	102.65	100	7.25	100	4.36	100	3.15	100	1.47	100	4.82	100	1.47	100	1.47	100	1.47	100	1.47	100	1.47	**1100**	**131.04**
	Total		**885**	**908.45**	**2040**	**1249.73**	**2040**	**122.27**	**2040**	**78.19**	**2040**	**49.33**	**2040**	**59.64**	**2040**	**68.68**	**2040**	**29.99**	**2040**	**29.99**	**2040**	**29.99**	**2040**	**29.99**	**1155**	**16.98**	**22440**	**2673.22**

Note: Amount is in lakh

Table 19: Year-Wise Physical and Financial Targets of Enrichment to be Undertaken in Sub-Watersheds

S. No.	Sub-Watershed	Name of Forest Division	Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Total	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	1D1B1a	Udhampur			25	22.32	25	1.31	25	0.79	25	0.68	25	0.26	25	1.10	25	0.26	25	0.26	25	0.26	25	0.26	25	0.26	**275**	**27.77**
		Batote			25	22.32	25	1.31	25	0.79	25	0.68	25	0.26	25	1.10	25	0.26	25	0.26	25	0.26	25	0.26	25	0.26	**275**	**27.77**
2	1D1B1b	Batote			50	44.63	50	2.63	50	1.58	50	1.36	50	0.53	50	2.20	50	0.53	50	0.53	50	0.53	50	0.53	50	0.53	**550**	**55.54**
3	1D1B4a	Ramban	125	111.58	125	6.56	125	3.94	125	3.40	125	1.31	125	5.50	125	1.31	125	1.31	125	1.31	125	1.31	125	1.31			**1375**	**138.85**
4	1D1B4b	Ramban	15	13.39	15	0.79	15	0.47	15	0.41	15	0.16	15	0.66	15	0.16	15	0.16	15	0.16	15	0.16	15	0.16			**165**	**16.66**
5	1D1B4c	Ramban			2	1.79	2	0.11	2	0.06	2	0.05	2	0.02	2	0.09	2	0.02	2	0.02	2	0.02	2	0.02	2	0.02	**22**	**2.22**
6	1D1B4d	Ramban			2	1.79	2	0.11	2	0.06	2	0.05	2	0.02	2	0.09	2	0.02	2	0.02	2	0.02	2	0.02	2	0.02	**22**	**2.22**
7	1D1B4f	Ramban	75	66.95	75	3.94	75	2.36	75	2.04	75	0.79	75	3.30	75	0.79	75	0.79	75	0.79	75	0.79	75	0.79			**825**	**83.31**
8	1D1B5a	Ramban			35	31.24	35	1.84	35	1.10	35	0.95	35	0.37	35	1.54	35	0.37	35	0.37	35	0.37	35	0.37	35	0.37	**385**	**38.88**
9	1D1B5b	Ramban			0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	**0**	**0.00**
10	1D1B5c	Ramban	75	66.95	75	3.94	75	2.36	75	2.04	75	0.79	75	3.30	75	0.79	75	0.79	75	0.79	75	0.79	75	0.79			**825**	**83.31**
11	1D1B5d	Ramban			0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	**0**	**0.00**
12	1D1B5f	Ramban			0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	**0**	**0.00**
13	1D1B5g	Ramban	50	44.63	50	2.63	50	1.58	50	1.36	50	0.53	50	2.20	50	0.53	50	0.53	50	0.53	50	0.53	50	0.53			**550**	**55.54**
14	1D1B6a	Ramban			200	178.52	200	10.50	200	6.30	200	5.44	200	2.10	200	8.80	200	2.10	200	2.10	200	2.10	200	2.10	200	2.10	**2200**	**222.16**
15	1D1B6b	Ramban	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00			**0**	**0.00**
16	1D1B6c	Ramban			0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	**0**	**0.00**
17	1D1B6d	Ramban	25	22.32	25	1.31	25	0.79	25	0.68	25	0.26	25	1.10	25	0.26	25	0.26	25	0.26	25	0.26	25	0.26			**275**	**27.77**
18	1D1B7a	Batote			160	142.82	160	8.40	160	5.04	160	4.35	160	1.68	160	7.04	160	1.68	160	1.68	160	1.68	160	1.68	160	1.68	**1760**	**177.73**
19	1D1B7b	Batote	50	44.63	50	2.63	50	1.58	50	1.36	50	0.53	50	2.20	50	0.53	50	0.53	50	0.53	50	0.53	50	0.53			**550**	**55.54**
20	1D1B7c	Batote			5	4.46	5	0.26	5	0.16	5	0.14	5	0.05	5	0.22	5	0.05	5	0.05	5	0.05	5	0.05	5	0.05	**55**	**5.55**
	Total		**415**	**370.43**	**919**	**471.66**	**919**	**39.53**	**919**	**27.16**	**919**	**18.07**	**919**	**23.55**	**919**	**26.53**	**919**	**9.65**	**919**	**9.65**	**919**	**9.65**	**919**	**9.65**	**504**	**5.29**	**10109**	**1020.83**

Note: Amount is in lakh

Table 20: Year-Wise Physical and Financial Targets of Pasture Development to be Undertaken in Sub-Watersheds

S. No.	Sub-Watershed	Name of Forest Division	Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Total	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	1D1B1a	Udhampur			25	17.30	25	0.73	25	0.44	25	0.56	25	0.15	25	0.98	25	0.15	25	0.15	25	0.15	25	0.15	25	0.15	**275**	**20.88**
		Batote			25	17.30	25	0.73	25	0.44	25	0.56	25	0.15	25	0.98	25	0.15	25	0.15	25	0.15	25	0.15	25	0.15	**275**	**20.88**
2	1D1B1b	Batote			25	17.30	25	0.73	25	0.44	25	0.56	25	0.15	25	0.98	25	0.15	25	0.15	25	0.15	25	0.15	25	0.15	**275**	**20.88**
3	1D1B4a	Ramban	210	145.34	210	6.09	210	3.65	210	4.73	210	1.22	210	8.25	210	1.22	210	1.22	210	1.22	210	1.22	210	1.22			**2310**	**175.37**
4	1D1B4b	Ramban	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00			**0**	**0.00**
5	1D1B4c	Ramban			0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	**0**	**0.00**
6	1D1B4d	Ramban			0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	**0**	**0.00**
7	1D1B4f	Ramban	25	17.30	25	0.73	25	0.44	25	0.56	25	0.15	25	0.98	25	0.15	25	0.15	25	0.15	25	0.15	25	0.15			**275**	**20.88**
8	1D1B5a	Ramban			30	20.76	30	0.87	30	0.52	30	0.68	30	0.17	30	1.18	30	0.17	30	0.17	30	0.17	30	0.17	30	0.17	**330**	**25.05**
9	1D1B5b	Ramban			35	24.22	35	1.02	35	0.61	35	0.79	35	0.20	35	1.38	35	0.20	35	0.20	35	0.20	35	0.20	35	0.20	**385**	**29.23**
10	1D1B5c	Ramban	75	51.91	75	2.18	75	1.31	75	1.69	75	0.44	75	2.95	75	0.44	75	0.44	75	0.44	75	0.44	75	0.44			**825**	**62.63**
11	1D1B5d	Ramban			0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	**0**	**0.00**
12	1D1B5f	Ramban			0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	**0**	**0.00**
13	1D1B5g	Ramban	50	34.61	50	1.45	50	0.87	50	1.13	50	0.29	50	1.97	50	0.29	50	0.29	50	0.29	50	0.29	50	0.29			**550**	**41.76**
14	1D1B6a	Ramban			200	138.42	200	5.80	200	3.48	200	4.50	200	1.16	200	7.86	200	1.16	200	1.16	200	1.16	200	1.16	200	1.16	**2200**	**167.02**
15	1D1B6b	Ramban	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00			**0**	**0.00**
16	1D1B6c	Ramban			25	17.30	25	0.73	25	0.44	25	0.56	25	0.15	25	0.98	25	0.15	25	0.15	25	0.15	25	0.15	25	0.15	**275**	**20.88**
17	1D1B6d	Ramban	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00			**0**	**0.00**
18	1D1B7a	Batote			150	103.82	150	4.35	150	2.61	150	3.38	150	0.87	150	5.90	150	0.87	150	0.87	150	0.87	150	0.87	150	0.87	**1650**	**125.27**
19	1D1B7b	Batote	35	24.22	35	1.02	35	0.61	35	0.79	35	0.20	35	1.38	35	0.20	35	0.20	35	0.20	35	0.20	35	0.20			**385**	**29.23**
20	1D1B7c	Batote			5	3.46	5	0.15	5	0.09	5	0.11	5	0.03	5	0.20	5	0.03	5	0.03	5	0.03	5	0.03	5	0.03	**55**	**4.18**
	Total		**395**	**273.38**	**915**	**371.35**	**915**	**21.95**	**915**	**17.94**	**915**	**13.99**	**915**	**18.54**	**915**	**22.73**	**915**	**5.31**	**915**	**5.31**	**915**	**5.31**	**915**	**5.31**	**520**	**3.02**	**10065**	**764.12**

Note: Amount is in lakh

Table 21: Year-Wise Physical and Financial Targets of Assisted Natural Regeneration to be Undertaken in Sub-Watersheds

S. No.	Sub-Watershed	Name of Forest Division	Year II		Year III		Year IV		Year V		Year VI		Year VII		Year VIII		Year IX		Year X		Year XI		Year XII		Year XIII		Total	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	1D1B1a	Udhampur			15	10.70	15	0.39	15	0.24	15	0.33	15	0.08	15	0.58	15	0.08	15	0.08	15	0.08	15	0.08	15	0.08	**165**	**12.72**
		Batote			25	17.84	25	0.66	25	0.39	25	0.55	25	0.13	25	0.97	25	0.13	25	0.13	25	0.13	25	0.13	25	0.13	**275**	**21.19**
2	1D1B1b	Batote			15	10.70	15	0.39	15	0.24	15	0.33	15	0.08	15	0.58	15	0.08	15	0.08	15	0.08	15	0.08	15	0.08	**165**	**12.72**
3	1D1B4a	Ramban	75	53.51	75	1.97	75	1.18	75	1.65	75	0.39	75	2.90	75	0.39	75	0.39	75	0.39	75	0.39	75	0.39			**825**	**63.58**
4	1D1B4b	Ramban	30	21.41	30	0.79	30	0.47	30	0.66	30	0.16	30	1.16	30	0.16	30	0.16	30	0.16	30	0.16	30	0.16			**330**	**25.43**
5	1D1B4c	Ramban			2	1.43	2	0.05	2	0.03	2	0.04	2	0.01	2	0.08	2	0.01	2	0.01	2	0.01	2	0.01	2	0.01	**22**	**1.70**
6	1D1B4d	Ramban			10	7.14	10	0.26	10	0.16	10	0.22	10	0.05	10	0.39	10	0.05	10	0.05	10	0.05	10	0.05	10	0.05	**110**	**8.48**
7	1D1B4f	Ramban	35	24.97	35	0.92	35	0.55	35	0.77	35	0.18	35	1.35	35	0.18	35	0.18	35	0.18	35	0.18	35	0.18			**385**	**29.67**
8	1D1B5a	Ramban			15	10.70	15	0.39	15	0.24	15	0.33	15	0.08	15	0.58	15	0.08	15	0.08	15	0.08	15	0.08	15	0.08	**165**	**12.72**
9	1D1B5b	Ramban			10	7.14	10	0.26	10	0.16	10	0.22	10	0.05	10	0.39	10	0.05	10	0.05	10	0.05	10	0.05	10	0.05	**110**	**8.48**
10	1D1B5c	Ramban	60	42.81	60	1.58	60	0.95	60	1.32	60	0.32	60	2.32	60	0.32	60	0.32	60	0.32	60	0.32	60	0.32			**660**	**50.87**
11	1D1B5d	Ramban			30	21.41	30	0.79	30	0.47	30	0.66	30	0.16	30	1.16	30	0.16	30	0.16	30	0.16	30	0.16	30	0.16	**330**	**25.43**
12	1D1B5f	Ramban			30	21.41	30	0.79	30	0.47	30	0.66	30	0.16	30	1.16	30	0.16	30	0.16	30	0.16	30	0.16	30	0.16	**330**	**25.43**
13	1D1B5g	Ramban	35	24.97	35	0.92	35	0.55	35	0.77	35	0.18	35	1.35	35	0.18	35	0.18	35	0.18	35	0.18	35	0.18			**385**	**29.67**
14	1D1B6a	Ramban			40	28.54	40	1.05	40	0.63	40	0.88	40	0.21	40	1.55	40	0.21	40	0.21	40	0.21	40	0.21	40	0.21	**440**	**33.91**
15	1D1B6b	Ramban	15	10.70	15	0.39	15	0.24	15	0.33	15	0.08	15	0.58	15	0.08	15	0.08	15	0.08	15	0.08	15	0.08			**165**	**12.72**
16	1D1B6c	Ramban			10	7.14	10	0.26	10	0.16	10	0.22	10	0.05	10	0.39	10	0.05	10	0.05	10	0.05	10	0.05	10	0.05	**110**	**8.48**
17	1D1B6d	Ramban	20	14.27	20	0.53	20	0.32	20	0.44	20	0.11	20	0.77	20	0.11	20	0.11	20	0.11	20	0.11	20	0.11			**220**	**16.96**
18	1D1B7a	Batote			40	28.54	40	1.05	40	0.63	40	0.88	40	0.21	40	1.55	40	0.21	40	0.21	40	0.21	40	0.21	40	0.21	**440**	**33.91**
19	1D1B7b	Batote	40	28.54	40	1.05	40	0.63	40	0.88	40	0.21	40	1.55	40	0.21	40	0.21	40	0.21	40	0.21	40	0.21			**440**	**33.91**
20	1D1B7c	Batote			10	7.14	10	0.26	10	0.16	10	0.22	10	0.05	10	0.39	10	0.05	10	0.05	10	0.05	10	0.05	10	0.05	**110**	**8.48**
	Total		**310**	**221.19**	**562**	**187.96**	**562**	**11.51**	**562**	**10.79**	**562**	**7.17**	**562**	**13.32**	**562**	**11.38**	**562**	**2.95**	**562**	**2.95**	**562**	**2.95**	**562**	**2.95**	**252**	**1.32**	**6182**	**476.44**

Note: Amount is in lakh

Table 22: Year-Wise Physical and Financial Targets of DRSM Structures to be Undertaken in Sub-Watersheds

S. No.	Sub-Watershed	Name of Forest Division	Year II		Year III		Year VIII		Year IX		Total	
			Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)
1	1D1B1a	Udhampur			1500	16.49				4.12	**1500**	**20.61**
		Batote			2000	21.98				5.50	**2000**	**27.48**
2	1D1B1b	Batote			1100	12.09				3.02	**1100**	**15.11**
3	1D1B4a	Ramban	9100	100.01				25.00			**9100**	**125.01**
4	1D1B4b	Ramban	9100	100.01				25.00			**9100**	**125.01**
5	1D1B4c	Ramban			0	0.00				0.00	**0**	**0.00**
6	1D1B4d	Ramban			1800	19.78				4.95	**1800**	**24.73**
7	1D1B4f	Ramban	9100	100.01				25.00			**9100**	**125.01**
8	1D1B5a	Ramban			1800	19.78				4.95	**1800**	**24.73**
9	1D1B5b	Ramban			1300	14.29				3.57	**1300**	**17.86**
10	1D1B5c	Ramban	9100	100.01				25.00			**9100**	**125.01**
11	1D1B5d	Ramban			11300	124.19				31.05	**11300**	**155.23**
12	1D1B5f	Ramban			9100	100.01				25.00	**9100**	**125.01**
13	1D1B5g	Ramban	11300	124.19				31.05			**11300**	**155.23**
14	1D1B6a	Ramban			4500	49.46				12.36	**4500**	**61.82**
15	1D1B6b	Ramban	4500	49.46				12.36			**4500**	**61.82**
16	1D1B6c	Ramban			900	9.89				2.47	**900**	**12.36**
17	1D1B6d	Ramban	3500	38.47				9.62			**3500**	**48.08**
18	1D1B7a	Batote			4500	49.46				12.36	**4500**	**61.82**
19	1D1B7b	Batote	9100	100.01				25.00			**9100**	**125.01**
20	1D1B7c	Batote			1800	19.78				4.95	**1800**	**24.73**
	Total		**64800**	**712.15**	**41600**	**457.18**		**178.04**		**114.30**	**106400**	**1461.67**

Table 23: Year-Wise Physical and Financial Targets of Crate Wire Structures to be Undertaken in Sub-Watersheds

S. No.	Sub-Watershed	Name of Forest Division	Year II		Year III		Year VIII		Year IX		Total	
			Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)
1	1D1B1a	Udhampur			600	13.25				3.31	**600**	**16.56**
		Batote			800	17.66				4.42	**800**	**22.08**
2	1D1B1b	Batote			550	12.14				3.04	**550**	**15.18**
3	1D1B4a	Ramban	5650	124.75				31.19			**5650**	**155.94**
4	1D1B4b	Ramban	4250	93.84				23.46			**4250**	**117.30**
5	1D1B4c	Ramban			125	2.76				0.69	**125**	**3.45**
6	1D1B4d	Ramban			850	18.77				4.69	**850**	**23.46**
7	1D1B4f	Ramban	4250	93.84				23.46			**4250**	**117.30**
8	1D1B5a	Ramban			850	18.77				4.69	**850**	**23.46**
9	1D1B5b	Ramban			550	12.14				3.04	**550**	**15.18**
10	1D1B5c	Ramban	4250	93.84				23.46			**4250**	**117.30**
11	1D1B5d	Ramban			4250	93.84				23.46	**4250**	**117.30**
12	1D1B5f	Ramban			2825	62.38				15.59	**2825**	**77.97**
13	1D1B5g	Ramban	4225	93.29				23.32			**4225**	**116.61**
14	1D1B6a	Ramban			2275	50.23				12.56	**2275**	**62.79**
15	1D1B6b	Ramban	2275	50.23				12.56			**2275**	**62.79**
16	1D1B6c	Ramban			250	5.52				1.38	**250**	**6.90**
17	1D1B6d	Ramban	1400	30.91				7.73			**1400**	**38.64**
18	1D1B7a	Batote			2275	50.23				12.56	**2275**	**62.79**
19	1D1B7b	Batote	4250	93.84				23.46			**4250**	**117.30**
20	1D1B7c	Batote			850	18.77				4.69	**850**	**23.46**
	Total		**30550**	**674.54**	**17050**	**376.46**		**168.64**		**94.12**	**47600**	**1313.76**

Table 24: Year-Wise Physical and Financial Targets of Gabion Structures to be Undertaken in Sub-Watersheds

S. No.	Sub-Watershed	Name of Forest Division	Year II		Year III		Year VIII		Year IX		Total	
			Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)
1	1D1B1a	Udhampur			450	13.82				3.46	**450**	**17.28**
		Batote			575	17.66				4.42	**575**	**22.08**
2	1D1B1b	Batote			400	12.29				3.07	**400**	**15.36**
3	1D1B4a	Ramban	3975	122.09				30.52			**3975**	**152.62**
4	1D1B4b	Ramban	3050	93.68				23.42			**3050**	**117.10**
5	1D1B4c	Ramban			50	1.54				0.38	**50**	**1.92**
6	1D1B4d	Ramban			625	19.20				4.80	**625**	**24.00**
7	1D1B4f	Ramban	3050	93.68				23.42			**3050**	**117.10**
8	1D1B5a	Ramban			625	19.20				4.80	**625**	**24.00**
9	1D1B5b	Ramban			400	12.29				3.07	**400**	**15.36**
10	1D1B5c	Ramban	3050	93.68				23.42			**3050**	**117.10**
11	1D1B5d	Ramban			3050	93.68				23.42	**3050**	**117.10**
12	1D1B5f	Ramban			2050	62.97				15.74	**2050**	**78.71**
13	1D1B5g	Ramban	3050	93.68				23.42			**3050**	**117.10**
14	1D1B6a	Ramban			1625	49.91				12.48	**1625**	**62.39**
15	1D1B6b	Ramban	1625	49.91				12.48			**1625**	**62.39**
16	1D1B6c	Ramban			225	6.91				1.73	**225**	**8.64**
17	1D1B6d	Ramban	1025	31.48				7.87			**1025**	**39.35**
18	1D1B7a	Batote			1625	49.91				12.48	**1625**	**62.39**
19	1D1B7b	Batote	3050	93.68				23.42			**3050**	**117.10**
20	1D1B7c	Batote			625	19.20				4.80	**625**	**24.00**
	Total		**21875**	**671.89**	**12325**	**378.56**		**167.97**		**94.64**	**34200**	**1313.07**

Table 25: Year-Wise Physical and Financial Targets of Geotextile Mat to be Undertaken in Sub-Watersheds

S. No.	Sub-Watershed	Name of Forest Division	Year II		Year III		Year VIII		Year IX		Total	
			Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)
1	1D1B1a	Udhampur			28150	8.45				2.11	**28150**	**10.56**
		Batote			36975	11.09				2.77	**36975**	**13.87**
2	1D1B1b	Batote			24175	7.25				1.81	**24175**	**9.07**
3	1D1B4a	Ramban	325425	97.63				24.41			**325425**	**122.03**
4	1D1B4b	Ramban	185975	55.79				13.95			**185975**	**69.74**
5	1D1B4c	Ramban			2825	0.85				0.21	**2825**	**1.06**
6	1D1B4d	Ramban			97675	29.30				7.33	**97675**	**36.63**
7	1D1B4f	Ramban	186000	55.80				13.95			**186000**	**69.75**
8	1D1B5a	Ramban			32550	9.77				2.44	**32550**	**12.21**
9	1D1B5b	Ramban			30175	9.05				2.26	**30175**	**11.32**
10	1D1B5c	Ramban	185975	55.79				13.95			**185975**	**69.74**
11	1D1B5d	Ramban			185975	55.79				13.95	**185975**	**69.74**
12	1D1B5f	Ramban			151225	45.37				11.34	**151225**	**56.71**
13	1D1B5g	Ramban	185975	55.79				13.95			**185975**	**69.74**
14	1D1B6a	Ramban			93100	27.93				6.98	**93100**	**34.91**
15	1D1B6b	Ramban	93100	27.93				6.98			**93100**	**34.91**
16	1D1B6c	Ramban			16275	4.88				1.22	**16275**	**6.10**
17	1D1B6d	Ramban	74425	22.33				5.58			**74425**	**27.91**
18	1D1B7a	Batote			93100	27.93				6.98	**93100**	**34.91**
19	1D1B7b	Batote	185975	55.79				13.95			**185975**	**69.74**
20	1D1B7c	Batote			34950	10.49				2.62	**34950**	**13.11**
	Total		**1422850**	**426.86**	**827150**	**248.15**		**106.71**		**62.04**	**2250000**	**843.75**

Table 26: Year-Wise Physical and Financial Targets of Catch Water Drain to be Undertaken in Sub-Watersheds

S. No.	Sub-Watershed	Name of Forest Division	Year II		Year III		Year VIII		Year IX		Total	
			Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)	Phy. (Cum)	Fin. (Rs in lakh)
1	1D1B1a	Udhampur			1660	10.90				2.72	**1660**	**13.62**
		Batote			2150	14.12				3.53	**2150**	**17.64**
2	1D1B1b	Batote			1900	12.47				3.12	**1900**	**15.59**
3	1D1B4a	Ramban	7600	49.90				12.47			**7600**	**62.37**
4	1D1B4b	Ramban	5710	37.49				9.37			**5710**	**46.86**
5	1D1B4c	Ramban			0	0.00				0.00	**0**	**0.00**
6	1D1B4d	Ramban			0	0.00				0.00	**0**	**0.00**
7	1D1B4f	Ramban	5710	37.49				9.37			**5710**	**46.86**
8	1D1B5a	Ramban			1900	12.47				3.12	**1900**	**15.59**
9	1D1B5b	Ramban			1900	12.47				3.12	**1900**	**15.59**
10	1D1B5c	Ramban	5710	37.49				9.37			**5710**	**46.86**
11	1D1B5d	Ramban			3810	25.01				6.25	**3810**	**31.27**
12	1D1B5f	Ramban			0	0.00				0.00	**0**	**0.00**
13	1D1B5g	Ramban	0	0.00				0.00			**0**	**0.00**
14	1D1B6a	Ramban			3810	25.01				6.25	**3810**	**31.27**
15	1D1B6b	Ramban	3810	25.01				6.25			**3810**	**31.27**
16	1D1B6c	Ramban			1900	12.47				3.12	**1900**	**15.59**
17	1D1B6d	Ramban	3810	25.01				6.25			**3810**	**31.27**
18	1D1B7a	Batote			3810	25.01				6.25	**3810**	**31.27**
19	1D1B7b	Batote	3810	25.01				6.25			**3810**	**31.27**
20	1D1B7c	Batote			1900	12.47				3.12	**1900**	**15.59**
	Total		**36160**	**237.41**	**24740**	**162.43**		**59.35**		**40.61**	**60900**	**499.80**

Annexure-I

SYI Index as per Erosion Category of Sub-Watersheds

Sub-Watershed	EIMU	EIMU Area (ha) (EA)	Weightage factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100)/SA
1D1B1a	1	0	20	10	0.9	0
	2	294	19	5577	0.8	101
	3	1212	18	21824	0.7	345
	4	2394	17	40699	0.6	551
	5	515	16	8241	0.5	93
	6	15	15	229	0.4	2
Total		**4431**		**76579**		**1092**
1D1B1b	1	0	20	0	0.9	0
	2	104	19	1982	0.8	37
	3	1112	18	20011	0.7	327
	4	2357	17	40077	0.6	562
	5	603	16	9642	0.5	113
	6	101	15	1516	0.4	14
Total		**4277**		**73229**		**1054**
1D1B4a	1	8	20	157	0.9	2
	2	2140	19	40656	0.8	394
	3	2834	18	51013	0.7	433
	4	1138	17	19346	0.6	141
	5	2085	16	33363	0.5	202
	6	48	15	718	0.4	3
Total		**8253**		**145253**		**1175**
1D1B4b	1	0	20	6	0.9	0
	2	910	19	17286	0.8	224
	3	2239	18	40310	0.7	457
	4	1311	17	22280	0.6	217
	5	1592	16	25471	0.5	206
	6	118	15	1767	0.4	11
Total		**6170**		**107120**		**1116**
1D1B4c	1	0	20	0	0.9	0
	2	8	19	160	0.8	3
	3	706	18	12713	0.7	188
	4	2525	17	42920	0.6	544
	5	1340	16	21442	0.5	226
	6	158	15	2372	0.4	20
Total		**4738**		**79608**		**980**
1D1B4d	1	0	20	0	0.9	0
	2	215	19	4090	0.8	65
	3	1146	18	20637	0.7	285
	4	2095	17	35621	0.6	422
	5	1519	16	24301	0.5	240
	6	89	15	1329	0.4	10
Total		**5065**		**85979**		**1022**
1D1B4f	1	143	20	2858	0.9	79
	2	766	19	14551	0.8	356
	3	1209	18	21766	0.7	466

Sub-Watershed	EIMU	EIMU Area (ha) (EA)	Weightage factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100)/SA
	4	750	17	12750	0.6	234
	5	309	16	4948	0.5	76
	6	90	15	1354	0.4	17
Total		**3267**		**58227**		**1228**
1D1B5a	1	6	20	114	0.9	1
	2	110	19	2087	0.8	9
	3	3885	18	69936	0.7	276
	4	9210	17	156574	0.6	530
	5	4359	16	69742	0.5	197
	6	149	15	2228	0.4	5
Total		**17719**		**300681**		**1018**
1D1B5b	1	0	20	7	0.9	0
	2	90	19	1715	0.8	24
	3	1569	18	28236	0.7	340
	4	2971	17	50511	0.6	522
	5	1125	16	17993	0.5	155
	6	53	15	800	0.4	6
Total		**5808**		**99263**		**1046**
1D1B5c	1	90	20	1790	0.9	35
	2	873	19	16583	0.8	284
	3	967	18	17402	0.7	261
	4	1834	17	31179	0.6	401
	5	672	16	10753	0.5	115
	6	234	15	3512	0.4	30
Total		**4669**		**81220**		**1125**
1D1B5d	1	2	20	37	0.9	1
	2	688	19	13076	0.8	175
	3	734	18	13206	0.7	155
	4	2663	17	45278	0.6	454
	5	1415	16	22642	0.5	189
	6	480	15	7202	0.4	48
Total		**5982**		**101441**		**1021**
1D1B5f	1	0	20	0	0.9	0
	2	533	19	10119	0.8	61
	3	3614	18	65046	0.7	342
	4	5678	17	96528	0.6	436
	5	2869	16	45899	0.5	173
	6	601	15	9018	0.4	27
Total		**13294**		**226609**		**1039**
1D1B5g	1	0	20	0	0.9	0
	2	612	19	11632	0.8	58
	3	7877	18	141781	0.7	618
	4	6349	17	107940	0.6	403
	5	1111	16	17782	0.5	55
	6	108	15	1627	0.4	4
Total		**16058**		**280762**		**1139**
1D1B6a	1	0	20	0	0.9	0
	2	327	19	6210	0.8	83

Sub-Watershed	EIMU	EIMU Area (ha) (EA)	Weightage factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100)/SA
	3	2020	18	36353	0.7	426
	4	2823	17	47987	0.6	482
	5	745	16	11920	0.5	100
	6	64	15	957	0.4	6
Total		**5978**		**103426**		**1097**
1D1B6b	1	0	20	0	0.9	0
	2	278	19	5288	0.8	116
	3	1225	18	22050	0.7	423
	4	1873	17	31840	0.6	523
	5	274	16	4385	0.5	60
	6	1	15	17	0.4	0
Total		**3651**		**63580**		**1122**
1D1B6c	1	0	20	0	0.9	0
	2	52	19	992	0.8	27
	3	867	18	15607	0.7	374
	4	1473	17	25047	0.6	515
	5	481	16	7690	0.5	132
	6	46	15	695	0.4	10
Total		**2920**		**50032**		**1057**
1D1B6d	1	0	20	0	0.9	0
	2	253	19	4802	0.8	78
	3	1631	18	29362	0.7	419
	4	2578	17	43831	0.6	536
	5	438	16	7013	0.5	71
	6	8	15	113	0.4	1
Total		**4908**		**85121**		**1105**
1D1B7a	1	5	20	102	0.9	2
	2	352	19	6683	0.8	122
	3	1198	18	21567	0.7	345
	4	1983	17	33715	0.6	462
	5	805	16	12873	0.5	147
	6	33	15	491	0.4	4
Total		**4376**		**75431**		**1083**
1D1B7b	1	10	20	204	0.9	4
	2	947	19	17993	0.8	321
	3	1140	18	20527	0.7	321
	4	1240	17	21084	0.6	283
	5	1111	16	17772	0.5	198
	6	29	15	436	0.4	4
Total		**4478**		**78016**		**1131**
1D1B7c	1	0	20	0	0.9	0
	2	149	19	2825	0.8	48
	3	1509	18	27166	0.7	401
	4	1730	17	29407	0.6	372
	5	1337	16	21388	0.5	225
	6	18	15	271	0.4	2
Total		**4743**		**81057**		**1048**

Annexure-II

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सत्यमेव जयते

Jammu & Kashmir Forest Department
Office of the Pr. Chief Conservator of Forests & HoFF
Government of Jammu & Kashmir

Circular No. 06 of 2022
D A T E D: 18 .05.2022

The estimates for forestry works are to be prepared based on Forest Schedule of Rates notified from time to time. The estimates for components of forestry works not specified in Forest Schedule of Rates shall be prepared based on the PWD Schedule of Rates.

These circular instructions are in continuation to the conditions as laid down in the Forest Order No. 114 of 2017 dated: 11.03.2017 issued for Forest Rate Schedule Tariff for forestry, Soil Conservation and related works.

18/5/2022

(Dr. Mohit Gera) IFS
Pr. Chief Conservator of Forests (HoFF),
Jammu & Kashmir

No. PCCF/Coord/Circular file/ Misc-213/1051-1101 **Dated:** 18.05.2022

Copy for information to the:

1. Addl. Pr. Chief Conservator of Forests/ CEO CAMPA
2. Addl. Pr. Chief Conservator of Forests Jammu
3. Addl. Pr. Chief Conservator of Forests Kashmir
4. Addl. Pr. Chief Conservator of Forests (WPR&T)
5. Chief Conservator of Forests (S&D)
6. Chief Conservator of Forests (P&P)
7. All Conservator of Forests
8. All Divisional Forest Officers
9. I/c website for uploading it on the website of J&K Forest Department
10. Circular File

GOVERNMENT OF JAMMU AND KASHMIR
OFFICE OF THE PR.CHIEF CONSERVATOR OF FORESTS

Subject : Revision of FOREST RATE SCHEDULE TARRIF for Forestry, Soil Conservation and related works for the year 2016-17----reg.

Forest Order No. 114 of 2017
D a t e d : 11- 03 - 2017

1. Whereas, the forest rate schedule for the Forestry, Soil Conservation and related works for Jammu and Kashmir region were revised and sanctioned in the year 2004-05 vide FO No. 91 of 2005 dated 26-09-2005 and issued vide endstt. No. PCCF/Plg/98/72/1044-49 dated 26-09-2005 and subsequently the rates were revised in the year 2013-14 based on built in factor as per 2004-05 rates and annexure-A to the said order.
2. Whereas, the PCCF vide Order No: **PCCF/Coord/Meeting/554-58** dated:**21-12-2016** had constituted a Committee for the upward revision of the Forest Schedule Rates. The Committee comprising of :
   a. Regional Director, Social Forestry Deptt., Jammu (Chairman)
   b. Regional Wildlife Warden, Jammu (Member)
   c. Conservator of Forests, South Circle, Kashmir (Member)
   d. Divisional Forest Officer, Urban Forestry Division, Jammu (Member)
3. Whereas, the committee after series of discussion furnished the report vide office letter No. 2710/RD/SFD-J dated 03-02-2017, indicating the basis for the revision of the rates alongwith the rate schedule/tarrif for various Forestry, Soil Conservation and related works for the year 2016-17 as follows :
   i. The minimum wage rate was applied for the calculation of labour rate in Forest Schedule earlier and it had become very difficult for the field staff to execute the works departmentally due to the fact that the market rate of labour have become quite high as compared to minimum wage rate applied to the Schedule Rate. Keeping in view the above said facts the labour rate applicable as per PWD schedule rate of **2012-13** i.e. **Rs. 300/-** has been taken as a base wage rate for calculating revised schedule rates along with change in material cost as per present available rate obtained from **SICOP** for the current year. The market labour rate is actually around **Rs. 350 –400/-** for **unskilled** labour and **Rs. 500/- – 600/-** for **skilled** labour. Hence, there is a need for escalation of labour rate of **20%**. However, only **10%** enhancement in labour rate has been incorporated in the preparation of present revised Forest Schedule Rate.
   ii. Further, for execution of works within the municipal limits of Jammu and Srinagar cities and expensive localities, further escalation on proposed rates may be given by the competent authority.
   iii. For the works which are deep inside the forest or any inaccessible areas the carriage charges both mechanical and head load / manual in nature as per **PWD schedule rates 2012-13** may be followed.
   iv. The proposal for raising of seedlings and their maintenance in poly bags have been taken from SFRI as submitted by Research Advisory Committee vide No: SFRI/CFR/F-102/2016-17/2038-39 dated: 21-01-2017.

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In view of the above, the following revised rate of schedule is hereby issued for undertaking forestry, Soil Conservation and related works in the respective regions.

Item of work	Rate (in Rupees) per unit of work item for the year 2016-17				Remarks
	Jammu	Kashmir	Leh	Kargil	
i. Fencing – using Square PCC Fence Posts conforming to product code PCFP-3 at spacing of 8' and 4 strands of black annealed Barbed Wire conforming to the product code BA-BW. At least every 10th fence post along the straight fence line and every fence posts at the corner be fixed in the cement concrete block of size 1'6"x1'x1'. This type of fencing be preferred on sites which are likely to experience excessive heavy pressure of grazing by the domestic animals.	80.71/ rft	98.69/ rft	--	--	The rate includes the cost and carriage charges of material upto the work site digging of 1'6"x1'6" pit, fixing of fence posts firmly in the ground upto basal height of 1'6" stretching and fixing of BABW in the hooks, painting numbering of fence posts and display of plantation boards etc.
ii. Fencing – using Square Fence conforming to product code PCFP-3 at spacing of 10' and 4 strands of black annealed Barbed Wire conforming to the product code BA-BW. At least every 8th fence along the straight line and every fence posts at the corner be fixed in the cement concrete block of size 1'6"x1'x1'. This type of fencing be preferred on sites which are likely to experience moderate to light pressure of grazing by the domestic animals.	72.78/ rft.	89.01/ rft	--	--	The rate includes the cost and carriage charges of material upto the work site digging of 1'6"x1'6" pit, fixing of fence posts firmly in the ground upto basal height of 1'6" stretching and fixing of BABW in the hooks, painting numbering of fence posts and display of plantation boards etc.
iii. Fencing – using triangular Fence Posts conforming to product code PCFP-4 at spacing of 8' and 4 strands of black annealed Barbed Wire conforming to the product code BA-BW. At least every 6th fence along the straight fence line and every fence posts at the corner be fixed in the cement concrete block of size 1'6"x9"x9". This type of fencing be preferred on sites which are likely to experience light pressure of grazing by the domestic animals.	70.90 / rft	77.24/ rft	--	--	The rate includes the cost and carriage charges of material upto the work site digging of 1'6" x 9" x6" pit, fixing of fence posts firmly into the ground upto basal height of 1'6" stretching and fixing of BABW in the hooks, painting numbering of fence posts and display of plantation boards etc.

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iv **Fencing – using Wooden Fence posts** of length = 1.85 meter, minimum mid girth of more than 8" to be fixed 1'6" to 2' deep in the ground at a spacing of 8' and 4 strands of Black Annealed Barbed Wire conforming to product code BA-BW. This type of fencing be preferred on sites situated far away in the interior area/remote localities.	68.32/ rft	68.77/ rft	85.57/rft	80.91/rft	The rate includes the cost of BABW, cost of extraction of wooden fence posts to be salvaged only from the dry and dead fallen trees easily available at site, U-nails, paint, Tarcoal and carriage of material upto the work site, tarring and charring, fixing of fence posts, painting and numbering, stretching and fixing of BABW with U-nails and display of plantation boards.
Fencing Repair and Renovation a. Fencing Repair	16.74/ rft	16.74/ rft	19.95/rft	19.08/rft	The rates will be applicable subject to the approval ofCCF/CF only for the fencing which is more than 5 years old and where there is/ are no daily wager(s) for the watch and ward of the unit. Normally the repairs of fencing should be done by the watch and ward staff including daily wagers.
b. Fencing Renovation	26.32/ rft	27.33/ rft	32.39/rft	30.70/rft	The rates including the cost of material upto Rs. 3.30 per rft., Rs. 4.20 per rft in Jammu and Kashmir regions respectively and labour charges. The renovation of fencing will be permissible only in case of damages by natural calamities like land slides, fire occurrence and theft etc. Subject to the approval of the CCF concerned

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Plating **(i) Pit Planting** (a) Planting of poly raised saplings in staggered pits 45cm x 45cm x 45cm along the contours as well as on the flat surface	29.34/ plant	29.34/ plant	34.51/ plant	33.08/ plant	The rates includes the cost of digging of pits, refilling with clean surface soil, carriage of plants and raising of water harvesting structure etc.
(b) Planting of naked root saplings in staggered pits 45x45x45 cms along the contours as well as on the flat surface.	23.17/ plant	23.17/ plant	27.44/ plant	26.28/ plant	The naked planting should be preferred in flat terrine of temperate zone.
(ii) Trench Planting **(a)** Planting of poly raised saplings in staggered trenches of size 90cm x 45cm x 45cm with on plant in each trench	46.42/ plant.	46.42/ plant	55.01/ plant	52.72/ plant	The rate includes the cost of digging of trenches, refilling with clean surface soil, carriage of plant, planting and raising of water harvesting structures etc.
(b) Planting of naked root saplings in staggered trenches of size 90cm x 45cm x45cm with one plant in each trench	42.70/ plant.	42.70/ plant	50.42/ plant	48.32/ plant	The naked planting should be preferred in hilly terrine of temperate zone.
iii. Mawa Planting **(a)** Extraction of Mawa	6.99/ plant	6.99/ plant	8.49/ plant	8.09/ plant	The rate includes extraction charges for standard size Mawa (10" long with minimum mid girth 4") obtainable from forest plantations.
(b) Jumper Planting of Mawa	12.82/ plant.	12.82/ plant.	14.93/	14.36/ plant	The rate includes the cost and carriage of Mawas upto the plantation site and planting of the Mawa by Jumper planting method. The basal end of Mawas should be embedded inside the soil upto a depth of 1'6" to 2'
iv. Dibbling of H.C. Nuts	7.18/ dibble	7.18/ dibble	8.83/ dibble	8.38/ dibble	The rate includes cost of healthy seeds and its carriage upto working site. At least two seeds should be dibbled per patch.
v Patch Sowing in 45cm x 45cm x 15 cm patches	6.99/ patch	6.99/ patch	8.50/ patch	8.09/ patch	The rate includes the cost of seeds and labour charges

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vi. Grass slips in patches	6.35/ slip	6.35/ slip	6.35/ slip	6.35/ slip	The rates includes the cost of grass slips, carriage charges upto site and planting charges
vii. Cutting, grubbing and removal of Lantana	22904/ ha	--	--	--	The rate includes cutting, grubbing and removal of Lantana in a year during the active growth period of the weed. This activity should not be resorted to unless the area is simultaneously being planted. Simple removal of weeds without providing thick cover by artificial plantation will not serve the purpose. 50% of amount may be charged for the second cutting if required in same place in the same year.
viii. Pruning and training of existing root stocks. (Tending operation)	6.35/ plant	6.35/ plant	7.35/ plant	7.06/ plant	The rate includes the cost of pruning and training tools and the labour charges.
3. Plant production a. Formation of New Permanent Nursery	302544/ ha	302544/ ha	358034.6/ Ha	342914/ ha	The rate includes the cost of levelling tractorization, complete soil working upto a depth of 1'6" to 2' formation of beds, raising of bunds, water channels and paths etc.
b. Raising of saplings in polythene bags of size (9" x 6") conforming to product code No. PB-60/90 with artificial source of irrigation in the nursery	8.03/ plant	8.03/ plant	8.03/ plant	8.03/ plant	The rate will includes cost of all components including the cost of Poly Bags, seed, pesticide and well rotten FYM to be used with good earth in the ratio of 2:3 and the cost of running of 5diesel pump, but does not includes cost of pump, its accessories and maintenance of plant.

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c. Raising of saplings in polythene bags of size (18"x14") conforming to product code No. PB-60/90 with artificial source of irrigation in the nursery	42.88/ plant	42.88/ plant	42.88/ plant	42.88/ plant	The rate will includes cost of all components including the cost of Poly Bags, seed, pesticide and well rotten FYM to be used with good earth in the ratio of 2:3 and the cost of running of 6diesel pump, but does not includes cost of pump, its accessories and maintenance of plant.
d. Raising of Naked Root saplings	7.44/ plant	7.44/ plant	9.30/ plant	8.79/ plant	The rate includes the cost of all components including the cost of seed well rotten FYM weeding, hoeing and maintenance for one year.
e. Maintenance of Poly raised conifer saplings in nurseries of 9" x 6"					
i. During 1st year of raising of plants	2.66/ plant	2.66/ plant	2.66/ plant	2.66/ plant	The rate includes the maintenance cost of plants during the 1st year.
ii. During 2nd year of raising of plants	2.66/ plant	2.66/ plant	2.66/ plant	2.66/ plant	The rate includes the maintenance cost of plants during the 2nd year.
iii. During the 3rd year of raising of plants	3.83/ plant.	3.83/ plant.	3.83/ plant.	3.83/ plant.	The rate includes the 6maintenance cost and replacement of the old rotten Poly Bags by the new ones in the 3rd year.
f. Maintenance of Poly raised conifer saplings in nurseries of 18" x 14"					
i. During 1st year of raising of plants	13.20/ plant	13.20/ plant	13.20/ plant	13.20/ plant	The rate includes the maintenance cost of plants during the 1st year.
ii. During 2nd year of raising of plants	13.20/ plant	13.20/ plant	13.20/ plant	13.20/ plant	The rate includes the maintenance cost of plants during the 2nd year.
iii. During the 3rd year of raising of plants	19.00/ plant.	19.00/ plant	19.00/ plant.	19.00/ plant	The rate includes the 6maintenance cost and replacement of the old rotten Poly Bags by the new ones in the 3rd year.

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4. Marking and Enumeration of trees:- **a.** Enumeration of trees.	5.40/ tree	5.40/ tree	5.40/ tree	5.40/ tree	The rate includes the labour charges for marking and numbering etc including bush clearance, cost of material / equipment.
b. Marking of trees	9.75/ tree	9.75/ tree	9.75/ tree	9.75/ tree	The rate includes labour charges and other expenses for making of trees (both standing and fallen) including bush clearance, cost of material / equipment.
Working Plan and Resources Survey : **a. Layout of boundaries**	1673.21 Per sq. Km	1673.21 Per sq. Km	1986.71 Per sq Km	1673.21 Per sq. Km	The rate includes the wages of one skilled and three unskilled labourers to be engaged in the layout of the boundaries, including making and tarring of dry layout rings and making and fixing of various types of demarcation boards of standard sizes. This includes cost of material and tools required for the purpose.
b. Point Sampling	2261.05 Per sample point	2261.05 Per sample point	2679.05 Per sample point	2261.05 Per sample point	The rate includes the wages of two skilled and four unskilled labourers to be engaged in locating the primary and secondary reference point. Location layout and survey of sample point selected at random and collection of the data.
c. Survey of sample plot (Bamboo Survey)	2921.05 Per plot of size 0.1 ha	2921.05 Per plot of size 0.1 ha	3460.05 Per plot of size 0.1 ha	2921.05 Per plot of size 0.1 ha	The rate includes the wages of two skilled and six unskilled labourers to be engaged in locating, layout and survey of six sample plot of size 0.1 hectare selected randomly and collection of data

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d. **Plantation (Plot) Survey**	799.26 Plot of size (10M x 10M)	799.26 Plot of size (10M x 10M)	947.76 Plot of size (10M x 10M)	799.26 Plot of size (10M x 10M)	The rate includes the wages of one skilled and one unskilled labourer required to be engaged in locating, layout and survey of a sample plot of size 0.01 hectare (10 M x 10M) selected at random in plantation area and collection of Data.
e. **Resin channel survey**	799.26 Plot of size 0.1 hectare	-	-	-	The rate includes the wages of one skilled and one unskilled labourer required to be engaged in locating, layout and survey of a circular sample plot of size 1 hectare selected at random and collection of Data. The circular sample plot be normally laid out around the sample point to be surveyed in the Chir area.
f. **Regeneration Survey/ Fixed plot survey**	2921.05 Per plot of size 0.1 hectare	2921.05 Per plot of size 0.1 hectare	3460.05 Per plot of size 0.1 hectare	2921.05 Per plot of size 0.1 hectare	The rate includes the wages of two skilled and six unskilled labourer required to be engaged in locating, layout and survey of a fixed plot of size 0.1 hectare selected at random and collection of Data.
Engineering Works **i.** Laying of wire crates for plugging gullies and Nallahs.					The prevailing state PWD schedule may be applied. It should be preferred to DRSM in the interest of sustenance of the work for longer period duration.
ii. Stone Wall Fencing					The prevailing State PWD schedule may be applied.

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iii. Construction of Bridges, Culverts and Roads -					The prevailing State PWD schedule may be applied.
i. DRSM works	1099/ cu.mt.	1099/ cu.mt.	1300/- cu.mt	1245/- cu.mt.	The rate includes the cost of collection, carriage of stone to the work site, fashioning of stones to be used along the exposed faces, in the construction of DRSM. It should be preferred only in sites which experience low to moderate rainfall and are free from flash floods.
ii. Inspection Path **a.** Construction of inspection path 1.5 Meter wide with standard specification	45221/ km	45221/ km	52349/ km	46849/km	The rate includes the cost and carriage of the material and labour charges
b. Construction of inspection path 1.0 Meter wide with standard specification	36971/ km	36971/ km	43736/ km	41536/km	The rate includes the cost and carriage of the material and labour charges.
iii. Fire line: i. Construction of permanent Fire line 10 mtr.. in width with standard specification	29250/- km.	29250/- km.	-	-	The rate includes the cutting/ burning/ disposal of bushes / slash/ debris/ dry leafs/ humus, fallen branches and other inflammable material and labour charges. The permanent fire line shall constructed in highly venerable areas. The rate is based on the PWD schedule of rates for bush clearance @ 5.85/ sq. mt. assuming 50% of the fire line area covered with bushes.
ii. Maintenance of permanent Fire line 10 mtr.. in width with standard specification	14625/- km	14625/- km	-	-	The rate includes the burning of slash, debris, dry leafs, fallen branches and other inflammable material and labour charges.

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Demarcation Works Fixing of RCC Boundary Pillar of size 6' x 1' 6" x 6"	-	-			The prevailing state PWD schedule rates may be applied. The escalation on said PWD rates shall be based on the site and terrain conditions and further subject to approval from competent authority.

The present revised rates are however, subject to the following conditions:

a. The revised schedule rates of works are for the areas which are within 1 km from approach road.
b. The revised schedule rate in respect to all the above said works shall be raised suitably in order to cover the extra expenditure involved in carriage of fencing material, planting stock and RCC boundary pillars, manually/ mechanically to cover longer distance in the far flung and in the interior Forest areas as per the carriage schedule chart of PWD schedule of rates of 2012.
c. For pit planting in 100% hard rock, 80% hard rock plus 20% ordinary soil and back filling of soil typical estimate based on prevailing PWD schedule rate may be followed.
d. For any specific location or any specific terrain the rate may be calculated based on terrain condition and be referred to the competent authority for approval.
e. Any deviation in the fencing viz chain link fencing with toe-wall, fixing of every square PCC fencing posts in cement concrete block, using mesh wire on PCC fence post, tree guards etc, for which estimates in this regard be prepared as per the prevailing PWD schedule rates and approval may be obtained from Competent Authority.
f. With regard to Leh and Kargil Districts the Labour rates may be applied as approved by the District Development Commissioners.
g. The built in factor which was approved in the Forest Order No. 91 of 2005 dated : 26-09-2005 has been adopted and is being annexed to this order as Annexure-A.

(A. K. SINGH) IFS
Pr. Chief Conservator of Forests (HoFF)

No PCCF/Pln/2016-17/1673-87 Dated 11-03-2017

Copy for information and necessary action to the:

1. Commissioner/Secretary to Government, Forest Department, Civil Secretariat, Jammu. This also takes in reference to your letter No FST/Plan-28/2016-17 Dated: 08.03.2017 on the subject.
2. Chief Conservator of Forests, Jammu/Kashmir.
3. All other Head of Department (J&K Forest Department).
4. Conservator of Forests, Central Circle, Jammu.
5. Conservator of Forests, Working Plan, Jammu.
6. Senior Agrostologist, Forest Department.

Annexure-III

1. Per ha Cost Norm for Normal Afforestation

S. No.	Operation	Unit	Unit Cost (Rs)	Qty	Total Cost (Rs)
1	ADVANCE WORK				
	a) Fencing with PCC Posts	Rft.	135.00	300	40500
2	CREATION				
	A. PLANTATION				
	a) Trench Planting (PB)	Plant	46.42	412	19125
	b) Trench Planting (NR)	Plant	42.70	412	17592
	c) Pit Plantation (PB)	Plant	29.34	138	4049
	d) Pit Plantation (NR)	Plant	23.17	138	3197
	B. SOWING				
	a) Patch Sowing	Patch	6.99	370	2586
	b) Dibbling	Dibble	7.18	370	2657
3	CONSTRUCTION OF INSPECTION PATH (1.5 m wide)	Rmt.	45221/km	100	4522
4	Construction of permanent fire line (10 m wide)	Rmt.	29250/km	100	2925
5	SMC WORKS	Cum.	1099.40	5	5497
	Sub Total I				**102651**
6	MAINTENANCE				
	(BUS) 1st year @ 25% of last year plantation				
	a) PB plantation	Plant	29.34	138	4049
	b) NR plantation	Plant	23.17	138	3197
	(BUS) 2nd year @ 15% of last year plantation				
	a) PB plantation	Plant	29.34	83	2435
	b) NR plantation	Plant	23.17	83	1923
	(BUS) 3rd year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	28	822
	b) NR plantation	Plant	23.17	28	649
	c) Fencing Repair	Rft.	16.74	100	1674
	(BUS) 4th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	28	822
	b) NR plantation	Plant	23.17	28	649
	(BUS) 5th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	28	822
	b) NR plantation	Plant	23.17	28	649
	c) Fencing Repair	Rft.	16.74	200	3348
	(BUS) 6th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	28	822
	b) NR plantation	Plant	23.17	28	649
	(BUS) 7th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	28	822
	b) NR plantation	Plant	23.17	28	649
	(BUS) 8th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	28	822
	b) NR plantation	Plant	23.17	28	649
	(BUS) 9th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	28	822
	b) NR plantation	Plant	23.17	28	649
	(BUS)10th year @ 5% of last year plantation				

S. No.	Operation	Unit	Unit Cost (Rs)	Qty	Total Cost (Rs)
	a) PB plantation	Plant	29.34	28	822
	b) NR plantation	Plant	23.17	28	649
	Sub Total II				**28389**
	Grand Total (Sub Total I + II)				**131040**
	OR SAY				**131040**

2. Per ha Cost Norm for Enrichment

S. No.	Operation	Unit	Unit Cost (Rs)	Qty	Total Cost (Rs)
1	ADVANCE WORK				
	a) Fencing with PCC Posts	Rft.	135.00	300	40500
2	CREATION				
	A. PLANTATION				
	a) Trench Planting (PB)	Plant	46.42	300	13926
	b) Trench Planting (NR)	Plant	42.70	300	12810
	c) Pit Plantation (PB)	Plant	29.34	100	2934
	d) Pit Plantation (NR)	Plant	23.17	100	2317
	B. SOWING				
	a) Patch Sowing	Patch	6.99	270	1887
	b) Dibbling	Dibble	7.18	270	1939
3	CONSTRUCTION OF INSPECTION PATH (1.5 m wide)	Rmt.	45221/km	100	4522
4	Construction of permanent fire line (10 m wide)	Rmt.	29250/km	100	2925
5	SMC WORKS	Cum.	1099.40	5	5497
	Sub Total I				**89257**
6	MAINTENANCE				
	(BUS) 1st year @ 25% of last year plantation				
	a) PB plantation	Plant	29.34	100	2934
	b) NR plantation	Plant	23.17	100	2317
	(BUS) 2nd year @ 15% of last year plantation				
	a) PB plantation	Plant	29.34	60	1760
	b) NR plantation	Plant	23.17	60	1390
	(BUS) 3rd year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	20	587
	b) NR plantation	Plant	23.17	20	463
	c) Fencing Repair	Rft.	16.74	100	1674
	(BUS) 4th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	20	587
	b) NR plantation	Plant	23.17	20	463
	(BUS) 5th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	20	587
	b) NR plantation	Plant	23.17	20	463
	c) Fencing Repair	Rft.	16.74	200	3348
	(BUS) 6th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	20	587
	b) NR plantation	Plant	23.17	20	463
	(BUS) 7th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	20	587
	b) NR plantation	Plant	23.17	20	463

S. No.	Operation	Unit	Unit Cost (Rs)	Qty	Total Cost (Rs)
	(BUS) 8th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	20	587
	b) NR plantation	Plant	23.17	20	463
	(BUS) 9th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	20	587
	b) NR plantation	Plant	23.17	20	463
	(BUS)10th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	20	587
	b) NR plantation	Plant	23.17	20	463
	Sub Total II				**21825**
	Grand Total (Sub Total I + II)				**111082**
	OR SAY				**111080**

3. Per ha Cost Norm for Pasture Development

S. No.	Operation	Unit	Unit Cost (Rs)	Qty	Total Cost (Rs)
1	ADVANCE WORK				
	a) Fencing with PCC Posts	Rft.	135.00	300	40500
2	CREATION				
	A. PLANTATION				
	a) Trench Planting (PB)	Plant	46.42	75	3482
	b) Trench Planting (NR)	Plant	42.70	75	3203
	c) Pit Plantation (PB)	Plant	29.34	25	734
	d) Pit Plantation (NR)	Plant	23.17	25	579
	B. SOWING				
	a) Patch Sowing	Patch	6.99	100	699
	b) Dibbling	Dibble	7.18	100	718
	C. GRASS SLIPS				
	a) In Patches	Slip	6.35	1000	6350
3	CONSTRUCTION OF INSPECTION PATH (1.5 m wide)	Rmt.	45221/km	100	4522
4	Construction of permanent fire line (10 m wide)	Rmt.	29250/km	100	2925
5	SMC WORKS	Cum.	1099.40	5	5497
	Sub Total I				**69208**
6	MAINTENANCE				
	(BUS) 1st year @ 25% of last year plantation				
	a) PB plantation	Plant	29.34	25	734
	b) NR plantation	Plant	23.17	25	579
	c) Grass Slip	Slip	6.35	250	1588
	(BUS) 2nd year @ 15% of last year plantation				
	a) PB plantation	Plant	29.34	15	440
	b) NR plantation	Plant	23.17	15	348
	c) Grass Slip	Slip	6.35	150	953
	(BUS) 3rd year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	5	147
	b) NR plantation	Plant	23.17	5	116
	c) Grass Slip	Slip	6.35	50	318
	d) Fencing Repair	Rft.	16.74	100	1674
	(BUS) 4th year @ 5% of last year plantation				

S. No.	Operation	Unit	Unit Cost (Rs)	Qty	Total Cost (Rs)
	a) PB plantation	Plant	29.34	5	147
	b) NR plantation	Plant	23.17	5	116
	c) Grass Slip	Slip	6.35	50	318
	(BUS) 5th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	5	147
	b) NR plantation	Plant	23.17	5	116
	c) Grass Slip	Slip	6.35	50	318
	d) Fencing Repair	Rft.	16.74	200	3348
	(BUS) 6th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	5	147
	b) NR plantation	Plant	23.17	5	116
	c) Grass Slip	Slip	6.35	50	318
	(BUS) 7th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	5	147
	b) NR plantation	Plant	23.17	5	116
	c) Grass Slip	Slip	6.35	50	318
	(BUS) 8th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	5	147
	b) NR plantation	Plant	23.17	5	116
	c) Grass Slip	Slip	6.35	50	318
	(BUS) 9th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	5	147
	b) NR plantation	Plant	23.17	5	116
	c) Grass Slip	Slip	6.35	50	318
	(BUS)10th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	5	147
	b) NR plantation	Plant	23.17	5	116
	c) Grass Slip	Slip	6.35	50	318
	Sub Total II				**14303**
	Grand Total (Sub Total I + II)				**83511**
	OR SAY				**83510**

4. Per ha Cost Norm for Assisted Natural Regeneration

S. No.	Operation	Unit	Unit Cost (Rs)	Qty	Total Cost (Rs)
1	ADVANCE WORK				
	a) Fencing with PCC Posts	Rft.	135.00	300	40500
2	CREATION				
	A. PLANTATION				
	a) Trench Planting (PB)	Plant	46.42	150	6963
	b) Trench Planting (NR)	Plant	42.70	150	6405
	c) Pit Plantation (PB)	Plant	29.34	50	1467
	d) Pit Plantation (NR)	Plant	23.17	50	1159
	B. SOWING				
	a) Patch Sowing	Patch	6.99	135	944
	b) Dibbling	Dibble	7.18	135	969
3	CONSTRUCTION OF INSPECTION PATH (1.5 m wide)	Rmt.	45221/km	100	4522
4	Construction of permanent fire line (10 m wide)	Rmt.	29250/km	100	2925

S. No.	Operation	Unit	Unit Cost (Rs)	Qty	Total Cost (Rs)
5	SMC WORKS	Cum.	1099.40	5	5497
	Sub Total I				71351
6	MAINTENANCE				
	(BUS) 1st year @ 25% of last year plantation				
	a) PB plantation	Plant	29.34	50	1467
	b) NR plantation	Plant	23.17	50	1159
	(BUS) 2nd year @ 15% of last year plantation				
	a) PB plantation	Plant	29.34	30	880
	b) NR plantation	Plant	23.17	30	695
	(BUS) 3rd year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	10	293
	b) NR plantation	Plant	23.17	10	232
	c) Fencing Repair	Rft.	16.74	100	1674
	(BUS) 4th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	10	293
	b) NR plantation	Plant	23.17	10	232
	(BUS) 5th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	10	293
	b) NR plantation	Plant	23.17	10	232
	c) Fencing Repair	Rft.	16.74	200	3348
	(BUS) 6th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	10	293
	b) NR plantation	Plant	23.17	10	232
	(BUS) 7th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	10	293
	b) NR plantation	Plant	23.17	10	232
	(BUS) 8th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	10	293
	b) NR plantation	Plant	23.17	10	232
	(BUS) 9th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	10	293
	b) NR plantation	Plant	23.17	10	232
	(BUS)10th year @ 5% of last year plantation				
	a) PB plantation	Plant	29.34	10	293
	b) NR plantation	Plant	23.17	10	232
	Sub Total II				13424
	Grand Total (Sub Total I + II)				84774
	OR SAY				84775