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Forest and Bio-diversity Conservation for Climate Change Response in West Bengal (WB-FBCCCR)

FUNDED BY JAPANESE ODA LOAN

CATCHMENT AREA TREATMENT (CAT) PLAN OF KANGSABATI SOUTH FOREST DIVISION

Prepared by

ICAR-Indian Institute of Soil and Water Conservation (ICAR-IISWC)
218 Kaulagarh Road, Dehradun – 248 195, Uttarakhand, India

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Consultancy Project: Preparation of Catchment Area Treatment Plan (CAT Plan) for 13 Forest Divisions in West Bengal under JICA Funded WB-FBCCCR

Consultant: ICAR-Indian Institute of Soil and Water Conservation (ICAR-IISWC)
218 Kaulagarh Road, Dehradun- 248 195, Uttarakhand, India

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Disclaimer

All input data / information *pertaining to status of DMU, existing and proposed interventions with respect to DLT, WHS and Land Treatments reported in this CAT plan were provided by the concerned officials of the DMU with technical support of the consultant. Thematic layers in terms of different maps are generated in GIS environment using basic inputs from topological maps of Survey of India, soil map of NBSS&LUP, DEM data of Copernicus, watershed boundary from SLUSI and, DMU boundaries and forest cover maps provided by WB-FBCCCR. Design, cost estimation and mapping of the said proposed measures were carried out by the consultant (Scientists and Technical) from ICAR-Indian Institute of Soil and Water Conservation (ICAR-IISWC), H/Q, Dehradun (Uttarakhand) and its Research Centres. This report is only for official purpose of the client and consultant.*

Sponsored by

Chief Project Director, Forest and Bio-diversity Conservation for Climate Change Response in West Bengal (WB-FBCCCR), Block LB-2, Sector-III, Salt Lake City, Kolkata – 700 106, West Bengal, India

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Glossary of Abbreviations

ICAR	Indian Council of Agricultural Research
IISWC	Indian Institute of Soil & Water Conservation
WB-FBCCCR	West Bengal-Forest and Bio-diversity Conservation for Climate Change Response
JICA	Japan International Cooperation Agency
ODA	Official Development Assistant
JFMC	Joint Forest Management Committees
CAT	Catchment Area Treatment
DMU	Divisional Management Unit
DLT	Drainage Line Treatment
WHS	Water Harvesting System
LT	Land Treatment
SLUSI	Soil & Land Use Survey of India
GIS	Geographical Information System
NBSS&LUP	National Bureau of Soil Survey and Land Use Planning
IFS	Indian Forest Service
Addl. PCCF	Additional Principal Chief Conservator of Forests
CCF	Chief Conservator of Forests
CF	Conservator of Forests
Addl. PD	Additional Project Director
Deputy CF	Deputy Conservator of Forests
JPD	Joint Project Director
DFO	Divisional Forest Officer
ADFO	Additional Divisional Forest Officer
Ros	Range Officers
Bos	Beat Officers
H/Q	Head Quarter
PI	Principal Investigator
Sr. Scientist	Senior Scientist
ACTO	Assistant Chief Technical Officer
TO	Technical Officer
STA	Senior Technical Assistant
ST	Senior Technician
JRF	Junior Research Fellow
YP-II	Young Professional-II
PA	Personal Assistant
HCN	Hydrologic Cover Complex
ESI	Erosion Susceptibility Index
HFL	Height Flood Level
BCD	Brushwood Check Dam

LBCD	Loose Boulder Check Dam
GC	Gabion Check
GCD	Gabion Check Dam
RRMCD	Random Rubble Masonry Check Dam
EP	Embankment Pond
PR	Pond Renovation
PP	Percolation Pond
DP	Dugout Pond
CST	Contour Staggered Trenching
CCT	Continuous Contour Trench
RT	Riser Trench
DD	Diversion Draine
FP	Forest Plantation
GF %	Gap Filling Percentage
NFP	New Forest Plantation
SGP	Shrub and Grasses Planning
H.I.	Horizontal Interval
V.I.	Vertical Interval
F.D.	Foundation Depth
m	Meter
sqm	Square meter
cm	Centimeter
gm	Gram
kg	Kilogram
Rs/m	Rupees per meter
cum	cubic meter
m^3	Cubic Meter
ha	hectare
NA	Not Applicable
Qty	Quantity
LS	Lump sum
C	Runoff Coefficient
Q	Peak Discharge
I	Rainfall Intensity
A	Catchment Area
L	Length of Weir
F	Fall/Drop
h	Depth of Flow
LB	Length of Basin

1. CAT Plan at a Glance

(A) Kangsabati South Forest Division

Area statistics

DIVISION	No. of ranges	No. of beats	Reported area (ha)	GIS calculated area (ha)	Difference b/w reported vs GIS calculated (ha)
Kangsabati South	6	15	28559.30	25759.50	-2799.30

Area statistics of different forest cover classes in Kangsabati South Division

Forest cover class	Divisional total area (ha)	% to total forest area
Water	595.88	2.33
Other forest area (no canopy)	8908.48	34.88
Scrub (tree canopy density < 10%)	104.98	0.41
Open forest (tree canopy density 10- 40%)	5725.49	22.42
Moderately dense forest (tree canopy density 40 - 70%)	8048.83	31.52
Very dense forest (tree canopy density >70%	2154.29	8.44

Area statistics of different Slope classes of Kangsabati South Division

Slope class	0 - 1	1 - 3	3 - 5	5 - 10	10 - 15	15 - 25	25 - 33	33 - 50	> 50	Total area (ha)
Divisional Area (ha)	590.50	2856.80	3719.00	7049.40	4098.40	4354.20	1422.10	1271.60	397.70	25759.50
% to total Area	2.29	11.09	14.44	27.37	15.91	16.90	5.52	4.94	1.54	100.00

Area statistics of different ESI classes spread over Kangsabati South Division

FOREST DIVISION	Area (ha) under different classes of Erosion Susceptibility Index					Total area (ha)
	Non critical (< 0.33)	Slightly critical (0.33 - 0.47)	Moderately critical (0.48 - 0.62)	Critical (0.63 - 0.79)	Very critical (> 0.79)	
Total area (ha)	2131.82	14.53	11721.86	9578.27	699.79	24146.27
% of total Forest Division area	**8.83**	**0.06**	**48.55**	**39.67**	**2.90**	**100.00**

Existing Drainage Line Treatment

Condition	Check Dam	Loose Boulder Check Dam
Breached	-	1
Functional	-	4
Purpose is fulfilled	5	17
Total	**5**	**22**

Existing Water Harvesting Structure

Condition	Earthen Dam	Pond
Fair	13	7
Poor	17	18
Total	**30**	**25**

(B) Proposed action plan

Physical and financial summary of action plan

Beat	DLT Structures		Water Harvesting Structures		Trenching (CST, CPT, CCT etc.)		Forest Plantation		Total estimated cost (in lakh ₹) * except forest plantation
	No. of structures	Estimated cost (in lakh ₹)	No. of structures	Estimated cost (in lakh ₹)	Area to be covered (ha)	Estimated cost (in lakh ₹)	Total area for plantation (ha)	Estimated cost (in lakh ₹)	
Bamundiha	2	0.21	4	17.91	18.72	2.39	18.72	Department norms may be adopted	20.51
Bandwan	27	2.64	5	34.21	15.99	1.50	15.99		38.35
Barabazar	6	0.47	2	13.75	6.09	0.85	6.09		15.08
Dhadka	28	9.91	5	130.17	21.05	2.12	21.05		142.20
Jamtoria	160	20.78	17	36.50	37.36	3.94	37.36		61.22
Kenda	33	16.64	3	4.08	258.13	28.14	258.13		48.86
Kuilapal	20	9.06	2	8.33	11.68	1.26	11.68		18.64
Kumari	29	5.33	22	36.61	170.92	18.07	170.92		60.01
Kunchia	8	1.14	3	4.58	5.97	0.69	5.97		6.41
Latapara	8	1.63	2	6.21	88.09	9.29	88.09		17.14
Manbazar	58	38.97	6	12.58	19.59	2.21	19.59		53.77
Nanna	27	4.74	19	49.67	-	-	-		54.41
Pargora	5	1.85	3	26.59	7.41	0.87	7.41		29.31
Sindri	5	0.37	5	7.00	13.21	1.70	13.21		9.07
Sindurpur	20	4.70	14	41.20	350.30	35.35	350.30		81.25
Grand Total	**436**	**118.46**	**112**	**429.38**	**1024.51**	**108.40**	**1024.51**		**656.24**

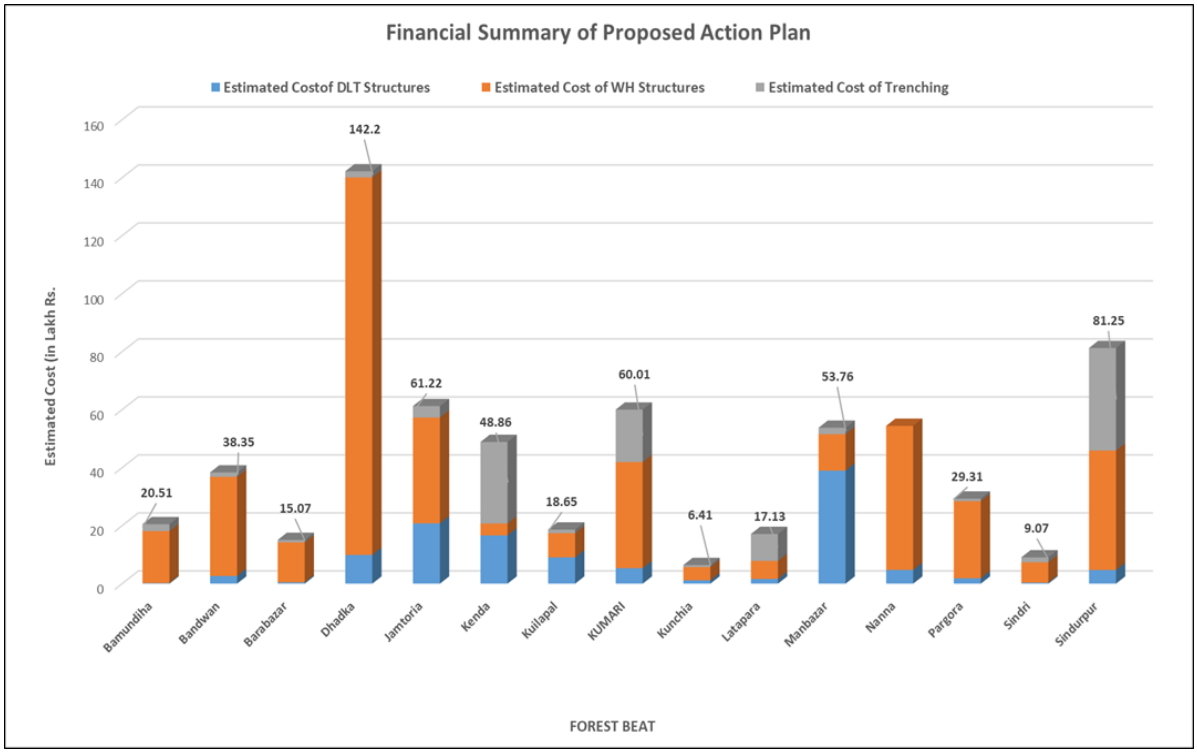

Fig 1.1: Beat wise financial summary of proposed action plan for Kangsabati South Forest Division

2. About WB-FBCCCR

Based on the Exchange of Notes between the Government of Japan and Government of India (GOI), Japan International Cooperation Agency (JICA) has extended a loan to implement the "Project for Forest and Biodiversity Conservation for Climate Change Response in West Bengal (WB-FBCCCR)". Total outlay of the project is ₹650 crore (₹520 crore loan component and ₹130 crore state share) for duration of 8 years starting from 2023-24 to 2030-31. The Govt. of West Bengal vide its Resolution No. 710-FOR/13099/18/2023, dated 4th May, 2023, the West Bengal Forest & Biodiversity Conservation Society has been established to get the project implemented by its Project Management Unit (PMU). Various offices of the West Bengal Forest Department (WBFD) at the Circle, Division and Range levels are implementing the Project. At the field level, 34 nos. of Division Management Units (DMU) and 90 nos. of Field Management Units (FMU) have been established. A total of 600 numbers of Joint Forest Management Committees (JFMC), have been formed as per the extant resolutions/regulations issued by Government of West Bengal.

Broad objectives of this project are to mitigate and adapt to climate change, conserve and restore ecosystems by ecosystem based climate change measures, biodiversity conservation and restoration, livelihood improvement activities and institutional strengthening, thereby contributing to sustainable socio-economic development in West Bengal. There are four major components of work being implemented under this project viz. Ecosystem Based Climate Change Measures, Biodiversity Conservation, Livelihood Improvement and Institutional Strengthening. Disaster risk reduction is intended to achieve by Catchment Area Treatment (CAT) which is part of Ecosystem Based Climate Change Measures.

3. Brief about ICAR-IISWC

The ICAR-Indian Institute of Soil and Water Conservation (ICAR-IISWC), (Formerly CSWCRTI) was established on 1st April,1974 with Headquarters at Dehradun by combining Soil and Water Conservation Research, Demonstration and Training Centres which were established in 1950's at Dehradun, Kota, Bellary, Udhagamandalam, Vasad, Agra and Chandigarh. These centres were initially established by the Govt. of India and transferred to the Indian Council of Agricultural Research (ICAR) on 1st October, 1967. Subsequently two new Research Centres were added to the CSWCRTI, one at Datia in M.P. (18th September, 1986) to tackle soil and water conservation problems of Bundelkhand region and another at Koraput in Orissa (31st January, 1992) to address the problems of shifting cultivation areas. The institute with the national mandate and multi-disciplinary team of scientists and paraphernalia vehemently involved in research, training, consultancy and demonstration on various aspects of soil and water conservation, watershed management and natural resource management as pioneer. The Institute was renamed as Indian Institute of Soil and Water Conservation (ICAR-IISWC) by ICAR on April 7, 2014.

4. Brief introduction about consultancy project

Chief Project Director, WB-FBCCCR (Forest and Bio-diversity Conservation for Climate Change Response in West Bengal), JICA Funded Project has proposed to prepare Catchment Area Treatment Plan (CAT Plans) for 13 Forest Divisions in West Bengal. Forest Department, Govt. of West Bengal is implementing a Japanese ODA loan assisted project FBCCCR which includes an activity of preparation of CAT plans for 13 Forest Divisions located in dry lateritic southern part of West Bengal (Details are provided in Table 4.1). The total project area is 4,66,654 ha which spread over thirteen Forest Divisions in West Bengal. Forest areas are being managed with respective working plans which will be more meaningful and effective if an integrated approach of watershed management is adopted. Hence the present project on Preparation of Catchment Area Treatment Plan (CAT Plans) for 13 Forest Divisions in West Bengal under JICA Funded WB-FBCCCR was taken up by ICAR-IISWC as a consultancy project in accordance with MoU signed between both the parties.

Table 4.1: Project Area - Information on Forest Divisions, ranges and beats

S. No.	Name of circle	District	Forest Division	Area (ha)	No. Of ranges	No. Of beats
1	Central	Bankura	Bankura North	54594	10	33
2			Bankura South	56300	12	38
3			Panchet	33850	5	21
4	South West	Purulia	Purulia	51173	8	24
5			Kangsabati North	26883	5	18
6			Kangsabati South	27862	6	15
7	South East	Purba Burdwan	Burdwan	21845	7	20
8		Pashim Burdwan	Durgapur	4963	3	8
9		Birbhum	Birbhum	16645	7	20
10	Western	Pashchim Madnipur	Mednipur	51358	9	29
11			Rupnarayan	29139	5	18
12			Kharagpur	32544	6	17
13		Jhargram	Jhargram	59498	12	36
Total				**466654**	**95**	**297**

5. Brief about Kangsabati South Forest Division

Initially, to reduce the inflow of sediment carried by Kangsabati, Kumari, and Damodar rivers, it was decided to concentrate soil conservation works in the entire catchment area of the Kangsabati and part of the Damodar River. To combat such hazardous erosion, Kangsabati Soil Conservation Division -I, Kangsabati Soil Conservation Division -II, and Panchet Soil Conservation Division were opened in the year 1964.

Panchet Soil Conservation Division was later on transferred to Bishnupur to treat the hazardous soil erosion of Bankura District. The approximate area of whole catchments 1257sq.miles of which sub-catchments 983 sq.miles was under Kangsabati Soil Conservation Division -II. Centrally sponsored scheme of soil conservation in catchments area are continued till 5th five years plan. Then onward new

strategy of micro or mini watershed was adopted till recent past. Then to reduce the biotic pressures on forest the extensive management system has been adopted by handing over a portion of territorial jurisdiction to Kangsabati Soil Conservation Division -II in July, 1992 as per Govt.G.O.No.8756/For. Dt.03-11-1991. Again with the reorganization of Forest Directorate as per G.O.No.37/FR/O/D/1/4E-2/95 dt.27-03-1996 restructuring was made in Purulia with an attempt to synchronies Range & Beat jurisdiction with that Panchayet Samity and Gram Panchayet for making viable administration unit for interaction with forest protection committees. The Division has renamed as Kangsabati South Division, Purulia vide **G.O. No.1373-For-FR/O/G/4E-01/05 dt.19-03-2008.**

The objective of creation was the well protection of forests and to increase the close relation with forest fringe population through the Joint Forest Management. Also to well performance for making green in all denuded forest land. The boundaries in Eastern side touches with Bankura district, in Western and Southern sides with Jharkhand State, in Northern side with Kangsabati North Division, in North west with Purulia Division and in South east with Jhargram district (Fig. 5.1).

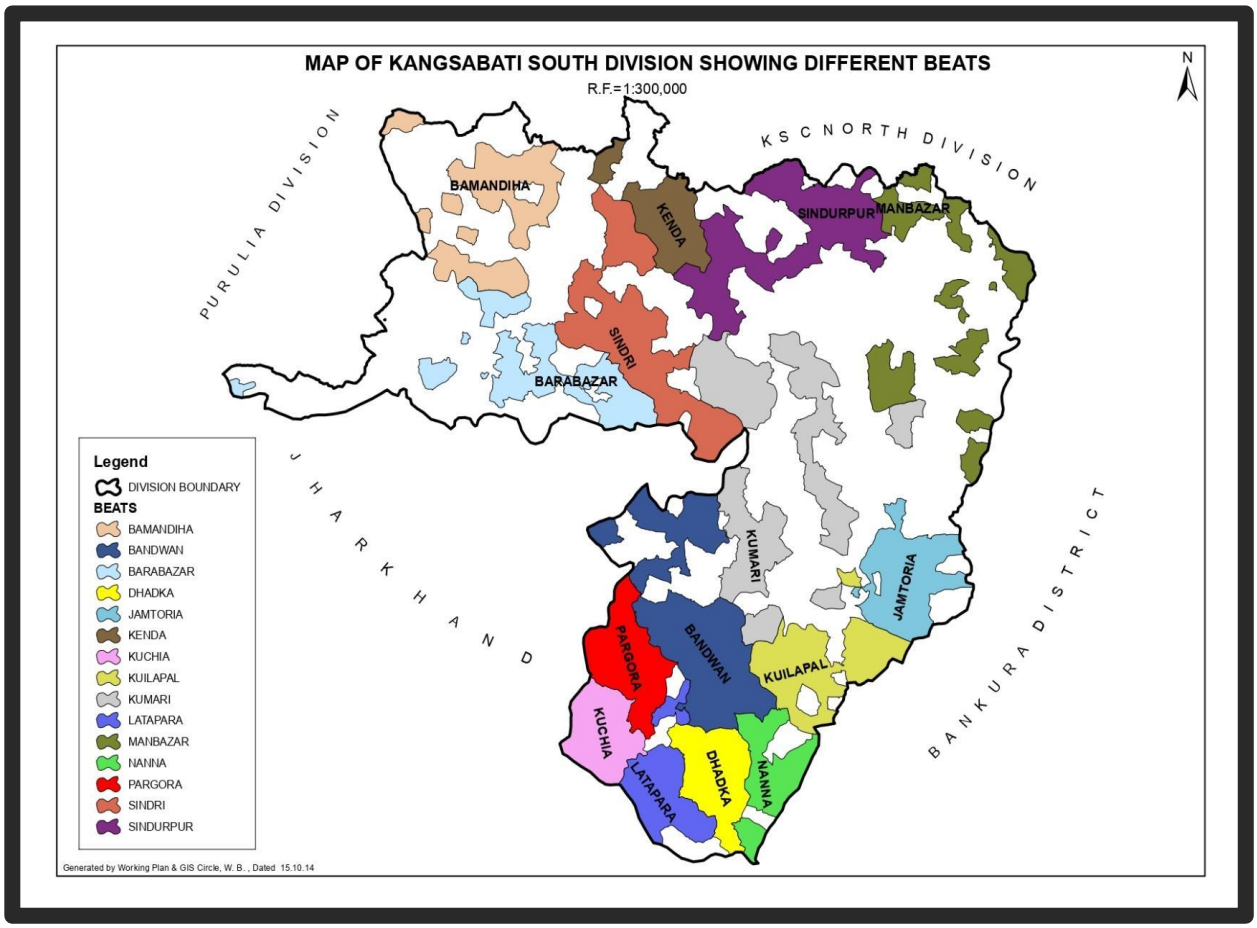

Fig. 5.1: Location map of Kangsabati South Forest Division

Table 5.1: Information on range and beats of Kangsabati South Forest Division

S. No.	Range	Beats	Range Officer (RO)	RO's mobile number	Beat officer
1	Manbazar- I	Manbazar	Binoy Mahata	8972655375	Sukdev Chowdhury
		Sindurpur			Parikshit Bauri
		Kenda			Surojit Kundu
2	Jamuna	Kuilapal	Soheli Reza	7450022406	Suresh Kanti Mandal
		Dhadka			Karuna Nidhan Gorain
		Nanna			Shraban Saren
3	Barabazar	Barabazar	Hirak Sinha	7432810325	Kamal Krishna Sarkar
		Bamundiha			Nayan Dey
		Sindri			Kamal Krishna Sarkar
4	BandwanII	Kunchia	Sankar Barari	7602966408	SadhanBauri
		Latapara			SadhanBauri
5	Manbazar-II	Kumari	Samir Mondal	7016403398	Haradhan Dey
		Jamtoria			Magaram Mandal
6	Bandwan-I	Bandwan	Biplab Mallick	8348472822	Debyendu Mahato
		Pargora			Parimal Bauri

Table 5.2: Beat area and forest cover comparison

S. No.	Range	Beats	Area (ha) as reported by the Division	Area (ha) as derived by GIS for boundary provided by the Client	Forest cover (canopy %) reported by the Division	Forest cover (canopy %) arrived by GIS analysis (wt. area av.)
1	Manbazar- I	Manbazar	1522.22	1465.89	42	33.43
		Sindurpur	2069.57	2061.06	45	32.88
		Kenda	643.18	434.87	41	31.25
2	Jamuna	Kuilapal	1107.99	1363.54	50	41.56
		Dhadka	2403.04	2312.16	60	58.46
		Nanna	3125.48	3005.47	70	62.28
3	Barabazar	Barabazar	1648.25	1270.94	40	40.47
		Bamundiha	1562.98	763.121	40	26.59
		Sindri	1842.73	939.43	40	41.18
4	Bandwan-II	Kunchia	1681.66	1714.43	70	47.03
		Latapara	1891.37	1761.28	70	55.05
5	Manbazar-II	Kumari	2305.23	2771.77	65	29.78
		Jamtoria	1600.99	1371.97	75	42.02
6	Bandwan-I	Bandwan	3293.29	2801.30	60	51.37
		Pargora	1861.32	1722.28	70	39.95

Table 5.3: Meteorological data from Purulia (average of last 10 years)

S. No.	Met. Station	Place	Latitude	Longitude
1.	Purulia	Purulia Town	23.342257	86.362839

Month	No. of rainy days	Rainfall (mm)	Max. Temp. (º C)	Min. Temp. (º C)	Wind velocity (km/hr)	Bright sunshine hours (hrs/day)	Humidity (%)	
							0723 hrs.	1423 hrs.
JAN	2	13	24.2	10.5	3	9.2	20	60
FEB	2	20	28.3	14.1	4	9.6	18	52
MAR	3	21	33.5	18.5	6	10.6	13	40
APR	5	30	37.8	23..2	8	11.1	12	39
MAY	9	83	37.3	25.7	10	10.9	19	55
JUN	16	262	34.1	26.2	10	9.6	24	71
JUL.	20	341	30.6	25.0	9	7.5	27	84
AUG	20	303	30.4	24.7	8	6.9	28	85
SEP	16	224	30.2	24.0	7	7.3	28	85
OCT	8	88	29.4	20.7	4	8.4	25	77
NOV	1	11	27.5	15.9	3	9.1	22	65
DEC	1	10	24.5	11.8	3	9.0	20	62
Total / Av.	**9**	**1406**	**30.7**	**18.1**	**6**	**9.1**	**21**	**65**

6. Geology and landform of Purulia district

Purulia district is located in the western most part of West Bengal and forms the eastern fringe of the Chhotanagpur Plateau. It spans approximately 6,259 square kilometers and contains rock formations ranging from the Archaean to the Quaternary periods. The region is rich in mineral resources but faces significant challenges such as soil degradation, deforestation, and unsustainable land use. The geology of Purulia is dominated by the Chhotanagpur Gneissic Complex, which primarily consists of high-grade metamorphic rocks like gneisses and schists. Other major rock types include plutonic rocks such as gabbro and anorthosite, along with granitic intrusions like the Kuilapal and Manbhum granites. The Singhbhum Group includes meta-sedimentary and meta-basic rocks, while the Dalma Group features basic volcanic formations. Gondwana sedimentary rocks, found in faulted basins, contain valuable coal seams, and Quaternary deposits are present in the valleys. This geological variety reflects a long history of tectonic activity, igneous intrusions, sedimentation, and weathering.

7. Drainage and contours

This thematic layer has been prepared for all 13 Forest Divisions in GIS environment with basic inputs for topological maps of Survey of India. Forest beat wise soft and hard copies of these maps have been provided to three Forest Divisions (Purulia, Kangsabati North and Kangsabati South) where field survey have been completed. These features are depicted in Map-1 as base map of Kangsabati South Division.

8. Land slope

This thematic layer has been prepared with utilizing DEM input of 30 m resolution of Copernicus available on Open Topography which is an open source of topographical data worldwide. This feature is depicted in Map-2. Beat wise area statistics of different slope groups present in Kangsabati South Division is given in Table 8.1.

Table 8.1. Area (ha) of different beat fall under different slope classes in Kangsabati South Division

Beat name	Area (ha) under different slope (%) classes									Total area (ha)
	0 – 1	1 – 3	3 - 5	5 - 10	10 - 15	15 - 25	25 - 33	33 - 50	> 50	
Bamundiha	28.90	248.66	259.36	209.38	15.36	1.47	-	-	-	763.12
Bandwan	39.00	91.97	129.11	496.00	544.75	800.31	313.06	299.78	87.30	2801.30
Barabazar	33.89	254.33	256.77	383.63	120.30	96.78	50.90	60.94	13.41	1270.94
Dhadka	23.39	162.82	240.23	623.07	440.20	525.05	167.80	113.53	16.07	2312.16
Jamtoria	30.60	79.39	126.70	367.21	291.56	321.35	88.61	55.93	10.62	1371.97
Kenda	17.83	149.70	150.97	104.63	9.63	2.10	-	-	-	434.87
Kuilapal	16.52	104.85	168.66	444.14	263.60	239.89	60.44	51.29	14.14	1363.54
Kumari	153.37	460.01	622.96	964.21	302.88	190.87	45.37	30.20	1.91	2771.77
Kunchia	13.07	117.38	166.29	315.28	213.09	323.86	189.52	243.50	132.44	1714.43
Latapara	9.96	73.14	102.95	367.20	336.92	449.82	172.57	174.14	74.58	1761.28
Manbazar	120.81	296.71	369.29	462.18	116.66	69.84	15.18	13.45	1.78	1513.44
Nanna	16.87	126.68	238.00	921.18	821.99	718.57	121.91	38.14	2.12	3005.47
Pargora	7.31	69.41	128.02	397.57	316.73	431.86	174.08	166.02	31.27	1722.28
Shindurpur	55.58	432.65	512.97	674.26	234.48	136.43	11.04	3.64	-	939.43
Sindri	23.41	189.04	246.73	319.47	70.20	45.99	11.58	20.99	12.01	2061.06
Division total	**590.49**	**2856.75**	**3719.01**	**7049.41**	**4098.35**	**4354.21**	**1422.07**	**1271.56**	**397.65**	**25759.50**
% to total	**2.29**	**11.09**	**14.44**	**27.37**	**15.91**	**16.90**	**5.52**	**4.94**	**1.54**	**100.00**

9. Soils of Kangsabati South Forest Division

Data / information on soil parameters like soil units, depth and texture were collected from ICAR-NBSS&LUP, Nagpur. Forest boundaries provided by WB-FBCCCR in terms of shape files were used to extract maps and data tables on these soil parameters restricting to forest areas alone. The following Table 9.1.1 shows the distribution of different soil types present in the Kangsabati South Forest Division which excludes the area of water bodies and rock outcrops. Each range, such as Bamundiha, Bandwan, Barabazar, and others, has a unique combination of soils differing in depth, texture, drainage and erosion levels. The soils of Kangsabati South Division are predominantly very deep to deep, occurring mostly on gently sloping to undulating terrains, which offer potential for productive land use if proper soil conservation is adopted. However, significant areas are characterized by shallow and gravelly soils with high erosion risk, particularly on ridges and slopes, limiting bio-mass productivity. Spatial distribution of different soils in Kangsabati South Division is given in Map-3.

9.1 Soil depth

The soils of Kangsabati South Division exhibit considerable spatial variability in depth with shallow soils being the most widespread, covering nearly 38.95% of the total soil area. Very shallow soils follow, occupying about 23.80%, indicating a predominance of limited-depth soils across the region. Moderately deep and very deep soil is less extensive, found mainly in localized patches, offering better potential of plant growth in these areas (Table 9.1.2). Map-4 shows spatial distribution of soil depth in Kangsabati South Division.

Table 9.1.1. Area statistics of different Soil Units in Kangsabati South Forest Division

Unit code	Description	Area (ha)	Percent to total area
W093	Shallow, gravelly loamy soils on gentle ridges with severe erosion and excessive drainage	345.07	1.34
W094	Deep, well-drained soils on gentle to moderate plains	1438.26	5.58
W095	Shallow, coarse soils on gently sloping plains	508.23	1.97
W096	Shallow, gravelly soils on undulating terrain with moderate erosion	814.92	3.16
W097	Very deep, fine soils on gentle plains with loamy surface and moderate erosion	2001.46	7.77
W099	Shallow, well-drained gravelly loamy soils on gentle granite-gneiss plains with moderate erosion	2870.21	11.14
W104	Very deep, imperfectly drained soils on elevated plateaus	179.85	0.70
W108	Very shallow, gravelly loamy soils on gentle hill slopes with moderate erosion and drainage	9687.31	37.61
W110	Shallow, moderately well-drained coarse loamy soils on gentle hills with severe erosion nearby	897.35	3.48
W111	Deep, moderately well-drained fine loamy soils on gentle uplands with slight erosion nearby	2656.54	10.31
W112	Very deep, moderately well-drained fine loamy soils on gentle uplands with moderate erosion nearby	4360.31	16.93

Table 9.1.2. Soil depth classification in Kangsabati South Forest Division

Depth class	Area (ha)	Percent (%)
Very shallow	5896.19	23.98
Shallow	9563.6	38.90
Mod. shallow	4268.81	17.36
Mod. deep	1014.94	4.13
Deep	3228.83	13.13
Very deep	610.67	2.48
Total	**24583.04**	**100.00**

Table 9.1.3. Beat wise area statistics of different soil depth classes in Kangsabati South Division

Beat	Very shallow	Shallow	Mod. shallow	Mod. deep	Deep	Very deep	Grand total (ha)
Bamundiha	46.87	-	-	-	478.34	225.41	750.61
Bandwan	394.77	1011.26	1176.93	0.12	91.87	5.66	2680.62
Barabazar	35.53	316.22	54.12	-	556.42	178.32	1140.6
Dhadka	777.25	1462.46	-	-	72.14	-	2311.84
Jamtoria	209.94	667.75	390.29	0.42	67.12	-	1335.52
Kenda	182.01	-	-	188.49	38.43	-	408.92
Kuilapal	120.67	769.9	332.95	0.5	111.62	13.06	1348.71
Kumari	537.98	971.71	338.94	269.22	359.36	-	2477.21
Kunchia	-	660.44	722.07	-	220.35	-	1602.86
Latapara	337.55	972.85	146.19	-	253.29	-	1709.89
Manbazar	693.93	22.9	24.4	3.49	550.39	-	1295.11
Nanna	1090.68	1863.23	39.87	-	5.49	1.19	3000.46
Pargora	452.6	450.31	751.95	-	1.67	-	1656.54
Sindri	167.02	189.6	-	54.74	308.94	187.03	907.34
Sindurpur	849.42	204.97	291.08	497.95	113.41	-	1956.83
Grand total (ha)	**5896.19**	**9563.6**	**4268.81**	**1014.94**	**3228.83**	**610.67**	**24583.04**

9.2 Soil texture

Kangsabati South Divisions soil texture is predominantly coarse to moderately fine, with sandy clay loam textures covering 8579.06 ha (34.89%) of the area. Sandy loam to sandy clay loam is the second most widespread texture, comprising about 19.93% of the area. Finer textures like sandy loam to clay loam and loam occupy smaller proportions, indicating generally low water retention and moderate fertility levels across the region (Table 9.2.1). Map-5 shows spatial distribution of soil textural classes present in Kangsabati South Division.

Table 9.2.1. Area (ha) of different soil textural class distribution in Kangsabati South Division

Soil textural class	Area (ha)	Percent (%)
Loam	218.36	0.89
Loam to clay loam	248.72	1.01
Loamy sand	1148.55	4.67

Sandy clay loam	8578.06	34.89
Sandy clay loam to clay	597.91	2.43
Sandy clay loam to clay loam	400.83	1.63
Sandy loam	4084.58	16.62
Sandy loam to clay loam	17.78	0.07
Sandy loam to sandy clay loam	4898.17	19.92
Gravelly sandy loam	4138.50	16.83
Sandy loam to loamy sand	251.56	1.02
Grand total	**24583.04**	**100.00**

Table 9.2.2. Beat wise area statistics of different soil texture classes in Kangsabati South Division

Beat	Gravelly sandy loam	Loam	Loam to clay loam	Loamy sand	Sandy clay loam	Sandy clay loam to clay	Sandy clay loam to clay loam	Sandy loam	Sandy loam to clay loam	Sandy loam to loamy sand	Sandy loam to sandy clay loam	Grand total (ha)
Bamundiha	-	181.95	-	-	97.66	-	-	245.59	-	-	225.41	750.61
Bandwan	394.77	-	14.57	376.43	672.40	-	-	39.73	-	0.12	1182.59	2680.62
Barabazar	-	0.58	-	186.77	218.84	-	1.04	507.23	-	-	226.15	1140.60
Dhadka	777.25	-	-	47.43	1415.02	-	-	72.14	-	-	-	2311.84
Jamtoria	260.54	-	25.96	142.59	570.38	-	0.42	3.82	-	-	331.81	1335.52
Kenda	-	-	-	-	33.92	27.78	7.99	186.52	-	152.72	-	408.92
Kuilapal	120.67	-	-	0.17	770.09	-	-	111.27	-	0.50	346.02	1348.71
Kumari	476.60	-	208.19	-	730.92	156.61	90.32	535.15	17.37	62.19	199.85	2477.21
Kunchia	-	-	-	208.44	452.00	-	-	220.35	-	-	722.07	1602.86
Latapara	337.55	-	-	53.92	918.94	-	-	253.29	-	-	146.19	1709.89
Manbazar	22.90	-	-	-	152.82	3.49	24.40	693.93	-	-	397.57	1295.11
Nanna	1090.68	-	-	-	1863.23	-	-	5.49	-	-	41.06	3000.46
Pargora	452.60	-	-	-	450.31	-	-	1.67	-	-	751.95	1656.54
Sindri	-	35.82	-	132.79	137.53	18.93	-	358.99	0.42	35.82	187.03	907.34
Sindurpur	204.97	-	-	-	94.01	391.09	276.66	849.42	-	0.22	140.45	1956.83
Grand total (ha)	**4138.50**	**218.36**	**248.72**	**1148.55**	**8578.06**	**597.91**	**400.83**	**4084.58**	**17.79**	**251.57**	**4898.17**	**24583.04**

10. Forest cover in Kangsabati South Division

Spatial data on forest cover showing different classes like non-forest, scrub, open forest, moderate forest and dense forest cover was generated using shape files on Forest Cover and Forest Boundary provided by WB-FBCCCR in GIS environment. Beat wise area statistics of different forest cover classes are given in Table 10.1 and their spatial distribution is depicted in Map 6. Information on predominant species of trees, shrubs and grasses was provided by Kangsabati South Division and presented below.

Predominant species of trees, shrubs and grasses in Kangsabati South Division

Dominant tree Species: Sal, Mohua, Jam, Kendu, Piyal, Bahera, Haritaki, Amlaki, Kusum, Neem, Karam, Simul, Karanj, Challa, Arjun, Asan, Palash etc.

Dominant Shrubs Species: Kurchi, Akando, Kuchela etc.

Dominant Grass Species: Babui.

Table 10.1: Beat wise area statistics of different forest cover classes in Kangsabati South Division.

Beat	Other forest area (no canopy)	Scrub (tree canopy density < 10%)	Open forest (tree canopy density 10-40%)	Moderately dense forest (tree canopy density 40 - 70%)	Very dense forest (tree canopy density >70%)
Bamundiha	571.72	-	174.22	9.70	-
Bandwan	366.17	30.39	620.06	1269.20	422.35
Barabazar	684.87	-	253.71	270.19	-
Dhadka	517.61	-	300.09	921.75	546.99
Jamtoria	261.61	23.13	415.44	612.55	-
Kenda	376.95	-	40.67	10.83	-
Kuilapal	327.98	-	458.54	519.28	15.08
Kumari	1493.18	14.00	882.21	182.27	-
Kunchia	612.13	-	354.93	639.35	77.02
Latapara	409.69	-	258.66	760.65	283.98
Manbazar	715.02	13.56	446.58	184.48	-
Nanna	485.69	-	134.19	1575.26	808.87
Pargora	334.06	11.78	660.61	685.69	-
Sindri	556.84	-	162.42	190.83	-
Sindurpur	1194.96	12.12	563.18	216.80	-
Division total	**8908.48**	**104.98**	**5725.49**	**8048.83**	**2154.29**
% to total	35.72	0.42	22.96	32.27	8.64

11. Surface runoff

Surface runoff has been assessed employing Hydrologic Cover Complex (HCN) method. Entire Forest Division area was first divided into homogenous hydrologic response units by over laying and intersecting forest cover, land slope and soil type. Runoff potential with 15 years average rainfall was calculated and forest range wise maps were generated (Map 7).

Table 11.1. Beat wise area statistics of annual surface runoff in Kangsabati South Division

Beat	Annual surface runoff (mm)					Grand total area (ha)
	<50	50 - 100	100 - 150	150 - 200	> 200	
Bamundiha	189.18	180.87	143.50	127.02	1176.81	1817.37
Bandwan	283.72	243.22	164.98	136.81	902.78	1731.51
Barabazar	128.84	104.12	70.72	62.15	621.44	987.28
Dhadka	118.82	113.47	84.22	61.97	526.02	904.51
Jamtoria	337.33	291.48	218.81	192.40	1313.08	2353.10
Kenda	194.61	142.73	97.80	65.48	710.69	1211.32
Kuilapal	159.70	129.72	91.09	70.40	494.40	945.31
Kumari	327.63	280.86	189.07	179.73	1446.37	2423.66
Kunchia	159.37	109.84	69.51	53.29	352.36	744.37
Latapara	88.30	57.64	43.88	35.13	236.68	461.63
Manbazar	453.52	345.09	237.22	230.09	1943.17	3209.08
Nanna	162.63	155.88	116.52	91.14	833.32	1359.49
Pargora	102.10	80.80	58.12	45.34	279.03	565.39
Shindurpur	540.36	426.26	302.45	238.54	2034.40	3542.01
Sindri	222.94	172.73	137.45	106.99	884.06	1524.17
Grand total area (ha)	**3469.07**	**2834.72**	**2025.34**	**1696.49**	**13754.58**	**23780.20**

12. Existing engineering structures and other information

In order to collect information on existing engineering structures in different Forest Division, data collection format were designed and circulated among all 13 Forest Division s. This information was collected with geo-coordinates of each structure as to delineate them on map in GIS environment. Details on existing engineering structures (DLT and WHS) are provided in Tables 12.1 and 12.2 and their spatial distribution are provided in Map 8a, Map 8b, Map 8c, Map 8d, Map 8e and Map 8f. Similarly information on land treatments carried out in Kangsabati South Division was collected and presented in Table 12.3. Information on earlier works carried out and dependency on forests were also sought from Forest Division and what so ever information received is presented in Table 12.4 and 12.5.

Table 12.1: Drainage Line Treatments: Loose Boulder Check Dam/Brush Wood Check Dam/ Masonry Check Dam etc.

No	Type of Measure	Beat and Mouza No.	Condition (breached/ silted-up / functional)	Order of Gully	Latitude	Longitude	Remarks*
1	Check Dam	Kuilapal/ Sanga/ 74	Silted up	2nd	22.815892	86.614093	Maint. Required
2	Check Dam	Kuilapal/ Barsole/ 77	Silted up	2nd	22.806471	86.592595	Maint. Required
3	Check Dam	Kunchia/Makopali (93)	Silted up	2nd	22.8218	86.45528	Maint. Required
4	Check Dam	Kunchia/Sekebara (94)	Silted up	2nd	22.813338	86.445139	Maint. Required
5	Check Dam	Kunchia/Asanpani (97)	Silted up	2nd	22.76325	86.455119	Maint. Required
6	Loose Boulder Check Dam	Sindurpur/ Rangatard (162)	Silted up	2nd	23°02’32’’	86°35’23’’	Maint. Required
7	Loose Boulder Check Dam	Sindurpur/Khatchiri (40)	Breached	2nd	23°08’16’’	86°34’03’’	Maint. Required
8	Loose Boulder Check Dam	Manbazar/ Baraghutu (116)	Functional	2nd	23°08’00’’	86°41’56’’	Maint. Required
9	Loose Boulder Check Dam	Manbazar/ Dhadika (138)	Silted up	2nd	23°06’44’’	86°41’54’’	Maint. Required
10	Loose Boulder Check Dam	Sindurpur/ Jitujuri (60)	Functional	2nd	23°07’35’’	86°38’38’’	Maint. Required
11	Loose Boulder Check Dam	Kenda /Bijoydih /12	Good	2nd	23.160926	86.492232	Maint. Required
12	Loose Boulder Check Dam	Sindurpur/ Maruagora (36)	Functional	2nd	23°08’21’’	86°31’56’’	Maint. Required
13	Loose Boulder Check Dam	Bandwan/Jamunagora/30	Silted up	2nd	22* 50’ 13’’	86* 30’ 50’’	Maint. Required
14	Loose Boulder	Bandwan/Udalbani/33	Silted up	2nd	22* 49’ 55’’	86* 32’ 46’’	Maint. Required

	Check Dam						
15	Loose Boulder Check Dam	Bandwan/Ledasal/83	Silted up	2nd	22* 48’ 34’’	86* 32’ 24’’	Maint. Required
16	Loose Boulder Check Dam	Bandwan/Ghagra/82	Silted up	2nd	22* 48’ 25’’	86* 33’ 31’’	Maint. Required
17	Loose Boulder Check Dam	Bandwan/Barudih/84	Silted up	2nd	22* 48’ 21’’	86* 31’ 25’’	Maint. Required
18	Loose Boulder Check Dam	Bandwan/Popo/85	Silted up	2nd	22* 49’ 11’’	86* 32’ 07’’	Maint. Required
19	Loose Boulder Check Dam	Barabazar/Kutra/199	Silted up	2nd	23°01’21”	86°26’19”	Maint. Required
20	Loose Boulder Check Dam	Barabazar/Latpada/185	Silted up	2nd	23°02’05”	86°26’04”	Maint. Required
21	Loose Boulder Check Dam	Barabazar/Sugnibasa/155	Silted up	2nd	23°02’25”	86°22’21”	Maint. Required
22	Loose Boulder Check Dam	Jamuna/Kuilapal/59	Silted up	2nd	22°49’34”	86°37’34”	Maint. Required
23	Loose Boulder Check Dam	Jamuna/Natundih/57	Silted up	2nd	22°50’06”	86°37’50”	Maint. Required
24	Loose Boulder Check Dam	Jamuna/Paharpur/54	Silted up	2nd	22°50’42”	86°38’11”	Maint. Required
25	Loose Boulder Check Dam	Jamuna/Sarga/74	Silted up	2nd	22°48’36”	86°36’56”	Maint. Required
26	Loose Boulder Check Dam	Jamuna/Barsole/77	Silted up	2nd	22°48’41”	86°35’35”	Maint. Required
27	Loose Boulder Check Dam	Sindri/Agajhore/186	Silted up	2nd	23°02’08”	86°26’31”	Maint. Required

Table 12.2: Water Harvesting Structures (Pond/Well/Tank/Percolation pond/Small dam etc.)

S. No	Type of Structure	Beat and Mouza No.	Condition (breached/ silted-up / functional)	Approx. capacity (cum)	Latitude	Longitude	Remarks*
1	Pond	Kuilapal/ Kuilapal/ 59	Fair	900m3	22.840144	86.627076	No improvement needed
2	Pond	Kuilapal/ Natundih /57	Poor	900m3	22.839844	86.64564°	Improvement needed
3	Pond	Kuilapal/ Churku/7 2	Poor	450m3	22.813313	86.587177	Improvement needed
4	Pond	Kuilapal/ Paharpur /54	Fair	900m3	22.845559	86.63712	No improvement needed
5	Pond	Kuilapal/ Chirudih/ 64	Poor	450m3	22.851197	86.589992	Improvement needed
6	Pond	Kuilapal/ laopal/65	Poor	450m3	22.837131	86.590091	Improvement needed
7	Pond	Kuilapal/ Kaira/80	Poor	900m3	22.83479	86.57843	Improvement needed
8	Pond	Dhadka/ Punsha/1 26	Fair	900m3	22°46.032’	86°31.178’	No improvement needed
9	Pond	Dhadka/ Digha/110	Poor	450m3	22.783291	86.521701	Improvement needed
10	Pond	Dhadka/ Madhuban/123	Poor	450m3	22.777523	86.526246	Improvement needed
11	Pond	Nanna/Bamundera /118	Poor	900m3	22°47’5”	86°35’6”	Improvement needed
12	Pond	Nanna/Nanna/116	Poor	450m3	22.785673	86.597473.	Improvement needed
13	Pond	Dhadka/ Dhadka/109	poor	900m3	22.799833	86.499922	Improvement needed
14	Pond	Nanna/ Harada/115	Poor	900m3	22.788693	86.584052	Improvement needed
15	Pond	Nanna/Latajharna/ 134	Poor	450m3	22°44’8”	86°33’19”	Improvement needed
16	Pond	Kuilapal/Keshra/3 4	Poor	900m3	22°50’10”	86°33’28”	Improvement needed
17	Pond	Nanna/Dulukdih/1 21	Poor	450m3	22°44’26”	86°33’17”	Improvement needed
18	Pond	Nanna/ Ledam/ 119	Poor	450m3	22°45’2”	86°34’4”	Improvement needed
19	Pond	Nanna/Latajharna/ 134	Poor	900m3	22°43’41”	86°32’57”	Improvement needed
20	Pond	Dhadka/ Ghoratika /124	Poor	900m3	22°45’28”	86°31’39”	Improvement needed
21	Earthen Dam	Sindurpur/ Majhihira (22)	Poor	900 m3	23°05’29”	86°32’16”	Improvement needed
22	Pond	Sindurpur/ Rajagram (69)	Fair	800 m3	23°05’44”	86°37’53”	No improvement needed

22	Pond	Sindurpur/ Bagdega (32)	Fair	800 m3	23°07’17”	86°31’50”	No improvement needed
23	Pond	Manbazar/Dhadika (138)	Fair	1100 m3	23.11649°	86.69185°	No improvement needed
24	Pond	Bandwan/Barudih/84	Poor	1500 m3	22* 47’ 58’’	86* 31’ 05’’	Improvement needed
25	Pond	Bandwan/Mangla/29	Fair	1000m3	22* 50’ 46’’	86* 29’ 55’’	No improvement needed
26	Earthen Dam	Sindurpur/Kunardi (37)	Fair	1100 m3	23.12599°	86.54679°	No improvement needed
27	Earthen Dam	Sindurpur/ Maruagora (36)	Fair	800m3	23°08’19”	86°31’57”	No improvement needed
28	Earthen Dam	Sindurpur/ Keshargaria (34)	Fair	800m3	23°07’55”	86°31’43”	No improvement needed
29	Earthen Dam	Sindurpur/ Tetulagora (68)	Poor	800m3	23°05’47”	86°37’47”	Improvement needed
30	Earthen Dam	Sindurpur/ Lekrakhonda (61)	Fair	800m3	23°06’13”	86°37’56”	No improvement needed
31	Earthen Dam	Manbazar/Dhadika (138)	Fair	800m3	23°06’49”	86°41’50”	No improvement needed
32	Earthen Dam	Manbazar/Poradih (119)	Fair	800m3	23°07’18”	86°40’38”	No improvement needed
33	Earthen Dam	Manbazar/Banagram (121)	Fair	800m3	23°07’32”	86°39’34”	No improvement needed
34	Earthen Dam	Kumari/Dighi (181)	Fair	800 m3	23°01'05.0"	86°36'38.4"	No improvement needed
35	Earthen Dam	Kenda & Mahilidih/10	Fair	5,200 m3	23.130073	86.473517	No improvement needed
36	Earthen Dam	Kamta/01	Fair	1,500 m3	23.160311	86.447986	No improvement needed
37	Earthen Dam	Dhakakendu/16	Fair	1,900 m3	23.100342	86.487310	No improvement needed
38	Earthen Dam	Turang/13	Poor	250 m3	23.120171	86.507871	Improvement needed
39	Earthen Dam	Bijoydih/12	Fair	2,000 m3	23.137108	86.504112	No improvement needed
40	Earthen Dam	Turang/13	Fair	1500 m3	23.122784	86.492856	No improvement needed
41	Earthen	Bandwan/Mangla/29	Poor	1250 m3	22* 50’ 57’’	86* 29’ 23’’	Improveme

	Dam						nt needed
42	Earthen Dam	Bandwan/Ledasal/83	Poor	1250 m3	22* 48’ 47’’	86* 32’ 29’’	Improvement needed
43	Earthen Dam	Bandwan/Kendapara/31	Poor	1250 m3	22* 50’ 29’’	86* 31’ 10’’	Improvement needed
44	Earthen Dam	Bandwan/Ghagra/84	Poor	1000 m3	22* 49’ 39’’	86* 33’ 21’’	Improvement needed
45	Earthen Dam	Bandwan/Popo/85	Poor	1500 m3	22* 49’ 01’’	86* 32’ 03’’	Improvement needed
46	Earthen Dam	Barabazar/Bhalukhal/152	Poor	450 m3	23°02’44”	86°22’44”	Improvement needed
47	Earthen Dam	Barabazar/Metyala/125	Poor	450 m3	23°00’18”	86°18’37”	Improvement needed
48	Earthen Dam	Barabazar/Khawasdih/149	Poor	450 m3	23°03’21”	86°22’59”	Improvement needed
49	Earthen Dam	Barabazar/Nilmohanpur/171	Poor	450 m3	23°01’32”	86°22’30”	Improvement needed
50	Earthen Dam	Sindri/Agajhore/186	Poor	450 m3	23°02’11”	86°26’43”	Improvement needed
51	Earthen Dam	Sindri/Kudlung/196	Poor	450 m3	23°01’57”	86°27’47”	Improvement needed
52	Earthen Dam	Barabazar/Kutra/199	Poor	450 m3	23°01’37”	86°27’04”	Improvement needed
53	Earthen Dam	Barabazar/Latpada/185	Poor	450 m3	23°02’02”	86°26’13”	Improvement needed
54	Earthen Dam	Barabazar/Sarberia/206	Poor	450 m3	23°01’04”	86°26’55”	Improvement needed

Table 12.3. Existing Land Treatment

S. No.	Type of Measure	Beat and Mouza No.	Condition (Good/ Fair /Poor)	Approx. area (ha)	Number or running meter per ha	Approx. size	Remarks*
1	Contour Trench	Jamtoria/Fulberia (294)	Fair	8	500	5 m x 0.45m x 0.45m	Improvement needed
2	Contour Trench	Kumari/Burudi (276)	Fair	10	500	5 m x 0.45m x 0.45m	Improvement needed
3	Contour Trench	Kumari/Patapahari (192)	Fair	16.3	500	5 m x 0.45m x 0.45m	Improvement needed
4	Contour Trench	Manbazar/Laudaha (136)	Fair	6.7	500	5 m x 0.45m x 0.45m	Improvement needed
5	Contour Trench	Pargora/Gangamanna (27)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed
6	Contour Trench	Pargora/Dangarjuri (105)	Fair	2	500	5 m x 0.45m x 0.45m	Improvement needed
7	Contour Trench	Pargora/Karpa (106)	Fair	2	500	5 m x 0.45m x 0.45m	Improvement needed
8	Contour Trench	Dhadka/Jamjora (104)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed
9	Contour Trench	Kuilapal/ Bara Talpat (39)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed
10	Contour	Bamundiha/Hurumda	Fair	5	500	5 m x 0.45m	Improvement

	Trench					x 0.45m	needed
11	Contour Trench	Bamundiha/Bamu (71)	Fair	15	500	5 m x 0.45m x 0.45m	Improvement needed
12	Contour Trench	Sindurpur/Rangatard (162)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed
13	Contour Trench	Kenda/Turang (13)	Fair	15	500	5 m x 0.45m x 0.45m	Improvement needed
14	Contour Trench	Jamtoria/Darikadoba (309)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed
15	Contour Trench	Latapara/Poradih (87)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed
16	Contour Trench	Sindurpur/Bamni (26)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed
17	Contour Trench	Manbazar/Asanboni (59)	Fair	10	500	5 m x 0.45m x 0.45m	Improvement needed
18	Contour Trench	Manbazar/Gobindapur (118)	Fair	11	500	5 m x 0.45m x 0.45m	Improvement needed
19	Contour Trench	Kumari/Toporbaid (318)	Fair	16	500	5 m x 0.45m x 0.45m	Improvement needed
20	Contour Trench	Bandwan/Bandwan (22)	Fair	2	500	5 m x 0.45m x 0.45m	Improvement needed
21	Contour Trench	Bandwan/Parbaid (4)	Fair	9	500	5 m x 0.45m x 0.45m	Improvement needed
22	Contour Trench	Bandwan/Dhabani (95)	Fair	8	500	5 m x 0.45m x 0.45m	Improvement needed
23	Contour Trench	Kuilapal/Mahulbona (38)	Fair	10	500	5 m x 0.45m x 0.45m	Improvement needed
24	Contour Trench	Kuilapal/Laupal (80)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed
25	Contour Trench	Dhadka/Digha (110)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed
26	Contour Trench	Sindurpur/Janara (24)	Fair	3	500	5 m x 0.45m x 0.45m	Improvement needed
27	Contour Trench	Sindurpur/Bamni (26)	Fair	2	500	5 m x 0.45m x 0.45m	Improvement needed
28	Contour Trench	Kuilapal/Chirudi (64)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed
29	Contour Trench	Kuilapal/Churku (72)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed
30	Contour Trench	Kumari/Pitidiri (183)	Fair	10	500	5 m x 0.45m x 0.45m	Improvement needed
31	Contour Trench	Kumari/Raghunathpur-Patapahari (210)	Fair	5	500	5 m x 0.45m x 0.45m	Improvement needed

Table 12.4. Forest plantation works carried out in recent years (last five years) in Kangsabati South Division

Creation of Plantation in F.Y 2023-24							
S. No.	**Scheme**	**Plantation type**	**Range**	**Beat**	**Mouza**	**JL No.**	**Area (in ha.)**
1	SDS	QGS	Manbazar-II	Jamtoriea	Fulberia	294	8
2	SDS	QGS	Manbazar-II	Kumari	Burudi	276	10
3	SDS	QGS	Manbazar-II	Kumari	Patapahari	192	16.3
4	SDS	QGS	Manbazar-I	Manbazar	Laudaha	136	6.7
5	SDS	QGS	Bandwan-I	Pargora	Gangamanna	27	5
6	SDS	QGS	Bandwan-I	Pargora	Dangarjhuri	105	2
7	SDS	QGS	Bandwan-I	Pargora	karpa	106	2
8	SDS	QGS	Jamuna	Dhadka	Jamjora	104	5
9	SDS	QGS	Jamuna	Kuilapal	Bara Talpat	39	5
10	SDS	QGS	Barabzar	Bamundiha	Hurumda	39	5
11	SDS	QGS	Barabzar	Bamundiha	Bamu	71	15
Sub Total							**80**
12	SDS	Sal	Manbazar-I	Sindurpur	Rangatard	162	5
13	SDS	Sal	Manbazar-I	Kenda	Turang	13	15
14	SDS	Sal	Manbazar-II	Jamtoria	Darikadoba	309	5
15	SDS	Sal	Bandwan-II	Latapara	Poradih	87	5
Sub Total							**30**
16	SDS	Bamboo	Manbazar-I	Kenda	Keshya	9	3
17	SDS	Bamboo	Manbazar-I	Sindurpur	Khatchiri	160	5
18	SDS	Bamboo	Manbazar-I	Manbazar	Hariharpur	116	5
19	SDS	Bamboo	Manbazar-II	Kumari	Dhanda	261	7
20	SDS	Bamboo	Bandwan-I	Bandwan	Popo	85	5
21	SDS	Bamboo	Bandwan-I	Pargora	Dangarjuri	105	5
22	SDS	Bamboo	Jamuna	Dhadka	Digha	110	10
Sub total							**40**
Grand total							**150**

Creation of Plantation in F.Y 2022-23							
S. No.	**Scheme**	**Type of Plantation**	**Range**	**Beat**	**Mouza**	**JL**	**Area (in ha.)**
1	SPAP	QGS	Manbazar-I	Sindurpur	Bamni	26	5
2	SPAP	QGS	Manbazar-I	Manbazar	Asanboni	59	10
3	SPAP	QGS	Manbazar-I	Manbazar	Gobindapur	118	11
4	SPAP	QGS	Manbazar-II	Kumari	Toporbaid	318	16
5	SPAP	QGS	Bandwan-I	Bandwan	Bandwan	22	2
6	SPAP	QGS	Bandwan-I	Bandwan	Parbaid	4	9

7	SPAP	QGS	Bandwan-I	Bandwan	Dhabani	95	8
8	SPAP	QGS	Jamuna	Kuilapal	Mahulbona	38	10
9	SPAP	QGS	Jamuna	Kuilapal	Laupal	80	5
10	SPAP	QGS	Jamuna	Dhadka	Digha	11	5
Sub Total							**81**
12	SPAP	SAL	Manbazar-I	Sindurpur	Janara	24	3
13	SPAP	SAL	Manbazar-I	Sindurpur	Bamni	26	2
14	SPAP	SAL	Jamuna	Kuilapal	Chirudi	64	5
15	SPAP	SAL	Jamuna	Kuilapal	Churku	72	5
16	SPAP	SAL	Manbazar-II	Kumari	Pitidiri	183	10
17	SPAP	SAL	Manbazar-II	Kumari	Raghunathpur -Patapahari	210	5
Sub Total							**30**
18	SPAP	BAMBOO	Bandwan-I	Pargora	Gangamanna	27	7
19	SPAP	BAMBOO	Manbazar-II	Kumari	Haridih	213	8
Sub total							**15**
Grand total							**126**

Creation of Plantation in F.Y 2021-22							
S .No.	**Scheme**	**Plantation type**	**Range**	**Beat**	**Mouza**	**JL. No.**	**Area (in ha.)**
1	SPAP	QGS	Manbazar-I	Sindurpur	Rajagram	69	25
2	SPAP	QGS	Manbazar-I	Sindurpur	Tetulagora	219	10
3	SPAP	QGS	Manbazar-I	Manbazar	Banagram	121	6
Sub Total							**41**
4	SPAP	QGS	Manbazar-II	Kumari	Singraidih	234	5
5	SPAP	QGS	Manbazar-II	Kumari	Ankro	221	7
6	SPAP	QGS	Manbazar-II	Kumari	Dangardih	199	25
7	SPAP	QGS	Manbazar-II	Kumari	Dighi	181	15
8	SPAP	QGS	Manbazar-II	Kumari	Nekra	227	10
10	SPAP	QGS	Manbazar-II	Jamtoria	Royna	306	3.5
11	SPAP	QGS	Manbazar-II	Jamtoria	Jamtoria	312	3
Sub Total							**68.5**
12	SPAP	QGS	Bandwan-I	Bandwan	Mangla	29	10
13	SPAP	QGS	Bandwan-I	Bandwan	Jamunagora	30	10
14	SPAP	QGS	Bandwan-I	Pargora	Roladih	26	13
15	SPAP	QGS	Bandwan-I	Pargora	Gangamanna	27	7
16	SPAP	SAL	Bandwan-I	Pargora	Gangamanna	27	5
17	SPAP	SAL	Bandwan-I	Pargora	Ghatihuli	89	5
18	SPAP	SAL	Bandwan-I	Pargora	Burigora	91	5
Sub Total							**55**

19	SPAP	SAL	Jamuna	Kuilapal	Sindrihuli	78	10
20	SPAP	QGS	Jamuna	Kuilapal	Hargara	63	4
21	SPAP	QGS	Jamuna	Kuilapal	Talpat	36	5
22	SPAP	QGS	Jamuna	Dhadka	Jamjora	104	5
23	SPAP	QGS	Jamuna	Dhadka	Punsha	126	5
24	SPAP	QGS	Jamuna	Dhadka	Golkata	133	5
25	SPAP	QGS	Jamuna	Nanna	Rasiknagar	120	10
Sub Total							**44**
26	SPAP	QGS	Bandwan-II	Kunchia	Bhomragora	95	10
27	SPAP	QGS	Bandwan-II	Kunchia	Kunchia	96	7
28	SPAP	QGS	Bandwan-II	Latapara	Satara	129	10
Sub Total							**27**
29	SPAP	QGS	Barabazar	Barabazar	Kutra	199	10
30	SPAP	QGS	Barabazar	Barabazar	Latpada	185	10
31	SPAP	QGS	Barabazar	Barabazar	Tilabani	153	11
32	SPAP	QGS	Barabazar	Barabazar	Bhalukkhal	152	12
33	SPAP	QGS	Barabazar	Barabazar	Lanka	148	10
Sub total							**53**
Grand total							**288.5**

Creation of Plantation in F.Y 2020-21

S. No.	Scheme	Plantation type	Range	Beat	Mouza	JL. No.	Area (in ha.)
1	SPAP	QGS	Manbazar-I	Sindurpur	Hullung	29	36
2	SPAP	QGS	Manbazar-I	Sindurpur	Tetulagora	219	10
3	SPAP	QGS	Manbazar-II	Kumari	Jagda	191	10
4	SPAP	QGS	Manbazar-II	Kumari	Jamunabandh	189	17
5	SPAP	QGS	Manbazar-II	Kumari	Haridi	213	10
6	SPAP	QGS	Manbazar-II	Kumari	Chirugora	201	14
7	SPAP	QGS	Manbazar-II	Jamtoria	Royna		5
8	SPAP	QGS	Barabazar	Sindri	Khayerbani	195	15
9	SPAP	QGS	Barabazar	Sindri	Tentlo	187	10
10	SPAP	QGS	Bandwan-I	Bandwan	Sirishgora	32	10
11	SPAP	QGS	Bandwan-I	Pargora	Gangamanna	27	25
12	SPAP	QGS	Bandwan-I	Pargora	Dangarjuri	105	10
13	SPAP	QGS	Bandwan-I	Pargora	Rolladih	26	10.65
14	SPAP	QGS	Bandwan-I	Pargora	Patkita	90	10
15	SPAP	QGS	Bandwan-II	Latapara	Salidih	101	20
16	SPAP	QGS	Bandwan-II	Latapara	Pachapani	99	10
17	SPAP	QGS	Bandwan-II	Kunchia	Bhomragora	95	10
18	SPAP	QGS	Bandwan-II	Latapara	Mahulbani	132	5
19	SPAP	QGS	Jamuna	Kuilapal	Radhanagar	37	20
20	SPAP	QGS	Jamuna	Kuilapal	Chirudih	64	5
21	SPAP	QGS	Jamuna	Kuilapal	Joshpur	76	5

22	SPAP	QGS	Jamuna	Kuilapal	Kaira	80	10
23	SPAP	QGS	Jamuna	Dhadka	Jamjora	104	5
24	SPAP	QGS	Jamuna	Dhadka	Madhuban	123	10
25	SPAP	QGS	Jamuna	Nanna	Rajauli	117	8
26	SPAP	QGS	Jamuna	Nanna	Nanna	116	9
Total							**309.65**

Creation of Plantation in F.Y 2019-20								
S. No.	**Scheme**	**Plantation type**	**Division**	**Range**	**Beat**	**Mouza**	**JL**	**Area (in ha.)**
1	SPAP	QGS	KSD	Bandwan-II	Kunchia	Bhomragora	95	5
2	SPAP	QGS	KSD	Bandwan-II	Kunchia	Kunchia	96	5
3	SPAP	QGS	KSD	Bandwan-II	Latapara	Salidih	101	5
4	SPAP	QGS	KSD	Bandwan-II	Latapara	Danga	86	5
5	SPAP	QGS	KSD	Jamuna	Kuilapal	Chirudih	64	10
6	SPAP	QGS	KSD	Jamuna	Kuilapal	Talpat	36	20
7	SPAP	QGS	KSD	Manbazar-I	Sindurpur	Janara	24	10
8	SPAP	QGS	KSD	Manbazar-I	Sindurpur	Bhalubasa	160	10
9	SPAP	QGS	KSD	Manbazar-I	Sindurpur	Amakocha	54	10
10	SPAP	QGS	KSD	Barabazar	Bamundiha	Bhagabandh	292	20
11	SPAP	QGS	KSD	Barabazar	Sindri	Agajhore	186	10
12	SPAP	QGS	KSD	Barabazar	Sindri	Hizli	184	20
13	SPAP	QGS	KSD	Manbazar-II	Kumari	Hensla	207	10
14	SPAP	QGS	KSD	Manbazar-II	Kumari	Patapahari	192	25
15	SPAP	QGS	KSD	Manbazar-II	Kumari	Raghunathpur	210	25
16	SPAP	QGS	KSD	Manbazar-II	Kumari	Penchara	192	10
17	SPAP	QGS	KSD	Bandwan-I	Bandwan	Chhotoparasia	7	10
18	SPAP	QGS	KSD	Bandwan-I	Pargora	Dangarjuri	105	10
Total QGS Plantation (SPAP)								**220**
19	SPAP	SAL	KSD	Manbazar-I	Sindurpur	Janara	24	10
20	SPAP	SAL	KSD	Jamuna	Kuilapal	Kuilapal	59	10
21	SPAP	SAL	KSD	Bandwan-I	Bandwan	Chhotoparasia	7	5
22	SPAP	SAL	KSD	Bandwan-I	Pargora	Dangarjuri	105	5
Total SAL Plantation (SPAP)								**30**
23	SPAP	Bamboo	KSD	Bandwan-I	Bandwan	Jamunagora	30	10
24	SPAP	Bamboo	KSD	Jamuna	Nanna	Harada	115	10
25	SPAP	Bamboo	KSD	Manbazar-II	Kumari	Hensla	207	10
Total Bamboo Plantation (SPAP)								**30**
Total Plantation								**280**

Dependency on Forest in Kangsabati South Division :-

1. **FDI Index : 40%**
2. **Collection of Kendu leaves, Sal leaves, firewood, Herbal medicine, Mushroom, fruits etc.**
3. **Babui grass cultivation for handicraft.**

13. Erosion susceptibility index in Kangsabati South Forest Division

Major factors responsible for assessing relative degree of soil erosion are identified as forest cover, land slope, soil texture and soil depth. These factors were classified in different groups and each of these groups was assigned numerical values as to reflect the severity of erosion. Finally Erosion Susceptibility Index (ESI) was computed for different erosion response units arrived by over laying and intersecting four thematic layers viz. forest cover, land slope, soil depth and soil texture. Range wise area statistics of different ESI classes spread over Kangsabati South Division is given in Table 13.1. Spatial distribution of these ESI classes is depicted in range wise ESI maps number Map 9a, Map 9b, Map 9c, Map 9d, Map 9e and Map 9f. Further beat wise priority table is also prepared by computing weighted area average ESI value and presented in Table 13.2.

Table 13.1. Range wise area statistics of different ESI classes spread over Kangsabati South Division

Forest range	Area (ha) under different classes of erosion susceptibility index					Total area (ha)
	Non critical (< 0.33)	Slightly critical (0.33 - 0.47)	Moderately critical (0.48 - 0.62)	Critical (0.63 - 0.79)	Very critical (> 0.79)	
Bandwan-I	188.59	3.69	2139.23	2266.72	160.07	4758.30
Bandwan-II	188.20	4.27	1164.00	1295.71	154.03	2806.21
Barabazar	827.38	-	1322.70	591.15	10.15	2751.38
Jamuna	378.36	-	3645.55	2429.32	150.62	6603.85
Manbazar-I	308.90	-	1744.87	1392.24	31.16	3477.17
Manbazar-II	240.40	6.56	1705.50	1603.13	193.77	3749.36
Total Area (ha)	2131.82	14.53	11721.86	9578.27	699.79	24146.27
% of Total Forest Division area	**8.83**	**0.06**	**48.55**	**39.67**	**2.90**	**100.00**

Table 13.2: Beat wise priority for taking up CAT interventions in Kangsabati South Forest Division

BEAT	ESI	Priority
Barabazar	0.3912	Low priority
Sindri	0.3964	
Bamundiha	0.3973	
Kenda	0.4118	
Manbazar	0.4162	
Nanna	0.4558	
Grand total	0.4603	
Shindurpur	0.4679	
Kuilapal	0.4682	
Jamtoria	0.4695	
Dhadka	0.4699	
Bandwan	0.4704	
Kumari	0.4753	
Latapara	0.4830	
Kunchia	0.4915	High priority

14. Proposed action plan

"In all the following calculations the estimated amount has arrived using Schedule of Rates 2018 of Irrigation & Waterways Department, Government of West Bengal and is indicative only. The actual amount is the vetted estimates may vary."

14.1 Brushwood Check Dam (BCD)

Input parameters:

- ✓ Structure No
- ✓ Order of gully
- ✓ Type of DLT
- ✓ Availability of Stone
- ✓ Shape of Gully (1=V, 2=U and 3=Parabolic)
- ✓ Gully width (m) at Highest Flood Level (HFL)
- ✓ Gully depth in centre at HFL (m)
- ✓ General clearance Rate (Rs/Sqm) @ Rs. 171
- ✓ Collecting poles about 8-10 cm dia of required height including driving poles (2 rows)- Rate (Rs/m) @ Rs. 33
- ✓ Collecting horizontal sticks about 4-6 cm dia of required length including placing sticks (for 2 vertical rows) – Rate (Rs/m) @ Rs. 6
- ✓ GI wire for binding poles and sticks @ 50 gm per node – Rate (Rs/kg) @ Rs. 85.55
- ✓ Collecting and spreading brushes – Rate (Rs/cum) @ Rs. 492.48
- ✓ Planting seedlings & maintenance charges including watering (LS) – Rate @ Rs. 500

Design Logic Used

i. For Design width:

Gully width (m) at HFL	Design width (m)	Gully width (m) at HFL	Design width (m)
<=1	1.0	>3.5 but <=4	4.0
>1 but <=1.5	1.5	<4 but <=4.5	4.5
>1.5 but <=2,	2.0	>4.5 but <=5	5.0
>2 but <=2.5	2.5	>5 but <=5.5	5.5
>2.5 but <=3	3.0	>5.5 but <=6	6.0
>3 but <=3.5	3.5		

ii. For Design height:

Gully depth in center at HFL (m)	Design height (m)
<0.5	NA
>=0.5 but <=0.75	0.5
>0.75 but <=1.75	Gully depth-0.25
>1.75	1.5

iii. **For depth of driving vertical poles inside the earth(m):** Design height * 0.6

iv. **Breath (m) - spacing between two rows:**

Design width (m)	Breath (m) - spacing between two rows
<=2.5	0.5
>2.5 but <=4.5	0.75
>4.5 but <=6	1.0

v. **General clearance Qty:**
(Design width * Breath (m) - Spacing between two rows) * 1.5

vi. **Collecting poles about 8-10 cm dia of required height including driving poles (2 rows):**

No of Poles of design height: Round ((Design width/0.4),0) *2
Total Length of Poles (m): (Design height + Depth of driving Vertical Poles inside the earth) * No of Poles of design height

vii. **Collecting horizontal sticks about 4-6 cm dia of required length including placing sticks (for 2 vertical rows):**
No of Sticks of design width: Round ((Design height/0.25),0) *2
Total Length of Sticks (m): Design width + No of Sticks of design width

viii. **GI wire for binding poles and sticks @ 50 gm per node- Qty:**
Round (((No of Poles of design height * No of Sticks of design width) / 2) * 0.05,1)

ix. **Collecting and spreading brushes – Qty:**
Round ((Design width * Design height * Breath spacing between two rows),1)

x. **Total Cost:**
(General clearance Qty * Rate) + (Total length of poles * Rate) + (Total length of sticks * rate) + (GI wire for binding poles and sticks @ 50 gm per node- Qty * Rate) + (Collecting and spreading brushes – Qty *Rate)

xi. **Unforeseen items if any @3%:**

Total cost * 0.03

xii. **Grand total:**
Total cost + Unforeseen items if any @3%

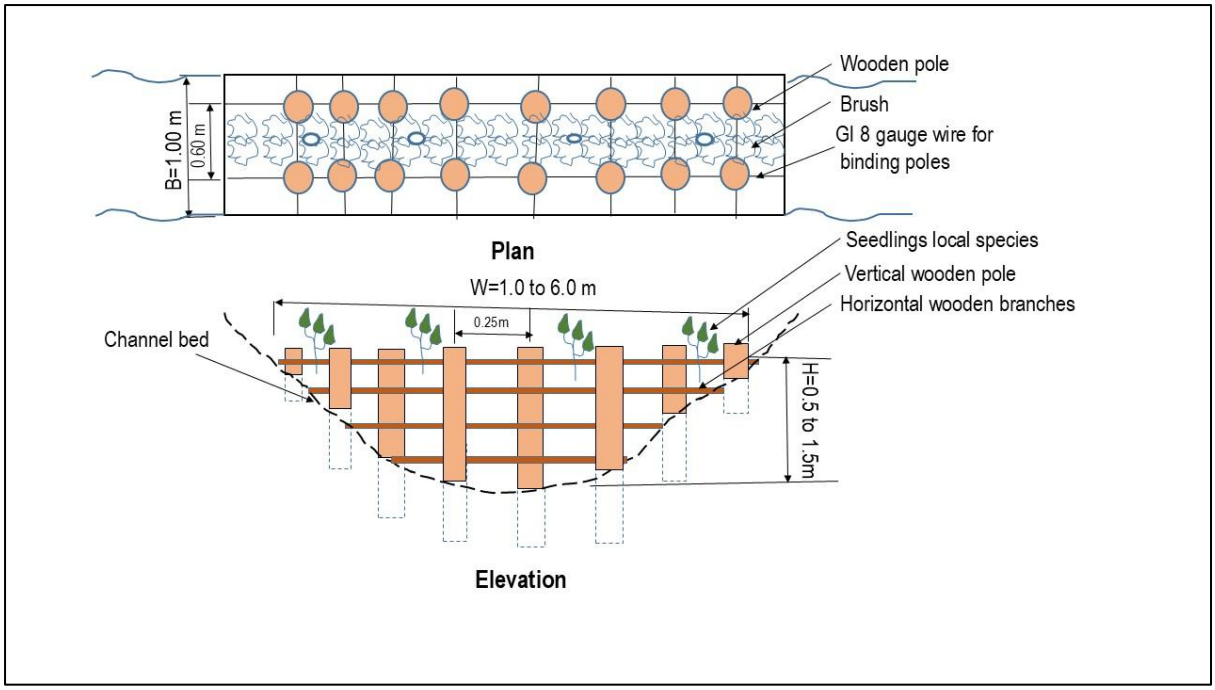

Fig.14.1: General design and drawing of Brush wood Check Dam

14.2 Loose Boulder Check Dam (LBCD)

Input parameters:

- ✓ Structure No.
- ✓ Order of gully
- ✓ Type of DLT
- ✓ Availability of stone
- ✓ Shape of Gully (1=V, 2=U and 3=Parabolic)
- ✓ Gully width (m) at HFL
- ✓ Gully depth in centre at HFL (m)
- ✓ Earth work Rate (Rs/cum) @ Rs. 82.98
- ✓ Boulder Rate (Rs/cum) @ Rs. 1998
- ✓ Labour Charges @ Rs. 380

Design Logic Used

i. For Design width:

Gully width at HFL (m)	Design width (m)	Gully width (m) at HFL	Design width (m)
<1 and >8.5	NA	>= 4.5 but <5	5.5
>= 1 but <1.5	2.0	>= 5 but <5.5	6.0
>= 1.5 but <2	2.5	>= 5.5 but <6	6.5
>= 2 but <2.5	3.0	>= 6 but <6.5	7.0
>= 2.5 but <3	3.5	>= 6.5 but <7	7.5
>= 3 but <3.5	4.0	>= 7 but <7.5	8.0

>= 3.5 but <4	4.5	>= 7.5 but <8	8.5
>= 4 but <4.5	5.0	>= 8 but <8.5	9.0

ii. For design height:

Gully depth at centre (m) of HFL	Design height (m)	Gully depth at centre (m) of HFL	Design height (m)
<0.5	NA	>=1.5 but <1.75	1.0
>=0.5 but <0.75	0.5	>=1.75 but <2	1.05
>=0.75 but <1	0.6	>=2 but<2.25	1.2
>=1 but <1.25	0.75	>=2.25 but <2.75	1.35
>=1.25 but <1.5	0.90	>=2.75	1.5

iii. Top width:

Design height (m)	Top width
<=0.75	0.4
>0.75 but <=1	0.5
>1 but <=1.5	0.6

iv. Bottom width:

Round ((Design height *0.5 + Design height * Top width),1)

v. Foundation depth (m):

Round ((Design height *0.3),1)

vi. Earth work Qty:

(0.5 * Design width * Bottom width * Foundation depth)

vii. Boulder Qty:

((Design width * Bottom width * Foundation depth) + (((Top Width + Bottom width) / 2) * Design height * Design width)) * 1.2

viii. Total cost:

(Earth work Qty * Earth work rate) + (Boulder Qty * Boulder rate) + (Boulder Qty * Labour charges)

ix. Unforeseen items if any @3%:

Total cost * 0.03

x. Grand total:

Total Cost + Unforeseen items if any @3%

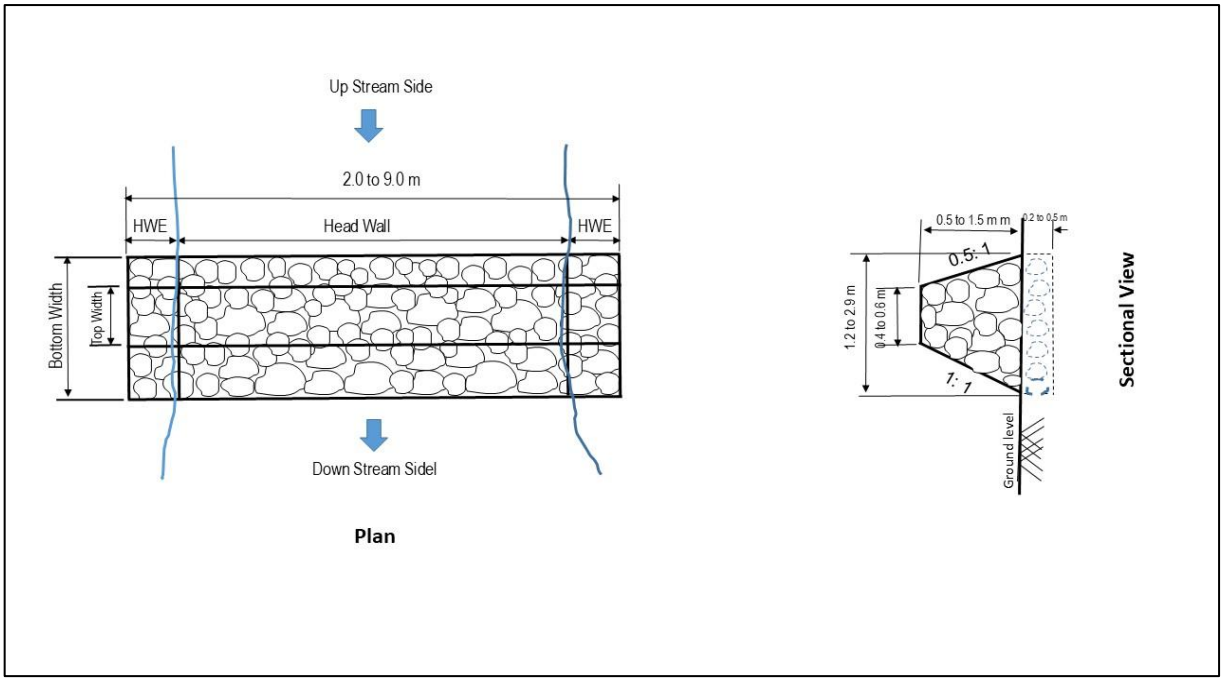

Fig. 14.2: General drawing of Loose Boulder Check Dam (LBCD)

14.3 Gabion Check (GC)

Input parameters:

- ✓ Structure no
- ✓ Order of gully
- ✓ Type of DLT
- ✓ Availability of stone
- ✓ Shape of gully (1=V, 2=U and 3=Parabolic)
- ✓ Gully width (m) at HFL
- ✓ Gully depth (m) in centre at HFL
- ✓ Earth work rate (Rs/cum) @ Rs. 82.98
- ✓ Gabion wire rate (Rs/kg) @ Rs. 85.55
- ✓ Labour charges for wire netting (Rs/sqm) @ Rs.70.29
- ✓ Boulder rate (Rs/cum) @ Rs. 1998
- ✓ Labour charges @ Rs. 380

Design Logic Used

i. For design width:

Gully width (m)	Design width (m)
<1.5 and >8.5	NA
>= 1.5 but <2.5	3
>= 2.5 but <3.5	4
>= 3.5 but <4.5	5
>= 4.5 but <5.5	6
>= 5.5 but <6.5	7
>= 6.5 but <7.5	8

>= 7.5 but <8.5	9

ii. For design height:

Gully depth (m)	Design height (m)
<0.55	NA
>=0.55 but <1	0.6
>=1 but <1.5	1
>=1.5 but <2	1.2
>=2 but <3	1.5
>=3	1.8

iii. Foundation depth (m):

Design height (m)	Foundation depth (m)
0.6	0.3
1.0	0.4
1.2	0.4
1.5	0.5
1.8	0.6

iv. Gabion boxes height (m):

Bottom row:
If (Design height + Foundation depth) > 1 then height of bottom row is 1 otherwise (Design height + Foundation depth)

Middle Row:
If (Design height + Foundation depth) <1 then height of middle row is 0,
If (Design height + Foundation depth) - 1 <1 then height of middle row is (Design height + Foundation depth) – 1 otherwise 1

Top Row:
(Design height + Foundation depth) - Bottom row height – Top row height

v. Earth Work Qty:

0.5 * (Design width * Foundation depth * Design breath)
(Design breath taken as 1 m)

vi. Wire netting Qty:
Design width * {(2 * 1 * Bottom row height) + (2 * 1 * Design breath) + (2 * Design breath * Bottom row height)} + Design width * {(2 * 1 * Middle row height) + (2 * 1 * Design breath) + (2 * Design breath * Middle row height)} + Design width * {(2 * 1 * Top row height) + (2 * 1 * Design breath) + (2 * Design breath * Top row height)}

vii. Gabion Wire Qty:
1.2 * Wire netting Qty *1.28

viii. Boulder Qty:

(Design width * Design breath) * (Design height + Foundation depth)) * 1.2

ix. Total Cost:

(Earth work Qty * Earth work Rate) + (Wire netting Qty * Labour charges for wire netting) + (Gabion wire Qty * Gabion wire rate) + (Boulder Qty * Boulder rate) + (Boulder Qty * Labour charges)

x. Unforeseen items if any @3%:

Total cost * 0.03

xi. Grand total:

Total cost + Unforeseen items if any @3%

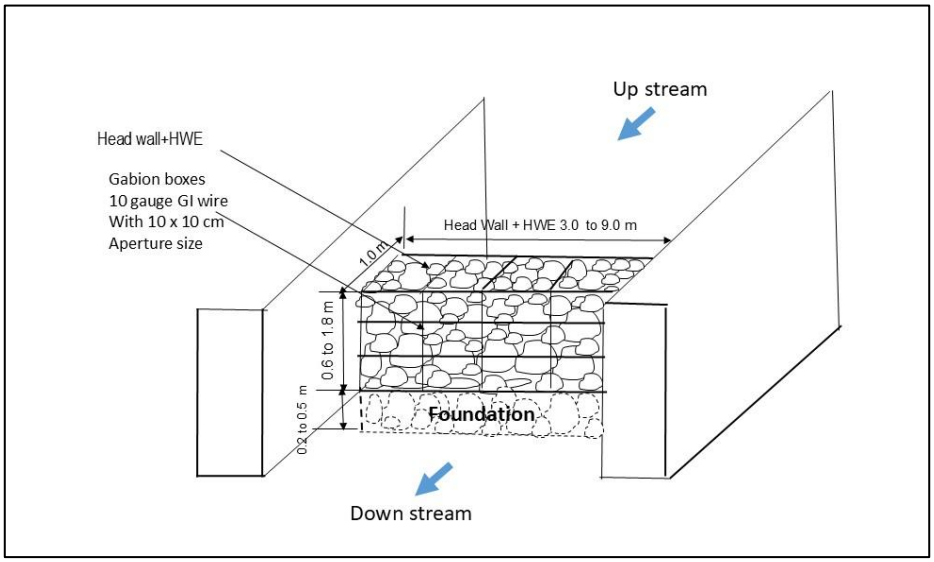

Fig.14.3. Isometric view of Gabion Check

14.4 Gabion Check Dam (GCD)

Input parameters:

- ✓ Structure no
- ✓ Order of gully
- ✓ Type of DLT
- ✓ Availability of stone
- ✓ Shape of gully (1=V, 2=U and 3=Parabolic)
- ✓ Gully width (m) at HFL
- ✓ Gully depth in centre at HFL (m)
- ✓ Earth work rate (Rs/cum) @ Rs.82.98
- ✓ Gabion wire rate (Rs/kg) @ Rs. 85.55
- ✓ Labour charges for wire netting (Rs/sqm) @ Rs.70.29
- ✓ Boulder rate (Rs/cum) @ Rs.1998
- ✓ Labour charges @ Rs. 380

Design Logic Used

For head wall:

i. For Design width:

Gully width at HFL (m)	Design width (m)	Gully at HFL width (m)	Design width (m)
<6 and >13	NA	>= 9.5 but <10	10.0
>= 6 but <6.5	6.5	>= 10 but <10.5	10.5
>= 6.5 but <7	7.0	>= 10.5 but <11	11.0
>= 7 but <7.5	7.5	>=11 but <11.5	11.5
>= 7.5 but <8	8.0	>= 11.5 but <12	12.0
>= 8 but <8.5	8.5	>= 12 but <12.5	12.5
>= 8.5 but <9	9.0	>= 12.5 but <=13	13.0
>= 9 but <9.5	9.5		

ii. For Design height:

Gully depth (m)	Design height (m)
<1 and >6	NA
>=1 but <1.2	1
>=1.2 but <1.5	1.2
>=1.5 but <1.8	1.5
>=1.8 but <2.1	1.8
>=2.1 but <=6	2.1

iii. Design breath (m): taken as 1 m

iv. Foundation depth (m):

Round ((design height * 0.35),1)

v. Gabion boxes height including foundation depth (m):

1st Row:

If Design height + Foundation depth >1 then height of 1st Row is 1 otherwise Design height + Design breath

2nd Row:

If Design height + Foundation depth <1 then height of 2nd Row is 0

If (Design height + Foundation depth)-1 <1 then height of 2nd Row is (Design height + Foundation depth)-1 otherwise 1

3rd Row:

If (Design height + Foundation depth) - 1st Row height - 2nd Row height

For Side Wall:

i. For Design length:

Design width (m) of head wall	Design length (m)
>=6.5 but <7.5	2 * 1.5
>=7.5 but <9.5	2 * 2.0
>=9.5 but <11.5	2 * 2.5
>=11.5	2 * 3.0

ii. For design height:

Design height of headwall +1

iii. Design breath: it takes as 1 m

iv. Foundation depth (m):

Round ((design height * 0.35),1)

v. Gabion boxes height including foundation depth (m):

1st Row:

If Side wall Design height + Side wall Foundation depth > 1, then height of 1st Row is 1 otherwise Side wall Design height + Side wall Foundation depth

2nd Row:

If Side wall Design height + Side wall Foundation depth < 1, then height of 2nd Row is 0

If (Side wall Design height + Side wall Foundation depth)-1 < 1, then height of 2nd Row is (Side wall Design height + Side wall Foundation depth)-1 otherwise 1

3rd Row:

If (Side wall design height + Side wall Foundation depth) - 1st Row height – 2nd Row Height < 1, then height of 3nd Row is (Side wall Design height + Side wall Foundation depth) - 1st Row height – 2nd Row Height otherwise 1

4th Row:

(Side wall Design height + Side wall foundation depth) - 1st Row height – 2nd Row height – 3rd Row height

vi. For Apron:

Design length (m): design width - 2
Apron height (m): taken as 0.3 m
Design breath – Lb (m): (side wall design length / 2) -0.5
Foundation depth (m): taken as 0.2 m

vii. For Toe Wall:

Design length (m): design width - 2
Toe wall height (m): taken as 0.3 m
Design breath (m): taken as 0.4 m
Foundation depth (m): Round (head wall design height * 0.35,1)

viii. 1 cum. on both side of HW to raise it up to SW:

Design Length (m): taken as 1 m
Design Height (m): taken as 1 m

ix. <u>For Earth Work Qty:</u>

(0.5 * Headwall Design Width * Headwall Design Breath * Headwall Foundation Depth) + (2 * (Side wall Design length * Side wall Design breath * Side wall Foundation depth)) + (Apron Design length * Apron Design breath * Apron Foundation depth) + (Toe wall Design length * Toe wall Design Breath * Toe wall Foundation depth)

x. For Wire Netting Qty:

(Headwall Design width -0.5) * ((2 * 1 * Headwall Gabion box 1st row height) + (2 * 1 * Headwall Design breath) + (2 * Headwall Design breath * Headwall Gabion box 1st row height)) +

(Headwall Design width -0.5) * ((2 * 1 * Headwall Gabion box 2nd row height) + (2 * 1 * Headwall Design breath) + (2 * Headwall Design breath * Headwall Gabion box 2nd row height)) +

0.5 * ((2 * 1 * Headwall Gabion box 1st row height) + (2 * 1 * Headwall Design breath) + (2 * Headwall Design breath * Headwall Gabion box 1st row height)) +

0.5 * * ((2 * 1 * Headwall Gabion box 2nd row height) + (2 * 1 * Headwall Design breath) + (2 * Headwall Design breath * Headwall Gabion box 2nd row height)) +

Side wall Design length * 2 * ((2 * 1 * Side wall Gabion box 1st row height) + (2 * 1 * Side wall Design breath) + (2 * Side wall Gabion box 1st row height * Side wall Design breath)) +

Side wall Design length * 2 * (2 * 1 * Side wall Gabion box 2nd row height) + (2 * 1 * Side wall Design breath) + (2 * Side wall Gabion box 2nd row height * Side wall Design breath)) +

Side wall Design length * 2 * (2 * 1 * Side wall Gabion box 3rd row height) + (2 * 1 * Side wall Design breath) + (2 * Side wall Gabion box 3rd row height * Side wall Design breath)) +

(2 * Toe wall design length * (Toe wall Foundation depth + Toe wall Design height)) +

(2 * Toe wall design length * Toe wall Design breath) + (2 * (Toe wall Foundation depth + Toe wall Design height) * Toe wall Design breath)

xi. For Gabion Wire Qty:

1.2 * Wire Netting Qty * 1.28

xii. For Boulder Qty:

1.2 * ((Head wall Design Width * 2 *1.7) + (Head wall Design Width * 1 * 1) + 2 * ((12 * 2 * Side wall Design breath * 1)) + (Apron Design length * Apron design Breath Lb * Apron Foundation depth) + (Toe wall Design length * Toe wall Design breath * (Toe wall Foundation depth + Toe wall height)) + (1 cum. on both side of HW to raise it up to SW- Design length * 1 cum. on both side of HW to raise it up to SW- Design Height * Headwall Design breath))

xiii. For total cost:

(Earth Work Qty * Earth Work Rate) + (Wire Netting Qty * Labour Charges for Wire Netting) + (Gabion Wire Qty * Gabion Wire Rate) + (Boulder Qty * Boulder Rate) + (Boulder Qty * Labour Charges)

xiv. For unforeseen items if any @3%:

Total Cost * 0.03

xv. For grand total:

Total cost + Unforeseen items if any @3%

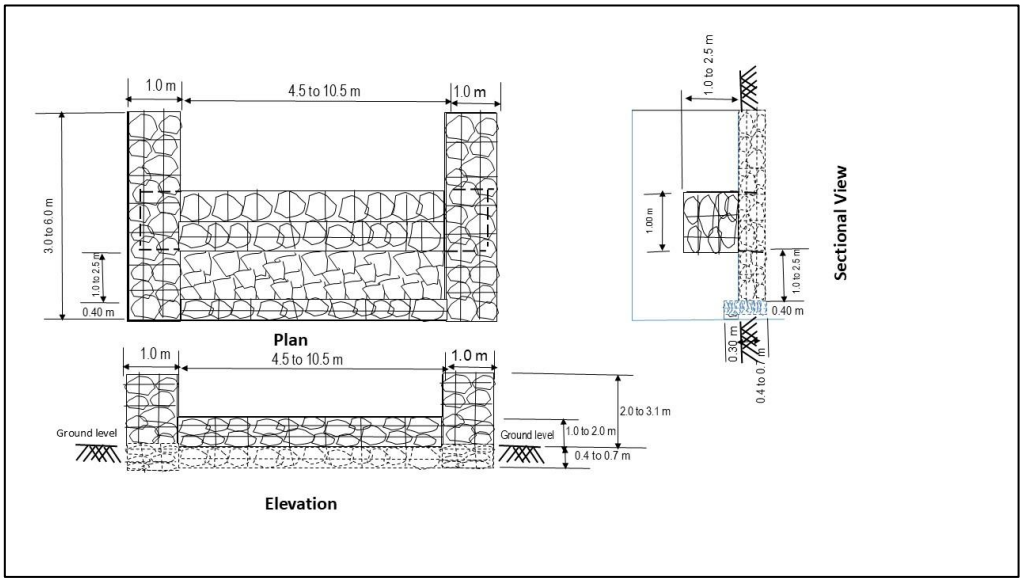

Fig.14.4: Drawing of Gabion Check Dam

14.5 Contour Staggered Trenching

Input parameters:

- ✓ Forest Cover Class
- ✓ Area (ha) of the polygon
- ✓ Soil depth class
- ✓ Slope Class

Design Logic used

i. For Horizontal Interval (H.I.):

Slope Class	H.I.
<=5	6.5
>5 but <=10	5.8
>10 but <=25	5.5
>25 but <=33	5.2
>33 but <=50	5.0
>50	NA

ii. For No. of Lines of 100 m Length/ha:

Round(100/H.I.,0)

iii. For No of Trenches per ha:

No. of Lines of 100 m Length/ha * 16

iv. For No of trenches for polygon:

Round (No of trenches for polygon * Area,0)

v. For soil depth class

Depth (cm)	Trench Design (LxWxD)
< 50	Type I (3.0x0.45x0.30)
> 50	Type II (3.0x0.45x0.45)

vi. For cross-sectional Area:

Trench Design	Cross Section Area (m)
Type I	0.45 * 0.30
Type II	0.45 * 0.45

vii. For volume (m^3):

No of trenches for polygon * 3 * Cross-sectional Area

viii. For cost calculation:

Volume (m^3) * Rate (Rs.)

Cost/ha = Volume (m^3) / Area

ix. For plantation (GF):

Forest Cover Class	Plantation (GF)
NON-FOREST	100 %
SCRUB	90 %
OPEN FOREST	50 %

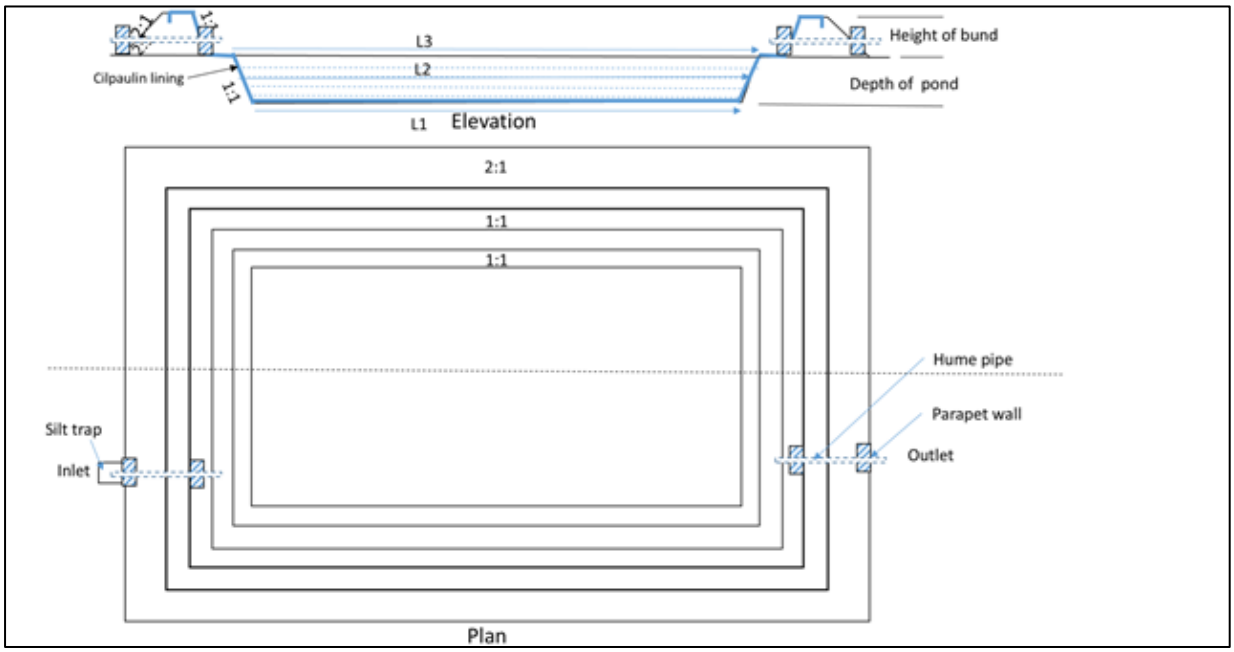

Fig. 14.5: Drawing of Dugout Pond to be constructed in the Kangsabati South Forest Division under JICA consultancy project at West Bengal

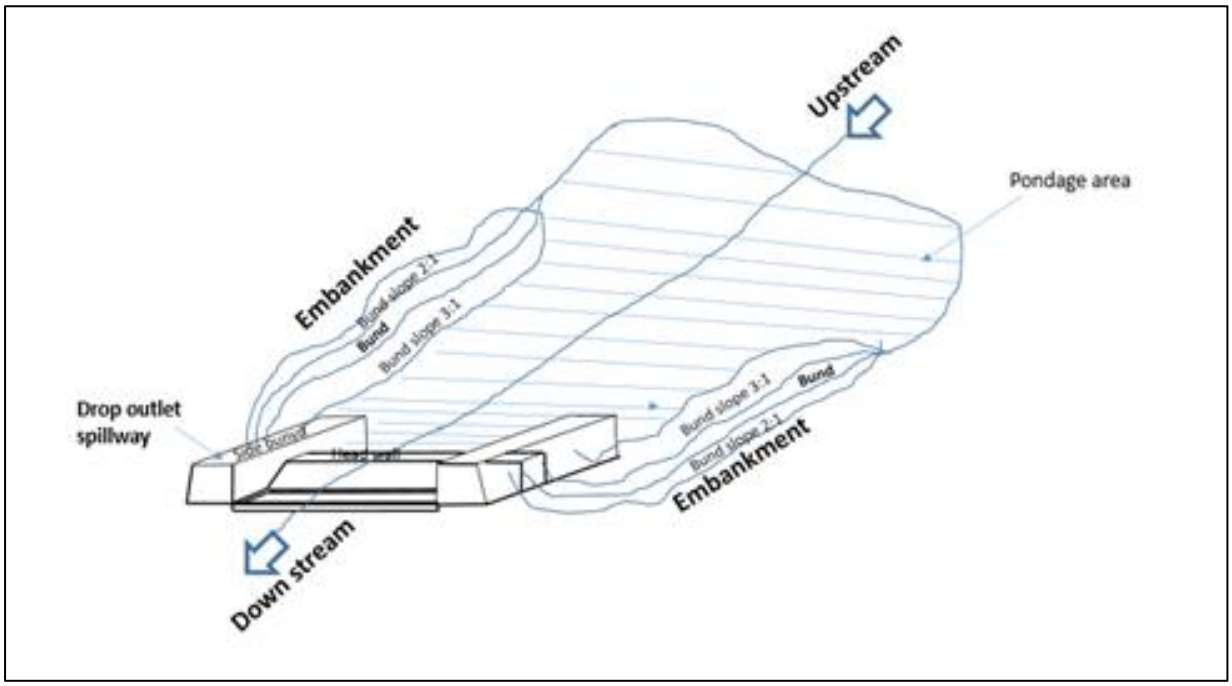

Fig. 14.6: Embankment Pond with Drop outlet spillway to be constructed in the Kangsabati South Forest Division under JICA consultancy project at West Bengal

15. Summary of Proposed Action Plan

Table No. 15.1. Summary of Proposed Loose Boulder Check Dam

BEAT	Design width (m)	No. of structures	Cost (in thousand ₹)	Total Cost (in thousand ₹)
Bamundiha	3	1	9.05	21.13
	4	1	12.07	
Bandwan	3	2	42.18	185.06
	3.5	1	6.61	
	4	5	37.79	
	4.5	1	8.50	
	5	6	56.92	
	5.5	1	10.39	
	6	2	22.67	
Barabazar	3	4	26.29	47.41
	3.5	2	21.13	
Dhadka	3	4	28.52	360.72
	4	13	147.97	
	4.5	3	51.88	
	5	3	57.66	
	6	2	29.53	
	7	1	21.08	
	8	1	24.09	
Jamtoria	2	12	50.73	2075.84
	2.5	9	51.05	
	3	28	181.68	
	3.5	11	83.32	
	4	16	128.82	
	4.5	15	136.54	
	5	10	131.32	
	5.5	9	119.78	
	6	11	186.26	
	6.5	3	113.08	
	7	9	187.39	
	7.5	3	65.24	
	8	8	139.41	
	8.5	2	32.32	
	9	13	468.91	
Kenda	5.5	1	30.05	987.16
	6	4	101.50	
	6.5	1	19.43	
	7	9	223.12	
	8	2	89.17	
	8.5	1	16.08	
	9	13	507.81	

Kuilapal	2.5	1	4.78	174.63
	3	5	29.81	
	3.5	4	26.67	
	5	1	9.55	
	6	4	74.38	
	7	2	29.44	
Kumari	2.5	1	7.52	533.34
	4	5	81.01	
	5	4	92.74	
	6	12	212.34	
	6.5	2	39.12	
	7	4	76.54	
	8	1	24.06	
Kunchia	2	2	9.74	114.42
	2.5	1	7.46	
	4	1	9.08	
	5	1	14.91	
	5.5	1	29.98	
	7	1	20.88	
	7.5	1	22.37	
Latapara	2.5	1	4.72	61.91
	5	1	24.39	
	6	1	32.80	
Manbazar	5	3	141.58	3897.44
	6	6	293.29	
	7	4	228.03	
	8	8	521.52	
	9	37	2713.02	
Nanna	2.5	1	7.54	474.33
	3	3	21.59	
	3.5	1	10.55	
	4	2	21.24	
	5	3	45.22	
	6	7	118.00	
	7	5	112.97	
	8	2	62.50	
	9	3	74.72	
Pargora	4	1	12.07	185.44
	4.5	1	13.58	
	8	2	110.12	
	9	1	49.68	
Sindri	3	4	26.28	36.84
	3.5	1	10.56	
Sindurpur	2.5	1	5.68	436.45
	3.5	3	37.54	
	4	3	35.86	
	4.5	1	13.45	

	5	4	96.88	
	6	3	93.02	
	7	2	77.98	
	9	2	76.05	
Grand Total		**414**	**9592.11**	**9592.11**

Table No.15.2. Summary of Proposed Gabion Check Dam

BEAT	Design width (m)	No. of structures	Cost (in lakh ₹)	Total Cost (in lakh ₹)
Kenda	6.5	1	2.77	6.77
	12.5	1	4.00	
Kuilapal	8.5	1	3.12	7.30
	12.5	1	4.18	
Grand Total		**4**	**14.07**	**14.07**

Table No.15.3. Summary of Proposed Gabion Check

BEAT	Design width (m)	No. of structures	Cost (in thousand ₹)	Total Cost (in thousand ₹)
Bandwan	3	1	25.18	67.14
	5	1	41.96	
Latapara	3	1	18.38	99.37
	5	1	30.63	
	6	1	50.36	
Sindurpur	4	1	33.57	33.57
Grand Total		**6**	**200.08**	**200.08**

Table No.15.4. Summary of Proposed Brushwood Check Dam

BEAT	Design width (m)	No. of structures	Cost (in thousand ₹)	Total Cost (in thousand ₹)
Bandwan	2	4	5.77	11.94
	2.5	2	3.29	
	4	1	2.89	
Jamtoria	2	1	2.11	2.11
Kuilapal	1.5	1	1.24	1.24
Latapara	1	2	2.08	2.08
Grand Total		11	17.37	17.37

Table No.15.5. Summary of Proposed Random Rubble Masonry Check Dam

Name of Beat	Length of weir, L.m	Height of dam, F	Estimated Cost (in lakh ₹)	Total Estimated Cost of Beat (in lakh ₹)
Dhadka	16	1.5	6.30	6.30
Grand Total			**6.30**	**6.30**

Table No.15.6. Summary of Water Harvesting Structures

#Cost in Lakh ₹

BEAT	Dugout Pond		Embankment Pond		Percolation Pond		Pond Renovation		Total Estimated Cost of WHS in Beat
	No. of DP	Estimated Cost	No. of EP	Estimated Cost	No. of PP	Estimated Cost	No. of PR	Estimated Cost	
Dhadka	-	-	2	87.79	-	-	3	42.37	130.16
Kuilapal	-	-	2	8.33	-	-	-	-	8.33
Kunchia	-	-	3	4.56	-	-	-	-	4.56
Latapara	-	-	1	0.45	-	-	1	5.76	6.21
Nanna	-	-	2	1.28	-	-	17	48.39	49.67
Sindri	-	-	2	4.38	-	-	3	2.61	6.99
Bandwan	4	3.35	-	-	1	0.07	-	-	3.42
Jamtoria	3	0.37	-	-	-	-	14	32.82	33.19
Kumari	9	1.36	-	-	-	-	13	22.98	24.34
Pargora	3	2.65	-	-	-	-	-	-	2.65
Kenda	-	-	-	-	3	0.41	-	-	0.41
Sindurpur	-	-	-	-	1	0.24	13	38.74	38.98
Bamundiha	-	-	-	-	-	-	4	17.91	17.91
Barabazar	-	-	-	-	-	-	2	13.75	13.75
Manbazar	-	-	-	-	-	-	6	12.58	12.58
Grand Total	**19**	**7.73**	**12**	**106.79**	**5**	**0.72**	**76**	**237.91**	**353.15**

Table No.15.7. Beat wise Summary of Land Treatment SWC Measures

Beat Name	Tench Density/ha	Total No. of Trenches	Area (ha)	Total Estimated Cost (in lakh ₹)	Grand Total of Estimated Cost (in lakh ₹)
Barabazar	240	518	2.16	0.27	0.85
	272	620	2.28	0.33	
	288	475	1.65	0.25	
Bamundiha	240	4314	17.98	2.28	2.39
	272	202	0.74	0.11	
Bandwan	240	1215	5.06	0.43	1.50
	272	1943	7.14	0.69	
	288	1091	3.79	0.38	
Dhadka	240	392	1.63	0.14	2.12
	272	3382	12.43	1.27	
	288	2010	6.98	0.71	

Jamtoria	240	873	3.63	0.41	3.94
	272	3246	11.93	1.31	
	288	5556	19.29	1.96	
	304	760	2.50	0.27	
Kenda	240	49704	207.10	22.04	28.14
	272	13517	49.70	5.90	
	288	386	1.34	0.20	
Kuilapal	240	1738	7.24	0.68	1.26
	272	1207	4.44	0.57	
Kumari	240	17136	71.41	6.90	18.07
	272	16889	62.09	6.87	
	288	10776	37.42	4.30	
Kunchia	240	186	0.77	0.07	0.69
	272	987	3.63	0.47	
	288	453	1.57	0.16	
Latapara	240	451	1.88	0.21	9.29
	272	3354	12.33	1.28	
	288	13635	47.35	4.86	
	304	2991	9.84	1.06	
	320	5344	16.70	1.89	
Manbazar	240	379	1.58	0.13	2.21
	272	1318	4.84	0.52	
	288	3794	13.17	1.56	
Pargora	240	1595	6.65	0.79	0.87
	288	221	0.77	0.08	
Sindri	240	1433	5.97	0.76	1.70
	272	1970	7.24	0.94	
Sindurpur	240	39536	164.74	15.43	35.35
	272	29757	109.39	11.75	
	288	21936	76.17	8.17	

Table No.15.8. Beat wise Summary of Forest Plantation (Gap filling-GF or New Forest Plantation – NFP) recommended

BEAT NAME	GF (50%)	GF (80%)	NFP (100%)	Total Area (ha)	Total Estimated Cost (in lakh ₹)
Barabazar	-	-	6.09	6.09	Calculate As per Regulations of the department
Bamundiha	-	-	18.72	18.72	
Bandwan	-	-	15.99	15.99	
Dhadka	17.59	-	3.45	21.05	
Jamtoria	34.46	-	2.90	37.36	
Kenda	24.65	-	233.48	258.13	
Kuilapal	4.83	-	6.84	11.68	
Kumari	86.06	-	84.86	170.92	
Kunchia	2.80	-	3.17	5.97	
Latapara	41.98	-	46.10	88.09	
Manbazar	4.32	-	15.28	19.59	

Pargora		-	7.41	7.41	
Sindri	3.00	-	10.21	13.21	
Sindurpur	184.01	23.17	143.12	350.30	
Grand Total	**403.71**	**23.17**	**597.63**	**1024.51**	

BEAT WISE DETAILED PROPOSED SWC MEASURES DESIGN & COST ESTIMATES - KANGSABATI SOUTH FOREST DIVISION

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			PR	10.2.2
Manbazar-I	**Kenda**	Drainage Line Treatment	LBCD	11.1.1
			GCD	11.1.2
		Water Harvesting Structures	PR	11.2.1
		Land Treatment & Plantation	LT & FP	11.3.1
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		Water Harvesting Structures	PR	12.2.1
		Land Treatment & Plantation	LT & FP	12.3.1
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			GC	13.1.2
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			PR	13.2.2
		Land Treatment & Plantation	LT & FP	13.3.1
Manbazar II	**Jamtoria**	Drainage Line Treatment	BCD	14.1.1
			LBCD	14.1.2
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			PR	14.2.2
		Land Treatment & Plantation	LT & FP	14.3.1
	Kumari	Drainage Line Treatment	LBCD	15.1.1
		Water Harvesting Structures	DP	15.2.1
			PR	15.2.2
		Land Treatment & Plantation	LT & FP	15.3.1

(1) Bamundiha Beat (Barabazar range)

Drainage Line Treatment measures Open Map

1.1.1 Loose Boulder Check Dam- Bamundiha Beat (Barabazar range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
492	DLT-1	2 A 2 B 3 g 2	4	23.07417	86.37028	4.0	0.75	0.4	1.50	0.20	12072.81
493	DLT-2	2 A 2 B 2 p 4	1	23.13917	86.36333	3.0	0.75	0.4	1.50	0.20	9054.84

Water Harvesting Structure measures Bamundiha Beat (Barabazar range) Open Map

1.2.1 Pond Renovation- Bamundiha Beat (Barabazar range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
128	WRD-1	2 A 2 B 2 p 4	1	23.13778	86.36361	272442.49
129	WRD-2	2 A 2 B 3 g 1	1	23.08611	86.39806	319864.72
130	WRD-3	2 A 2 B 3 g 4	1	23.09472	86.34306	272442.49
131	WRD-4	2 A 2 B 2 p 5	1	23.09111	86.39139	926510.09

1.3.1 Land Treatment and forest plantation measures- Bamundiha Beat (Barabazar range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
122	LFPF-1	CCT	GF 30%	0.743564	5.8	17	272	3×0.45×0.45	10692	100%	NFP
123	LFPF-2	CCT	NFP	5.597292	6.5	15	240	3×0.45×0.45	71086	100%	NFP
124	LFPF-3	CCT	GF 30%	6.604852	6.5	15	240	3×0.45×0.45	83895	100%	NFP
283	LFPF-1	CCT	GF 30%	2.044981	6.5	15	240	3×0.45×0.45	25989	100%	NFP
284	LFPF-4	CCT	GF 30%	3.728995	6.5	15	240	3×0.45×0.45	47373	100%	NFP

(2) Barabazar Beat (Barabazar range)

Drainage Line Treatment measures

Open Map

2.1.1 Loose Boulder Check Dam- Barabazar Beat (Barabazar range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
486	DLT-1	2 A 2 B 2 m 2	1	23.03111	86.44444	3.0	0.50	0.4	1.20	0.20	5743.58
487	DLT-2	2 A 2 B 2 m 2	1	23.03111	86.44528	3.0	0.50	0.4	1.20	0.20	5743.76
488	DLT-3	2 A 2 B 2 m 2	2	23.03139	86.44639	3.5	0.75	0.4	1.50	0.20	10562.63
489	DLT-4	2 A 2 B 2 m 3	1	23.02861	86.44194	3.0	0.50	0.4	1.20	0.20	5744.13
490	DLT-5	2 A 2 B 2 m 2	1	23.02139	86.44917	3.0	0.75	0.4	1.50	0.20	9054.14
491	DLT-6	2 A 2 B 2 m 2	1	23.02167	86.44917	3.5	0.75	0.4	1.50	0.20	10563.44

Water Harvesting Structure measures Barabazar Beat (Barabazar range) Open Map

2.2.1 Pond Renovation- Barabazar Beat (Barabazar range) Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
126	WRD-2	2 A 2 B 3 a 1	1	23.02139	86.44028	578444.17
127	WRD-3	2 A 2 B 2 m 2	1	23.01778	86.44833	797002.17

2.3.1 Land Treatment and forest plantation measures- Barabazar Beat (Barabazar range)

Open Map Open Design Detailed Excel File

Object ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
120	LTFP-1	CST	NFP	1.64775	5.5	18	288	3×0.45×0.45	25142	100%	NFP
121	LTFP-1	CST	NFP	0.920474	5.8	17	272	3×0.45×0.45	13233	100%	NFP
281	LTFP-1	CST	NFP	1.361316	5.8	17	272	3×0.45×0.45	19584	100%	NFP
282	LTFP-1	CST	NFP	2.156441	6.5	15	240	3×0.45×0.45	27418	100%	NFP

(3) Sindri Beat (Barabazar range)

Drainage Line Treatment measures Open Map

3.1.1 Loose Boulder Check Dam- Sindri Beat (Barabazar range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
481	DLT-1	2 A 2 B 2 m 2	1	23.03556	86.44778	3.0	0.50	0.4	1.20	0.20	5742.65
482	DLT-2	2 A 2 B 2 m 2	1	23.03667	86.44472	3.0	0.50	0.4	1.20	0.20	5742.84
483	DLT-3	2 A 2 B 2 m 2	2	23.03917	86.44528	3.5	0.75	0.4	1.50	0.20	10561.27
484	DLT-4	2 A 2 B 2 m 3	1	23.0375	86.44083	3.0	0.50	0.4	1.20	0.20	5743.21
485	DLT-5	2 A 2 B 2 m 3	2	23.03861	86.44028	3.0	0.75	0.4	1.50	0.20	9052.98

Water Harvesting Structure measures Sindri Beat (Barabazar range) Open Map

3.2.1 Embankment Pond- Sindri Beat (Barabazar range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
122	WRD-2	2 A 2 B 2 m 3	1	23.039167	86.435278	393436.43
123	WRD-3	2 A 2 B 2 n 4	1	23.111944	86.460556	45104.20

3.2.2 Pond Renovation- Sindri Beat (Barabazar range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
121	WRD-1	2 A 2 B 2 n 1	1	23.06694	86.4475	89592.81
124	WRD-4	2 A 2 B 2 m 3	1	23.03583	86.44139	72005.59
125	WRD-5	2 A 2 B 2 m 3	1	23.03778	86.43972	99584.79

3.3.1 Land Treatment and forest plantation measures- Sindri Beat (Barabazar range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
940	LTFP-1	CCT	GF- 80%	0.237445	5.8	17	272	3×0.45×0.45	3441	100%	NFP
941	LTFP-1	CCT	GF- 80%	0.107094	5.8	17	272	3×0.45×0.45	1535	50%	GF
942	LTFP-1	CCT	GF- 80%	0.854377	6.5	15	240	3×0.45×0.45	10851	50%	GF
943	LTFP-1	CCT	GF- 80%	0.926633	6.5	15	240	3×0.45×0.45	11751	50%	GF
944	LTFP-1	CCT	GF- 80%	0.090577	5.5	18	288	3×0.45×0.30	917	100%	NFP
945	LTFP-1	CCT	GF- 80%	0.107849	6.5	15	240	3×0.45×0.30	917	100%	NFP
946	LTFP-1	CCT	GF- 80%	0.113641	5.8	17	272	3×0.45×0.30	1094	50%	GF
947	LTFP-1	CCT	GF- 80%	0.038408	5.8	17	272	3×0.45×0.30	353	50%	GF
948	LTFP-1	CCT	GF- 80%	0.029469	6.5	15	240	3×0.45×0.30	247	50%	GF
949	LTFP-2	CCT	GF- 50%	1.327255	5.8	17	272	3×0.45×0.45	19108	100%	NFP
950	LTFP-2	CCT	GF- 50%	1.370481	6.5	15	240	3×0.45×0.45	17414	100%	NFP
2007	LTFP-1	CCT	GF- 80%	0.049722	6.5	15	240	3×0.45×0.45	635	50%	GF
2008	LTFP-1	CCT	GF- 80%	0.522785	6.5	15	240	3×0.45×0.45	6616	50%	GF
2009	LTFP-1	CCT	GF- 80%	0.554554	6.5	15	240	3×0.45×0.45	7040	100%	NFP
2010	LTFP-1	CCT	GF- 80%	0.726732	6.5	15	240	3×0.45×0.45	9210	100%	NFP
2011	LTFP-1	CCT	GF- 80%	0.072035	5.8	17	272	3×0.45×0.45	1059	50%	GF
2012	LTFP-1	CCT	GF- 80%	0.62784	5.8	17	272	3×0.45×0.45	9051	50%	GF
2013	LTFP-1	CCT	GF- 80%	0.06167	5.8	17	272	3×0.45×0.45	900	50%	GF
2014	LTFP-1	CCT	GF- 80%	0.646353	5.8	17	272	3×0.45×0.45	9316	100%	NFP
2015	LTFP-1	CCT	GF- 80%	1.100365	5.8	17	272	3×0.45×0.45	15826	100%	NFP
2016	LTFP-1	CCT	GF- 80%	0.789323	5.8	17	272	3×0.45×0.45	11380	100%	NFP
2017	LTFP-1	CCT	GF- 80%	0.688128	6.5	15	240	3×0.45×0.45	8734	100%	NFP
2018	LTFP-1	CCT	GF- 80%	0.281825	6.5	15	240	3×0.45×0.45	3599	100%	NFP
2019	LTFP-1	CCT	GF- 80%	0.016132	6.5	15	240	3×0.45×0.45	212	100%	NFP

2020	LTFP-1	CCT	GF- 80%	0.030697	6.5	15	240	3×0.45×0.45	371	100%	NFP
2021	LTFP-1	CCT	GF- 80%	0.102381	6.5	15	240	3×0.45×0.45	1323	100%	NFP
2022	LTFP-1	CCT	GF- 80%	0.171327	6.5	15	240	3×0.45×0.45	2170	100%	NFP
2023	LTFP-1	CCT	GF- 80%	0.197116	5.8	17	272	3×0.45×0.30	1906	100%	NFP
2024	LTFP-1	CCT	GF- 80%	1.310647	5.8	17	272	3×0.45×0.30	12562	100%	NFP
2025	LTFP-1	CCT	GF- 80%	0.06125	6.5	15	240	3×0.45×0.30	529	100%	NFP

(4) Bandwan Beat (Bandwan-I range)

Drainage Line Treatment measures Open Map

4.1.1 Brushwood Check Dam Bandwan Beat (Bandwan-I range)

Open Design Detailed Excel File

Survey No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design Width (m)	Design Height (m)	Depth of driving Vertical Poles inside the earth(m)	Breath (m) Spacing between two rows	Estimated Cost (₹)
449	DL-1	4 H 3 A 8 r 4	1	22.81384	86.53949	2.0	0.5	0.3	0.50	1442.30
462	DL-14	2 A 2 B 1 n 3	1	22.84028	86.52556	2.0	0.5	0.3	0.50	1442.30
463	DL-15	4 H 3 A 8 r 3	1	22.83611	86.52556	2.0	0.5	0.3	0.50	1442.30
464	DL-16	2 A 2 B 1 n 6	1	22.84556	86.49917	2.5	0.5	0.3	0.50	1643.44
467	DL-19	4 H 3 A 8 r 3	1	22.83333	86.51278	2.0	0.5	0.3	0.50	1442.30
469	DL-21	2 A 2 B 1 f 5	1	22.83028	86.54083	2.5	0.5	0.3	0.50	1643.44
471	DL-23	2 A 2 B 1 h 4	1	22.80944	86.55917	4.0	0.5	0.3	0.75	2887.42

4.1.2 Loose Boulder Check Dam- Bandwan Beat (Bandwan-I range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
450	DL-2	4 H 3 A 8 r 4	1	22.8128	86.539344	3.0	1.50	0.6	2.90	0.50	36506.42
458	DL-10	2 A 2 B 1 h 4	1	22.80945	86.55887	5.0	0.50	0.4	1.20	0.20	9565.83
475	DL-27	4 H 3 A 8 s 2	1	22.80111	86.52806	5.0	0.50	0.4	1.20	0.20	9569.23
453	DL-5	4 H 3 A 8 r 4	1	22.82799	86.53666	6.0	0.50	0.4	1.20	0.20	11333.64
454	DL-6	4 H 3 A 8 r 4	1	22.82462	86.53817	5.0	0.50	0.4	1.20	0.20	9445.01
455	DL-7	4 H 3 A 8 r 4	1	22.82083	86.53979	5.0	0.50	0.4	1.20	0.20	9445.32
456	DL-8	4 H 3 A 8 r 4	1	22.82003	86.5402	6.0	0.50	0.4	1.20	0.20	11334.76
457	DL-9	2 A 2 B 1 h 4	1	22.81011	86.55734	5.0	0.50	0.4	1.20	0.20	9445.94
459	DL-11	2 A 2 B 1 h 4	1	22.8093	86.55866	4.0	0.50	0.4	1.20	0.20	7557.00
460	DL-12	4 H 3 A 8 r 4	1	22.83589	86.53333	4.0	0.50	0.4	1.20	0.20	7557.25
461	DL-13	4 H 3 A 8 r 4	1	22.83571	86.5332	4.0	0.50	0.4	1.20	0.20	7557.49
465	DL-17	2 A 2 B 1 n 5	1	22.84917	86.48917	4.0	0.50	0.4	1.20	0.20	7557.74
466	DL-18	4 H 3 A 8 r 3	1	22.83333	86.50639	3.5	0.50	0.4	1.20	0.20	6613.24
468	DL-20	2 A 2 B 1 f 5	1	22.8375	86.535	3.0	0.50	0.4	1.20	0.20	5668.68
470	DL-22	2 A 2 B 1 h 4	1	22.80694	86.55778	4.0	0.50	0.4	1.20	0.20	7558.48
472	DL24	4 H 3 A 8 r 4	1	22.82722	86.53306	5.5	0.50	0.4	1.20	0.20	10393.25
473	DL-25	4 H 3 A 8 r 4	1	22.82444	86.53028	4.5	0.50	0.4	1.20	0.20	8503.85
474	DL-26	4 H 3 A 8 s 2	1	22.80778	86.53194	5.0	0.50	0.4	1.20	0.20	9449.03

4.1.3 Gabion Check-Bandwan Beat (Bandwan-I range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design height (m)	FD (m)	Estimated Cost (₹)
451	DL-3	4 H 3 A 8 r 4	1	22.81123	86.54117	3	1.5	0.50	25178.19
452	DL-4	2 A 2 B 1 h 4	1	22.81079	86.54504	5	1.5	0.50	41963.66

Water Harvesting Structure measures Bandwan Beat (Bandwan-II range) Open Map

4.2.1 Dugout Pond- Bandwan Beat (Bandwan-I range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
113	WR-1	4 H 3 A 8 r 4	1	22.811381	86.539931	374437.75
114	WR-2	2 A 2 B 1 n 5	1	22.849167	86.489722	994812.35
115	WR-3	2 A 2 B 1 n 6	1	22.846111	86.498056	1424692.64
116	WR-4	2 A 2 B 1 n 3	1	22.846111	86.515	558791.98

4.2.2 Percolation Pond- Bandwan Beat (Bandwan-I range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
117	WR-5	2 A 2 B 1 n 6	1	23.1259	86.514	67958.19

4.3.1 Land Treatment and forest plantation measures- Bandwan Beat (Bandwan-I range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
65	LF-1	CPT & CST	GF- 80%	1.296529	5.8	17	272	3×0.45×0.30	12456	100%	NFP
66	LF-1	CPT & CST	GF- 80%	0.898472	5.8	17	272	3×0.45×0.30	8610	100%	NFP
67	LF-1	CPT & CST	GF- 80%	0.78058	5.5	18	288	3×0.45×0.30	7940	100%	NFP
68	LF-1	CPT & CST	GF- 80%	2.261466	5.8	17	272	3×0.45×0.30	21702	100%	NFP
237	LF-1	CPT & CST	GF- 80%	0.84206	5.5	18	288	3×0.45×0.30	8575	100%	NFP

238	LF-1	CPT & CST	GF- 80%	2.686773	5.8	17	272	3×0.45×0.30	25795	100%	NFP
405	LF-1	CPT & CST	GF- 80%	5.064082	6.5	15	240	3×0.45×0.30	42874	100%	NFP
406	LF-1	CPT & CST	GF- 80%	2.162767	5.5	18	288	3×0.45×0.30	21984	100%	NFP

(5) Pargora Beat (Bandwan-I range)

Drainage Line Treatment measures Open Map

5.1.1 Loose Boulder Check Dam- Pargora Beat (Bandwan-I range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
476	DL-1	4 H 3 A 8 r 5	1	22.83204	86.49158	9.0	1.00	0.5	2.00	0.30	49676.14
477	DL-2	4 H 3 A 8 r 5	1	22.83875	86.49436	4.5	0.75	0.4	1.50	0.20	13576.70
478	DL-3	2 A 2 B 1 n 5	1	22.85583	86.47664	4.0	0.75	0.4	1.50	0.20	12068.48
479	DL-4	2 A 2 B 1 n 5	1	22.85587	86.47664	8.0	1.00	0.5	2.00	0.30	44160.28
480	DL-5	4 H 3 A 8 q 5	1	22.82546	86.45009	8.0	1.20	0.6	2.40	0.40	65955.69

Water Harvesting Structure measures Kunchia Beat (Bandwan-II range) Open Map

5.2.1 Dugout Pond- Pargora Beat (Bandwan-I range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
118	WR-1	4 H 3 A 8 r 6	2	22.826747	86.478489	1771008.23
119	WR-2	2 A 2 B 1 n 5	1	22.856528	86.478772	244887.12
120	WR-3	4 H 3 A 8 q 5	1	22.828403	86.465286	642712.57

5.3.1 Land Treatment and forest plantation measures- Pargora Beat (Bandwan-I range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
21	LF-1	None	SGP	0.768841	5.5	18	288	3×0.45×0.30	7798	100%	NFP
206	LF-1	None	SGP	5.421894	6.5	15	240	3×0.45×0.45	68863	100%	NFP
207	LF-1	None	SGP	1.223656	6.5	15	240	3×0.45×0.30	10374	100%	NFP

(6) Kunchia Beat (Bandwan-II range)

Drainage Line Treatment measures

Open Map

6.1.1 Loose Boulder Check Dam- Kunchia Beat (Bandwan-II range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
9	DLT-1	4 H 3 A 8 n 4	2	22.79437	86.43526	4.0	0.60	0.4	1.30	0.20	9075.25
10	DLT-2	4 H 3 A 8 n 4	2	22.79433	86.43537	2.0	0.50	0.4	1.20	0.20	3772.69
13	DLT - 5	4 H 3 A 8 n 4	2	22.79433	86.4351	5.0	0.75	0.4	1.50	0.20	14913.72
14	DLT- 6	4 H 3 A 8 n 4	1	22.78846	86.43156	5.5	1.00	0.5	2.00	0.30	29982.05
15	DLT-7	4 H 3 A 8 n 4	1	22.78847	86.43134	7.5	0.75	0.4	1.50	0.20	22371.74
16	DLT - 8	4 H 3 A 8 n 4	1	22.78833	86.43193	7.0	0.75	0.4	1.50	0.20	20880.83
11	DLT -3	4 H 3 A 8 n 4	2	22.79439	86.43538	2.0	0.75	0.4	1.50	0.20	5965.95
12	DLT - 4	4 H 3 A 8 n 4	2	22.79438	86.43528	2.5	0.75	0.4	1.50	0.20	7457.63

Water Harvesting Structure measures Kunchia Beat (Bandwan-II range) Open Map

6.2.1 Embankment Pond- Kunchia Beat (Bandwan -II range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
3	WR - 3a	4 H 3 A 8 n 4	2	22.7941	86.4341	354922.20
4	WR- 3b	4 H 3 A 8 n 4	1	22.7927	86.4352	32449.41
5	WR-1	4 H 3 A 8 n 4	1	22.8015	86.4294	70136.29

6.3.1 Land Treatment and Forest Plantation measures- Kunchia Beat (Bandwan-II range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
12	LF -1	CPT & CST	GF 40%	1.598221	5.8	17	272	3×0.45×0.45	23025	100%	NFP
13	LF - 5	CPT & CST	NFP	0.918423	5.8	17	272	3×0.45×0.45	13233	50%	GF
14	LF-2	CST	GF 40%	1.572562	5.5	18	288	3×0.45×0.30	15985	100%	NFP
15	LF -2a	CST	NFP	1.111046	5.8	17	272	3×0.45×0.30	10657	50%	GF
16	LF -2a	CST	NFP	0.773815	6.5	15	240	3×0.45×0.30	6563	50%	GF

(7) Latapara Beat (Bandwan-II range)

Drainage Line Treatment measures Open Map

7.1.1 Brushwood Check Dam Latapara Beat (Bandwan-II range)

Open Design Detailed Excel File

Survey No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design Width (m)	Design Height (m)	Depth of driving Vertical Poles inside the earth(m)	Breath (m) Spacing between two rows	Estimated Cost (₹)
1	DLT-2A	4 H 3 A 8 r 5	1	22.82213	86.50308	1.0	0.5	0.3	0.50	1040.02
2	DLT-2a	4 H 3 A 8 r 5	1	22.82234	86.50308	1.0	0.5	0.3	0.50	1040.02

7.1.2 Loose Boulder Check Dam- Latapara Beat (Bandwan-II range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
3	DLT-2b	4 H 3 A 8 r 5	1	22.82241	86.50284	2.5	0.50	0.4	1.20	0.20	4719.26
6	DLT-4	4 H 3 A 8 r 3	1	22.82365	86.50691	6.0	1.00	0.5	2.00	0.30	32800.39
5	DLT-3a	4 H 3 A 8 r 5	1	22.82544	86.50487	5.0	0.90	0.5	1.90	0.30	24387.89

7.1.3 Gabion Check-Latapara Beat (Bandwan-II range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design height (m)	FD (m)	Estimated Cost (₹)
4	DLT-3	4 H 3 A 8 r 5	1	22.82539	86.50488	3	1	0.40	18379.03
7	DLT-3C	4 H 3 A 8 r 5	1	22.82421	86.50611	5	1	0.40	30631.72
8	DLT -3D	4 H 3 A 8 r 5	1	22.82427	86.50618	6	1.5	0.50	50356.39

Water Harvesting Structure Measures Latapara Beat (Bandwan-II range) Open Map

7.2.1 Embankment Pond- Latapara Beat (Bandwan -II range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
1	WR - 3	4 H 3 A 8 p 1	1	22.7668	86.4833	45011.50

7.2.2 Pond Renovation- Latapara Beat Bandwan-II range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
2	WR -M1	4 H 3 A 8 p 5	1	22.7256	86.5211	576093.17

7.3.1 Land Treatment and Forest Plantation measures- Latapara Beat (Bandwan-II range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
1	LF -2	CCT	NFP	1.059294	5.8	17	272	3×0.45×0.45	15244	100%	NFP
2	LF- 1	CST	NFP	1.245297	6.5	15	240	3×0.45×0.45	15826	100%	NFP
3	LF- 1	CST	NFP	0.63272	6.5	15	240	3×0.45×0.30	5364	100%	NFP
4	LF-R1	CCT	NFP	3.377887	5	20	320	3×0.45×0.30	38146	50%	GF
5	LF-R1	CCT	NFP	1.080981	5.8	17	272	3×0.45×0.30	10374	50%	GF
6	LF-R1	CCT	NFP	1.386862	5.2	19	304	3×0.45×0.30	14891	100%	NFP
7	LF-R1	CCT	NFP	0.328104	5	20	320	3×0.45×0.30	3705	100%	NFP

8	LF-R1	CCT	NFP	0.729011	5	20	320	3×0.45×0.30	8222	100%	NFP
9	LF-R1	CCT	NFP	0.652641	5.8	17	272	3×0.45×0.30	6281	100%	NFP
10	LF-R1	CCT	NFP	1.781557	5	20	320	3×0.45×0.30	20114	100%	NFP
11	LF-R1	CCT	NFP	1.040864	5.8	17	272	3×0.45×0.30	9986	100%	NFP
22	LF-M2	CCT	NFP	0.674168	5.2	19	304	3×0.45×0.30	7234	50%	GF
23	LF-M2	CCT	NFP	2.161229	5.2	19	304	3×0.45×0.30	23184	100%	NFP
24	LF-M2	CCT	NFP	1.739351	5	20	320	3×0.45×0.30	19655	50%	GF
25	LF-M2	CCT	NFP	0.734222	5.2	19	304	3×0.45×0.30	7869	50%	GF
26	LF-M2	CCT	NFP	0.734221	5	20	320	3×0.45×0.30	8293	50%	GF
27	LF-M2	CCT	NFP	0.995391	5	20	320	3×0.45×0.30	11257	50%	GF
28	LF-M2	CCT	NFP	2.789709	5.5	18	288	3×0.45×0.30	28336	50%	GF
29	LF-M2	CCT	NFP	0.990758	5	20	320	3×0.45×0.30	11186	100%	NFP
30	LF-M2	CCT	NFP	1.46569	5.2	19	304	3×0.45×0.30	15738	50%	GF
31	LF-M2	CCT	NFP	6.68973	5.5	18	288	3×0.45×0.30	67999	100%	NFP
194	LF -2	CCT	NFP	0.917961	5.5	18	288	3×0.45×0.45	13974	100%	NFP
195	LF -2	CCT	NFP	1.664002	5.5	18	288	3×0.45×0.30	16903	100%	NFP
196	LF- 1	CST	NFP	0.987973	5.8	17	272	3×0.45×0.45	14238	100%	NFP
197	LF-R1	CCT	NFP	1.785998	5	20	320	3×0.45×0.30	20184	50%	GF
198	LF-R1	CCT	NFP	2.085893	5	20	320	3×0.45×0.30	23537	50%	GF
199	LF-R1	CCT	NFP	1.009297	5.5	18	288	3×0.45×0.30	10269	50%	GF
200	LF-R1	CCT	NFP	2.397925	5.5	18	288	3×0.45×0.30	24383	50%	GF
201	LF-R1	CCT	NFP	3.927078	5.5	18	288	3×0.45×0.30	39910	100%	NFP
202	LF-R1	CCT	NFP	0.852171	5.5	18	288	3×0.45×0.30	8645	100%	NFP
208	LF-M2	CCT	NFP	2.151218	5	20	320	3×0.45×0.30	24278	50%	GF
209	LF-M2	CCT	NFP	4.207625	5.5	18	288	3×0.45×0.30	42768	50%	GF
210	LF-M2	CCT	NFP	3.558919	5.5	18	288	3×0.45×0.30	36169	100%	NFP
211	LF-M2	CCT	NFP	1.226652	5.5	18	288	3×0.45×0.30	12456	100%	NFP
212	LF-M2	CCT	NFP	2.164086	5.8	17	272	3×0.45×0.30	20784	100%	NFP
394	LF-R1	CCT	NFP	5.340877	5.8	17	272	3×0.45×0.30	51272	100%	NFP
395	LF-R1	CCT	NFP	11.34095	5.5	18	288	3×0.45×0.30	115248	50%	GF
396	LF-R1	CCT	NFP	6.764001	5.5	18	288	3×0.45×0.30	68740	100%	NFP
399	LF-M2	CCT	NFP	3.413795	5.2	19	304	3×0.45×0.30	36628	50%	GF

(8) Dhadka Beat (Jamuna range)

Drainage Line Treatment measures Open Map

8.1.1 Loose Boulder Check Dam- Dhadka Beat (Jamuna range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
375	DLT-2	4 H 3 A 8 s 2	1	22.79686	86.51465	3.0	0.75	0.4	1.50	0.20	9030.27
376	DLT-3	4 H 3 A 8 s 2	1	22.79717	86.5146	3.0	0.50	0.4	1.20	0.20	5725.41
377	DLT-4	4 H 3 A 8 s 2	1	22.79734	86.51448	4.5	1.00	0.5	2.00	0.30	24777.58
378	DLT-5	4 H 3 A 8 s 8	1	22.7622	86.54045	4.0	0.75	0.4	1.50	0.20	12041.29
379	DLT-6	4 H 3 A 8 s 8	1	22.76277	86.54056	4.0	0.75	0.4	1.50	0.20	12041.60
380	DLT-7	4 H 3 A 8 s 8	1	22.76166	86.54258	4.0	0.75	0.4	1.50	0.20	12041.91
381	DLT-8	4 H 3 A 8 s 8	1	22.76194	86.54259	4.5	0.75	0.4	1.50	0.20	13547.50
382	DLT-9	4 H 3 A 8 s 8	3	22.76159	86.5377	4.0	0.75	0.4	1.50	0.20	12042.53
383	DLT-10	4 H 3 A 8 s 8	1	22.76199	86.54385	4.0	0.75	0.4	1.50	0.20	12042.84
384	DLT-11	4 H 3 A 8 s 4	1	22.77749	86.52255	8.0	0.75	0.4	1.50	0.20	24086.29
385	DLT-12	4 H 3 A 8 s 5	1	22.77769	86.52594	4.0	0.60	0.4	1.30	0.20	9173.80
386	DLT-13	4 H 3 A 8 s 7	1	22.77106	86.5386	4.0	0.60	0.4	1.30	0.20	9174.07
387	DLT-14	4 H 3 A 8 s 7	1	22.77087	86.53919	6.0	0.50	0.4	1.20	0.20	11454.89
388	DLT-15	4 H 3 A 8 s 7	1	22.77085	86.53957	4.0	0.60	0.4	1.30	0.20	9174.60
389	DLT-16	4 H 3 A 8 s 8	1	22.76194	86.54247	7.0	0.75	0.4	1.50	0.20	21078.21
390	DLT-17	4 H 3 A 8 s 8	1	22.76216	86.54247	3.0	0.60	0.4	1.30	0.20	6881.35
391	DLT-18	4 H 3 A 8 s 6	1	22.74503	86.52734	4.5	0.75	0.4	1.50	0.20	13550.97
392	DLT-19	4 H 3 A 8 s 6	1	22.74508	86.52709	4.0	0.75	0.4	1.50	0.20	12045.62
393	DLT-20	4 H 3 A 8 s 6	1	22.74546	86.53049	4.0	0.75	0.4	1.50	0.20	12045.93
394	DLT-21	4 H 3 A 8 s 6	1	22.74972	86.52823	5.0	0.75	0.4	1.50	0.20	15057.79
395	DLT-22	4 H 3 A 8 s 3	1	22.7905	86.52527	5.0	0.75	0.4	1.50	0.20	15058.18
396	DLT-23	4 H 3 A 8 s 2	1	22.7914	86.51244	6.0	0.75	0.4	1.50	0.20	18070.28
397	DLT-24	4 H 3 A 8 s 3	1	22.78976	86.52575	4.0	0.75	0.4	1.50	0.20	12047.16

398	DLT-25	4 H 3 A 8 s 3	1	22.78888	86.52615	5.0	1.00	0.5	2.00	0.30	27546.87
399	DLT-26	4 H 3 A 8 s 2	1	22.79773	86.52701	4.0	0.75	0.4	1.50	0.20	12047.78
400	DLT-27	4 H 3 A 8 s 2	1	22.79772	86.52711	3.0	0.60	0.4	1.30	0.20	6883.36
401	DLT-28	4 H 3 A 8 s 2	1	22.79793	86.52673	4.0	0.75	0.4	1.50	0.20	12048.40

8.1.2 Random Rubble Masonry Check Dam-Dhadka Beat (Jamuna range)

Open Design Detailed Excel File

Catchment ID	Survey Sr_No	Beat	Map Id	Watershed Code	Gully Order	Latitude	Longitude	Catchment Area (ha)	Length of weir, L (m)	Height of dam, F	Depth of flow (including freeboard), h	Total Estimated Cost (in lakh ₹)
1	374	Dhadka	DLT-1	4 H 3 A 8 s 2	3	22.792648	86.511455	344	16.0	1.5	1.10	6.30

Water Harvesting Structure measures Dhadka Beat (Jamuna range)

Open Map

8.2.1 Embankment Pond- Dhadka Beat (Jamuna range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
72	WHS- 1	4 H 3 A 8 s 2	3	22.792658	86.51143	4389912.83
73	WHS-2	4 H 3 A 8 s 2	1	22.795938	86.514847	4389912.83

8.2.2 Pond Renovation- Dhadka Beat (Jamuna range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
74	WHS-3	4 H 3 A 8 p 5	1	22.72809	86.54181	914460.77
75	WHS-4	4 H 3 A 8 s 5	1	22.78312	86.52194	995214.83

76	WHS-5	4 H 3 A 8 s 5	1	22.77699	86.52625	2327943.37

8.3.1 Land Treatment and Forest Plantation measures- Dhadka Beat (Jamuna range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
17	L-1	CCT	NFP	1.605078	5.8	17	272	3×0.45×0.45	23131	50%	GF
18	L-1	CCT	NFP	3.492216	5.5	18	288	3×0.45×0.30	35499	50%	GF
19	L-1	CCT	NFP	0.734222	5.5	18	288	3×0.45×0.30	7446	50%	GF
20	L-1	CCT	NFP	1.378874	5.5	18	288	3×0.45×0.30	14009	100%	NFP
203	L-1	CCT	NFP	1.374691	5.5	18	288	3×0.45×0.30	13974	100%	NFP
204	L-1	CCT	NFP	1.883061	5.8	17	272	3×0.45×0.30	18067	50%	GF
205	L-1	CCT	NFP	0.700038	5.8	17	272	3×0.45×0.30	6705	100%	NFP
397	L-1	CCT	NFP	1.631605	6.5	15	240	3×0.45×0.30	13833	50%	GF
398	L-1	CCT	NFP	8.245921	5.8	17	272	3×0.45×0.30	79149	50%	GF

(9) Kuilapal Beat (Jamuna range)

Drainage Line Treatment measures

Open Map

9.1.1 Brushwood Check Dam Kuilapal Beat (Jamuna range)

Open Design Detailed Excel File

Survey No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design Width (m)	Design Height (m)	Depth of driving Vertical Poles inside the earth(m)	Breath (m) Spacing between two rows	Estimated Cost (₹)
406	DLT-9	2 A 2 B 1 f 3	1	22.84227	86.60853	1.5	0.5	0.3	0.50	1241.16

9.1.2 Loose Boulder Check Dam- Kuilapal Beat (Jamuna range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
402	DLT -1	2 A 2 B 1 f 7	1	22.84308	86.61433	3.0	0.50	0.4	1.20	0.20	5730.23
403	DLT-5	2 A 2 B 1 f 3	1	22.84632	86.61341	6.0	0.60	0.4	1.30	0.20	13767.93
404	DLT-6	2 A 2 B 1 f 7	1	22.84327	86.61257	3.0	0.50	0.4	1.20	0.20	5730.60
405	DLT-8	2 A 2 B 1 f 7	1	22.84327	86.61257	3.0	0.50	0.4	1.20	0.20	5730.78
407	DLT-13	2 A 2 B 1 f 3	1	22.84835	86.61311	3.5	0.50	0.4	1.20	0.20	6686.13
408	DLT-14	2 A 2 B 1 f 3	1	22.84826	86.61278	3.5	0.50	0.4	1.20	0.20	6686.35
409	DLT-21	2 A 2 B 1 d 8	1	22.83924	86.63177	7.0	0.50	0.4	1.20	0.20	13373.13
410	DLT-22	2 A 2 B 1 d 8	1	22.84007	86.63097	6.0	0.60	0.4	1.30	0.20	13770.34
411	DLT-23	2 A 2 B 1 d 8	2	22.84045	86.62981	7.0	0.60	0.4	1.30	0.20	16065.87
412	DLT-24	2 A 2 B 1 d 8	1	22.84129	86.62802	6.0	0.60	0.4	1.30	0.20	13771.15
413	DLT-25	2 A 2 B 1 f 7	1	22.84185	86.61135	6.0	1.00	0.5	2.00	0.30	33069.22
415	DLT-15	2 A 2 B 1 f 3	1	22.84802	86.61234	5.0	0.50	0.4	1.20	0.20	9553.78
416	DLT-15	2 A 2 B 1 f 3	1	22.84782	86.61206	3.5	0.50	0.4	1.20	0.20	6687.86
419	DLT-18	2 A 2 B 1 f 3	1	22.84766	86.61131	3.0	0.60	0.4	1.30	0.20	6886.58
420	DLT-19	2 A 2 B 1 f 3	1	22.84756	86.61142	3.0	0.50	0.4	1.20	0.20	5733.01
421	DLT-20	2 A 2 B 1 f 3	1	22.84762	86.61154	2.5	0.50	0.4	1.20	0.20	4777.66
417	DLT-16	2 A 2 B 1 f 3	1	22.84782	86.61206	3.5	0.50	0.4	1.20	0.20	6606.75

9.1.3 Gabion Check Dam-Kuilapal Beat (Jamuna range)

Open Design Detailed Excel File

Sr. No.	Map ID	Watershed	Order of Gully	Latitude	Longitude	Head wall Design width (m)	Head wall Design Height (m)	Head wall Design breath (m)	Head wall FD(m)	Side wall Design Length (m)	Side wall Height (m)	Side wall Design breath (m)	Side wall FD(m)	Estimated Cost (₹)
414	DLT-26	2 A 2 B 1 h 6	1	22.80159	86.59063	12.5	2.1	1.0	0.70	6	3.10	1.0	0.70	417969.33

418	DLT-17	2 A 2 B 1 f 3	2	22.84805	86.61182	8.5	1.0	1.0	0.40	4	2.00	1.0	0.40	311959.38

Water Harvesting Structure measures Kuilapal Beat (Jamuna range) Open Map

9.2.1 Embankment Pond- Kuilapal Beat (Jamuna range)

Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
77	WHS 1	2 A 2 B 1 f 3	1	22.84052	86.60311	425211.47
93	WHS-16	2 A 2 B 1 h 1	1	22.810946	86.591594	407860.91

9.3.1 Land Treatment and forest plantation measures- Kuilapal Beat (Jamuna range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
62	L-5	None	GF 40%	1.382474	5.8	17	272	3×0.45×0.30	13268	50%	GF
63	L-5	None	GF 40%	3.452341	6.5	15	240	3×0.45×0.30	29253	50%	GF
64	L-1	None	NFP	2.133572	6.5	15	240	3×0.45×0.30	18067	100%	NFP
235	L-3	None	Existed Plantation Thinning	3.055432	5.8	17	272	3×0.45×0.45	43986	100%	NFP
236	L-3	None	Existed Plantation Thinning	1.652615	6.5	15	240	3×0.45×0.45	21014	100%	NFP

(10) Nanna Beat (Jamuna range)

Drainage Line Treatment measures Open Map

10.1.1 Loose Boulder Check Dam- Nanna Beat (Jamuna range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Cost (₹)
422	L-DLT-1	4 H 3 A 8 s 6	1	22.73672	86.54824	4.0	0.75	0.4	1.50	0.20	12053.96
423	L-DLT-2	4 H 3 A 8 s 6	1	22.73651	86.55127	3.0	0.60	0.4	1.30	0.20	6887.38
424	L-DLT-3	2 A 2 B 1 j 4	1	22.73162	86.55127	3.0	0.75	0.4	1.50	0.20	9040.93
425	G-DLT-4	2 A 2 B 1 j 5	1	22.72058	86.55534	6.0	0.60	0.4	1.30	0.20	13775.56
426	G-DLT-5	2 A 2 B 1 j 4	1	22.72937	86.55064	7.0	0.60	0.4	1.30	0.20	16071.96
427	G-DLT-6	2 A 2 B 1 j 5	1	22.72687	86.55577	6.0	0.60	0.4	1.30	0.20	13776.37
429	D-DLT-8	4 H 3 A 8 s 8	1	22.74133	86.55463	2.5	0.75	0.4	1.50	0.20	7535.08
430	D-DLT-9	4 H 3 A 8 s 8	1	22.7405	86.55477	4.0	0.60	0.4	1.30	0.20	9185.05
431	D-DLT-10	4 H 3 A 8 s 8	1	22.74042	86.56486	3.5	0.75	0.4	1.50	0.20	10549.65
432	R-DLT-11	2 A 2 B 1 h 8	1	22.77362	86.58905	5.0	0.75	0.4	1.50	0.20	15071.31
433	K-DLT-12	4 H 3 A 8 s 7	1	22.76453	86.55445	8.0	0.60	0.4	1.30	0.20	18371.70
434	K-DLT-13	4 H 3 A 8 s 7	1	22.76408	86.55429	6.0	0.75	0.4	1.50	0.20	18086.50
436	N-DLT-15	2 A 2 B 1 h 8	1	22.78885	86.59959	6.0	0.75	0.4	1.50	0.20	18087.43
437	N-DLT-16	2 A 2 B 1 h 8	1	22.78945	86.59937	7.0	0.75	0.4	1.50	0.20	21102.54
438	N-DLT-17	2 A 2 B 1 h 8	1	22.78975	86.59954	9.0	0.75	0.4	1.50	0.20	27132.53
439	P-DLT-18	4 H 3 A 8 s 8	1	22.74841	86.56412	9.0	0.60	0.4	1.30	0.20	20671.78
440	K-DLT-19	4 H 3 A 8 s 2	1	22.79811	86.54508	5.0	0.75	0.4	1.50	0.20	15074.40
441	K-DLT-20	4 H 3 A 8 s 2	1	22.79862	86.54466	7.0	1.00	0.5	2.00	0.30	38608.88
442	K-DLT-21	2 A 2 B 1 h 4	1	22.80573	86.54781	6.0	0.75	0.4	1.50	0.20	18090.21
443	K-DLT-22	2 A 2 B 1 h 4	1	22.80613	86.5481	8.0	1.00	0.5	2.00	0.30	44126.91
444	K-DLT-23	2 A 2 B 1 h 4	1	22.80587	86.54802	6.0	0.75	0.4	1.50	0.20	18091.14
445	K-DLT-24	2 A 2 B 1 h 4	1	22.80631	86.54732	6.0	0.75	0.4	1.50	0.20	18091.60

446	K-DLT-25	2 A 2 B 1 h 4	1	22.8064	86.54703	7.0	0.75	0.4	1.50	0.20	21107.41
447	H-DLT-26	2 A 2 B 1 h 6	1	22.78833	86.58454	7.0	0.60	0.4	1.30	0.20	16081.80
448	H-DLT-27	2 A 2 B 1 h 6	1	22.78818	86.58458	5.0	0.75	0.4	1.50	0.20	15077.49
428	D-DLT-7	4 H 3 A 8 s 8	1	22.7413	86.55454	3.0	0.50	0.4	1.20	0.20	5666.64
435	N-DLT-14	2 A 2 B 1 h 8	1	22.78902	86.59939	9.0	0.75	0.4	1.50	0.20	26914.23

Water Harvesting Structure measures Nanna Beat (Jamuna range) Open Map

10.2.1 Embankment Pond- Nanna Beat (Jamuna range) Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
108	K-WHS-15	4 H 3 A 8 s 5	1	22.774887	86.54776	57527.55
110	D-WHS-17	4 H 3 A 8 s 8	1	22.743672	86.56603	70043.59

10.2.2 Pond Renovation- Nanna Beat (Jamuna range) Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
94	L-WHS 1	2 A 2 B 1 j 4	1	22.72808	86.54833	272442.49
95	L-WHS2	4 H 3 A 8 s 6	1	22.73573	86.54912	145591.21
96	L-WHS-3	4 H 3 A 8 s 8	1	22.74075	86.55478	714057.14
97	D-WHS-4	4 H 3 A 8 s 8	1	22.76302	86.54454	145591.21
98	B-WHS-5	2 A 2 B 1 j 4	1	22.74765	86.57212	225020.26
99	L-WHS-6	2 A 2 B 1 h 8	1	22.77344	86.57735	272442.49
100	R-WHS-7	2 A 2 B 1 h 8	1	22.77377	86.58723	589403.45
101	R-WHS-8	2 A 2 B 1 j 2	3	22.76307	86.58926	145591.21
102	R-WHS-9	2 A 2 B 1 h 6	1	22.78872	86.58286	319864.72
103	N-WHS-10	2 A 2 B 1 h 8	1	22.7985	86.6008	296153.60

104	P-WHS-11	2 A 2 B 1 h 3	1	22.80722	86.5644	201309.14
105	P-WHS-12	2 A 2 B 1 h 6	1	22.78868	86.5648	201309.14
106	H-WHS-13	2 A 2 B 1 j 3	1	22.75123	86.58449	225020.26
107	K-WHS-14	2 A 2 B 1 j 3	1	22.76291	86.57023	165523.21
109	K-WHS-16	4 H 3 A 8 s 8	1	22.74237	86.56256	501604.19
111	D-WHS-18	2 A 2 B 1 j 4	1	22.72922	86.55535	272442.49
112	G-WHS-19	2 A 2 B 1 j 5	1	22.72922	86.56603	145591.21

(11) Kenda Beat (Manbazar-I range)

Drainage Line Treatment measures Open Map

11.1.1 Loose Boulder Check Dam- Kenda Beat (Manbazar-I range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
97	L4	2 A 2 B 2 d 6	1	23.1641	86.45325	8.5	0.50	0.4	1.20	0.20	16078.58
98	L4	2 A 2 B 2 d 6	1	23.16404	86.45341	5.5	1.00	0.5	2.00	0.30	30051.73
99	L4	2 A 2 B 2 d 6	1	23.16392	86.45355	6.5	0.75	0.4	1.50	0.20	19430.02
101	L4	2 A 2 B 2 d 6	2	23.16508	86.45207	9.0	0.75	0.4	1.50	0.20	26904.49
102	L4	2 A 2 B 2 d 6	1	23.1657	86.45249	8.0	0.75	0.4	1.50	0.20	23915.72
104	L4	2 A 2 B 2 d 6	1	23.1658	86.45307	6.0	0.75	0.4	1.50	0.20	17937.72
105	L4	2 A 2 B 2 d 6	1	23.16559	86.45298	7.0	1.00	0.5	2.00	0.30	38255.23
107	L6	2 A 2 B 2 d 5	1	23.1429	86.46683	6.0	1.00	0.5	2.00	0.30	32792.05
108	L6	2 A 2 B 2 d 5	1	23.1427	86.46638	7.0	0.75	0.4	1.50	0.20	20929.50
109	L39	2 A 2 B 2 d 4	1	23.1468	86.49487	8.0	1.20	0.6	2.40	0.40	65257.60
110	L39	2 A 2 B 2 d 4	1	23.14664	86.4947	7.0	0.75	0.4	1.50	0.20	20930.58
112	L39	2 A 2 B 2 g 4	2	23.14743	86.49466	9.0	1.00	0.5	2.00	0.30	49195.03
119	L39	2 A 2 B 2 d 4	2	23.14655	86.49419	9.0	1.20	0.6	2.40	0.40	73432.59

120	L39	2 A 2 B 2 d 4	2	23.14636	86.49418	9.0	1.00	0.5	2.00	0.30	49203.37
121	L39	2 A 2 B 2 d 4	1	23.14641	86.49401	7.0	0.75	0.4	1.50	0.20	20935.45
130	L39	2 A 2 B 2 g 4	2	23.14797	86.49632	6.0	1.00	0.5	2.00	0.30	32811.52
131	L39	2 A 2 B 2 g 4	4	23.14817	86.49654	9.0	1.00	0.5	2.00	0.30	49218.67
133	L39	2 A 2 B 2 g 4	2	23.14722	86.49639	7.0	0.75	0.4	1.50	0.20	20941.94
134	L39	2 A 2 B 2 g 4	2	23.14702	86.49635	7.0	0.75	0.4	1.50	0.20	20942.48
135	L39	2 A 2 B 2 d 4	1	23.14627	86.49622	9.0	0.75	0.4	1.50	0.20	26926.74
136	L39	2 A 2 B 2 d 4	1	23.14624	86.49609	7.0	0.75	0.4	1.50	0.20	20943.56
138	L39	2 A 2 B 2 d 4	1	23.14561	86.49612	9.0	0.75	0.4	1.50	0.20	26928.83
139	L39	2 A 2 B 2 d 4	1	23.1455	86.49607	7.0	1.00	0.5	2.00	0.30	38289.84
152	L41	2 A 2 B 2 d 4	1	23.13414	86.51183	9.0	0.75	0.4	1.50	0.20	26938.56
154	L41	2 A 2 B 2 d 4	1	23.13539	86.51069	7.0	0.75	0.4	1.50	0.20	20953.29
155	L41	2 A 2 B 2 d 4	1	23.13647	86.5103	6.0	0.75	0.4	1.50	0.20	17960.43
95	L4	2 A 2 B 2 d 6	2	23.16417	86.45278	9.0	0.75	0.4	1.50	0.20	26901.02
96	L4	2 A 2 B 2 d 6	1	23.164	86.45308	9.0	0.75	0.4	1.50	0.20	26901.71
132	L39	2 A 2 B 2 g 4	4	23.14805	86.49682	9.0	1.00	0.5	2.00	0.30	49175.56
137	L39	2 A 2 B 2 d 4	1	23.14584	86.49621	9.0	1.00	0.5	2.00	0.30	49176.95
149	L41	2 A 2 B 2 d 4	1	23.13303	86.5118	9.0	0.75	0.4	1.50	0.20	26903.80

11.1.2 Gabion Check Dam-Kenda Beat (Manbazar-I range)

Open Design Detailed Excel File

Sr. No.	Map ID	Watershed	Order of Gully	Latitude	Longitude	Head wall Design width (m)	Head wall Design Height (m)	Head wall Design breath (m)	Head wall FD(m)	Side wall Design Length (m)	Side wall Height (m)	Side wall Design breath (m)	Side wall FD(m)	Estimated Cost (₹)
117	L39	2 A 2 B 2 d 4	2	23.14712	86.49415	12.5	1.0	1.0	0.40	6	2.00	1.0	0.40	399991.54
113	L39	2 A 2 B 2 g 4	2	23.14798	86.49477	6.5	1.5	1.0	0.50	3	2.50	1.0	0.50	276942.22

Water Harvesting Structure measures Kenda Beat (Manbazar -II range) Open Map

11.2.1 Percolation Pond- Kenda Beat (Manbazar-I range) Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
30	L23	2 A 2 B 2 k 4	1	23.1003	86.4872	165182.73
31	L39	2 A 2 B 2 g 4	1	23.1475	86.4944	191548.04
32	L40	2 A 2 B 2 d 4	1	23.1367	86.5042	51043.04

11.3.1 Land Treatment and forest plantation measures- Kenda Beat (Manbazar-I range)

Open Map Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
72	LDU	CST	None	2.864438	6.5	15	240	3×0.45×0.30	24242	100%	NFP
73	L1	CPT & CST	NFP	1.577494	5.8	17	272	3×0.45×0.45	22707	100%	NFP
74	L1	CPT & CST	NFP	2.071196	5.8	17	272	3×0.45×0.45	29800	100%	NFP
75	L1	CPT & CST	NFP	0.705251	6.5	15	240	3×0.45×0.45	8945	50%	GF
76	L2	CPT & CST	GF 40%	0.433408	6.5	15	240	3×0.45×0.45	5505	100%	NFP
77	L5	CPT & CST	NFP	1.284903	5.8	17	272	3×0.45×0.45	18473	100%	NFP
78	L6	CST	GF 30%	3.148676	6.5	15	240	3×0.45×0.45	40016	100%	NFP
79	L8	CPT & CST	None	0.823837	5.8	17	272	3×0.45×0.30	7904	100%	NFP
80	L8	CPT & CST	None	2.824915	6.5	15	240	3×0.45×0.30	23925	100%	NFP
81	L9	CPT & CST	None	1.242526	5.8	17	272	3×0.45×0.30	11927	50%	GF
82	L10	CCT	None	0.915785	5.8	17	272	3×0.45×0.30	8787	100%	NFP

83	L14	CPT & CST	None	4.986846	6.5	15	240	3×0.45×0.45	63358	100%	NFP
84	L15	CPT & CST	None	3.410428	6.5	15	240	3×0.45×0.45	43350	100%	NFP
85	L15	CPT & CST	None	1.431618	6.5	15	240	3×0.45×0.30	12139	100%	NFP
86	L17	CPT & CST	None	0.705013	5.8	17	272	3×0.45×0.45	10163	100%	NFP
87	L18	CPT & CST	GF 10%	2.198252	6.5	15	240	3×0.45×0.30	18632	50%	GF
88	L18	CPT & CST	GF 10%	0.903047	6.5	15	240	3×0.45×0.30	7657	50%	GF
89	L19	CPT & CST	NFP	3.507596	6.5	15	240	3×0.45×0.30	29712	100%	NFP
90	L20	CPT & CST	NFP	1.163683	6.5	15	240	3×0.45×0.30	9845	100%	NFP
91	L20	CPT & CST	NFP	2.239887	5.8	17	272	3×0.45×0.30	21490	100%	NFP
92	L21	CPT & CST	NFP	0.755658	5.8	17	272	3×0.45×0.30	7269	100%	NFP
93	L21	CPT & CST	NFP	1.122585	5.8	17	272	3×0.45×0.30	10763	100%	NFP
94	L21	CPT & CST	NFP	2.992612	5.8	17	272	3×0.45×0.30	28724	100%	NFP
95	L22	CPT & CST	NFP	0.769223	5.8	17	272	3×0.45×0.45	11063	100%	NFP
96	L23	CPT & CST	NFP	2.370457	6.5	15	240	3×0.45×0.45	30118	100%	NFP
97	L25	CPT & CST	None	1.686265	5.8	17	272	3×0.45×0.45	24295	100%	NFP
98	L26	CPT & CST	None	1.810692	6.5	15	240	3×0.45×0.45	23025	100%	NFP
99	L27	CPT & CST	None	1.338744	5.5	18	288	3×0.45×0.45	20431	100%	NFP
100	L28	CPT & CST	None	9.401103	6.5	15	240	3×0.45×0.45	119412	100%	NFP
101	L29	CST	GF 30%	3.586366	6.5	15	240	3×0.45×0.45	45573	100%	NFP
102	L30	CST	NFP	1.814483	6.5	15	240	3×0.45×0.45	23025	100%	NFP
103	L30	CST	NFP	1.370434	5.8	17	272	3×0.45×0.30	13162	100%	NFP
104	L31	CST	GF 20%	1.868993	6.5	15	240	3×0.45×0.45	23766	100%	NFP
105	L31	CST	GF 20%	2.108687	5.8	17	272	3×0.45×0.30	20255	100%	NFP
106	L32	CST	NFP	0.576135	5.8	17	272	3×0.45×0.45	8310	100%	NFP
107	L32	CST	NFP	0.813183	5.8	17	272	3×0.45×0.30	7798	100%	NFP
108	L32	CST	NFP	5.683602	6.5	15	240	3×0.45×0.30	48132	100%	NFP
109	L33	CST	NFP	3.834788	6.5	15	240	3×0.45×0.45	48696	100%	NFP
110	L34	CPT & CST	NFP	0.86805	5.8	17	272	3×0.45×0.45	12492	100%	NFP
111	L34	CPT & CST	NFP	8.50778	6.5	15	240	3×0.45×0.45	108085	100%	NFP
112	L35	CPT & CST	NFP	1.166468	5.8	17	272	3×0.45×0.45	16779	100%	NFP
113	L36	CPT & CST	NFP	1.905202	5.8	17	272	3×0.45×0.45	27418	50%	GF
114	L38	CPT & CST	NFP	1.85877	5.8	17	272	3×0.45×0.30	17855	100%	NFP

115	L39	CPT & CST	NFP	0.905887	5.8	17	272	3×0.45×0.45	13021	100%	NFP
239	L1	CPT & CST	NFP	1.31695	6.5	15	240	3×0.45×0.45	16726	100%	NFP
240	L1	CPT & CST	NFP	0.666431	6.5	15	240	3×0.45×0.45	8469	100%	NFP
241	L1	CPT & CST	NFP	0.606839	6.5	15	240	3×0.45×0.30	5152	100%	NFP
242	L4	CPT & CST	NFP	1.129259	5.8	17	272	3×0.45×0.45	16250	100%	NFP
243	L4	CPT & CST	NFP	0.929011	6.5	15	240	3×0.45×0.45	11804	100%	NFP
244	L5	CPT & CST	NFP	1.443462	6.5	15	240	3×0.45×0.45	18314	100%	NFP
245	L9	CPT & CST	None	0.633838	5.8	17	272	3×0.45×0.30	6069	100%	NFP
246	L9	CPT & CST	None	8.047209	6.5	15	240	3×0.45×0.30	68140	50%	GF
247	L9	CPT & CST	None	1.446297	6.5	15	240	3×0.45×0.30	12245	100%	NFP
248	L9	CPT & CST	None	2.64333	6.5	15	240	3×0.45×0.30	22372	100%	NFP
249	L14	CPT & CST	None	0.651239	6.5	15	240	3×0.45×0.30	5505	100%	NFP
250	L16	CPT & CST	None	7.156925	6.5	15	240	3×0.45×0.30	60623	100%	NFP
251	L17	CPT & CST	None	1.530577	6.5	15	240	3×0.45×0.45	19426	100%	NFP
252	L17	CPT & CST	None	2.425754	6.5	15	240	3×0.45×0.45	30806	100%	NFP
253	L18	CPT & CST	GF 10%	1.597686	5.8	17	272	3×0.45×0.30	15350	100%	NFP
254	L18	CPT & CST	GF 10%	4.362441	5.8	17	272	3×0.45×0.30	41886	100%	NFP
255	L18	CPT & CST	GF 10%	0.897529	6.5	15	240	3×0.45×0.30	7587	100%	NFP
256	L19	CPT & CST	NFP	1.310931	5.8	17	272	3×0.45×0.30	12598	100%	NFP
257	L20	CPT & CST	NFP	0.920312	6.5	15	240	3×0.45×0.30	7798	100%	NFP
258	L21	CPT & CST	NFP	7.940025	6.5	15	240	3×0.45×0.30	67257	100%	NFP
259	L22	CPT & CST	NFP	2.066821	6.5	15	240	3×0.45×0.45	26254	100%	NFP
260	L22	CPT & CST	NFP	5.429596	6.5	15	240	3×0.45×0.30	45979	100%	NFP
261	L24	CPT & CST	None	4.39033	6.5	15	240	3×0.45×0.45	55789	100%	NFP
262	L25	CPT & CST	None	2.797839	6.5	15	240	3×0.45×0.45	35517	100%	NFP
263	L29	CST	GF 30%	2.508124	6.5	15	240	3×0.45×0.30	21243	100%	NFP
264	L31	CST	GF 20%	0.995479	6.5	15	240	3×0.45×0.30	8434	100%	NFP
265	L31	CST	GF 20%	4.452174	6.5	15	240	3×0.45×0.30	37722	100%	NFP
266	L38	CPT & CST	NFP	1.913353	5.8	17	272	3×0.45×0.45	27524	100%	NFP
267	L38	CPT & CST	NFP	1.845563	6.5	15	240	3×0.45×0.45	23448	100%	NFP
268	L38	CPT & CST	NFP	1.499767	6.5	15	240	3×0.45×0.30	12703	100%	NFP
269	L39	CPT & CST	NFP	0.644801	5.8	17	272	3×0.45×0.45	9263	100%	NFP

270	L39	CPT & CST	NFP	4.283841	6.5	15	240	3×0.45×0.45	54413	50%	GF
271	L39	CPT & CST	NFP	1.85692	6.5	15	240	3×0.45×0.45	23607	100%	NFP
272	L39	CPT & CST	NFP	1.378177	6.5	15	240	3×0.45×0.30	11680	50%	GF
273	L39	CPT & CST	NFP	0.405198	6.5	15	240	3×0.45×0.30	3423	100%	NFP
408	L4	CPT & CST	NFP	4.696388	6.5	15	240	3×0.45×0.45	59653	100%	NFP
409	L7	CPT & CST	None	6.879942	6.5	15	240	3×0.45×0.30	58259	100%	NFP
410	L18	CPT & CST	GF 10%	1.895908	5.8	17	272	3×0.45×0.30	18208	50%	GF
411	L23	CPT & CST	NFP	6.357917	6.5	15	240	3×0.45×0.30	53848	100%	NFP
412	L24	CPT & CST	None	4.357167	5.8	17	272	3×0.45×0.45	62723	100%	NFP
413	L30	CST	NFP	13.072689	6.5	15	240	3×0.45×0.30	110696	100%	NFP
414	L32	CST	NFP	13.596306	6.5	15	240	3×0.45×0.45	172713	100%	NFP
415	L35	CPT & CST	NFP	9.362535	6.5	15	240	3×0.45×0.45	118936	100%	NFP
416	L36	CPT & CST	NFP	7.10263	6.5	15	240	3×0.45×0.45	90247	100%	NFP
417	L37	CPT & CST	NFP	7.039824	6.5	15	240	3×0.45×0.30	59635	100%	NFP
418	L39	CPT & CST	NFP	2.093503	5.8	17	272	3×0.45×0.45	30118	50%	GF

(12) Manbazar Beat (Manbazar-I range)

Drainage Line Treatment measures Open Map

12.1.1 Loose Boulder Check Dam- Manbazar Beat (Manbazar-I range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
21	DLT2	2 A 2 B 4 c 7	1	23.12254	86.64977	9.0	1.20	0.6	2.40	0.40	73223.46
22	DLT 2	2 A 2 B 4 c 5	1	23.12254	86.65731	9.0	1.20	0.6	2.40	0.40	73225.69
23	DLT 2	2 A 2 B 4 c 7	1	23.12269	86.65354	7.0	1.20	0.6	2.40	0.40	56955.04
24	DLT 2	2 A 2 B 4 c 7	1	23.12865	86.65354	5.0	1.20	0.6	2.40	0.40	40683.41

27	DLT 2	2 A 2 B 4 c 7	1	23.12882	86.65371	5.0	1.20	0.6	2.40	0.40	40685.88
29	DLT 2	2 A 2 B 4 c 7*	1	23.12871	86.65371	9.0	1.20	0.6	2.40	0.40	73239.04
34	DLT 3	2 A 2 B 2 a 2	2	22.97282	86.71185	9.0	1.20	0.6	2.40	0.40	73250.16
35	DLT 3	2 A 2 B 2 a 1	1	22.9675	86.7117	9.0	1.20	0.6	2.40	0.40	73252.39
48	DLT 3	2 A 2 B 2 a 2	1	22.97368	86.71161	9.0	1.20	0.6	2.40	0.40	73281.31
49	DLT 3	2 A 2 B 2 a 2	1	22.97363	86.71166	9.0	1.20	0.6	2.40	0.40	73283.53
52	DLT 4	2 A 2 B 4 d 5	1	23.12645	86.63916	9.0	1.20	0.6	2.40	0.40	73290.21
55	DLT 4	2 A 2 B 4 d 5	1	23.12467	86.64728	9.0	1.20	0.6	2.40	0.40	73296.88
56	DLT 4	2 A 2 B 4 d 5	4	23.12502	86.64681	6.0	1.20	0.6	2.40	0.40	48866.07
57	DLT 4	2 A 2 B 4 d 5	4	23.12771	86.64663	9.0	1.20	0.6	2.40	0.40	73301.33
60	DLT 4	2 A 2 B 4 c 7	1	23.12754	86.64761	9.0	1.20	0.6	2.40	0.40	73308.01
61	DLT 4	2 A 2 B 4 c 7	1	23.12745	86.64906	7.0	1.20	0.6	2.40	0.40	57019.07
62	DLT 4	2 A 2 B 4 c 7	1	23.12969	86.64721	7.0	1.20	0.6	2.40	0.40	57020.80
63	DLT 5	2 A 2 B 4 c 8	1	23.1319	86.6435	6.0	1.20	0.6	2.40	0.40	48876.45
64	DLT 5	2 A 2 B 4 c 8	1	23.13191	86.64335	9.0	1.20	0.6	2.40	0.40	73316.90
65	DLT5	2 A 2 B 4 c 7	4	23.13075	86.64273	6.0	1.20	0.6	2.40	0.40	48879.42
66	DLT 5	2 A 2 B 4 c 8	4	23.13229	86.64106	9.0	1.20	0.6	2.40	0.40	73321.35
67	DLT 5	2 A 2 B 4 c 8	1	23.13257	86.64098	9.0	1.20	0.6	2.40	0.40	73323.58
68	DLT 5	2 A 2 B 4 c 8	1	23.13261	86.64066	7.0	1.20	0.6	2.40	0.40	57031.18
69	DLT 5	2 A 2 B 4 c 8	1	23.13306	86.6406	9.0	1.20	0.6	2.40	0.40	73328.03
70	DLT 5	2 A 2 B 4 d 5	4	23.13304	86.63944	6.0	1.20	0.6	2.40	0.40	48886.84
71	DLT 5	2 A 2 B 4 d 5	4	23.13313	86.63947	6.0	1.20	0.6	2.40	0.40	48888.32
72	DLT 5	2 A 2 B 4 d 5	4	23.13375	86.63913	6.0	1.20	0.6	2.40	0.40	48889.80
73	DLT 5	2 A 2 B 4 d 5	4	23.13398	86.63919	9.0	1.20	0.6	2.40	0.40	73336.93
74	DLT 5	2 A 2 B 4 d 5	3	23.13411	86.63935	9.0	1.20	0.6	2.40	0.40	73339.15
17	DLT 1	2 A 2 B 2 a 6	1	23.00644	86.64088	8.0	1.20	0.6	2.40	0.40	65178.49
18	DLT1	2 A 2 B 2 a 6	1	23.00684	86.64088	8.0	1.20	0.6	2.40	0.40	65180.47
19	DLT 1	2 A 2 B 2 b 2	1	23.00813	86.6391	8.0	1.20	0.6	2.40	0.40	65182.45
20	DLT1	2 A 2 B 2 a 6	1	23.00813	86.64143	8.0	1.20	0.6	2.40	0.40	65184.43
26	DLT 2	2 A 2 B 4 c 7	1	23.12882	86.65387	8.0	1.20	0.6	2.40	0.40	65186.40
30	DLT3	2 A 2 B 2 a 2	2	22.97281	86.71243	9.0	1.20	0.6	2.40	0.40	73336.93
31	DLT 3	2 A 2 B 2 a 2	2	22.97281	86.71223	9.0	1.20	0.6	2.40	0.40	73339.15

32	DLT 3	2 A 2 B 2 a 2	2	22.97278	86.71197	9.0	1.20	0.6	2.40	0.40	73341.38
33	DLT 3	2 A 2 B 2 a 2	1	22.97292	86.71196	9.0	1.20	0.6	2.40	0.40	73343.60
36	DLT 3	2 A 2 B 2 a 2	1	22.97251	86.71168	9.0	1.20	0.6	2.40	0.40	73345.83
37	DLT 3	2 A 2 B 2 a 1	1	22.97259	86.71756	9.0	1.20	0.6	2.40	0.40	73348.05
38	DLT 3	2 A 2 B 2 a 2	1	22.97053	86.71189	9.0	1.20	0.6	2.40	0.40	73350.28
39	DLT 3	2 A 2 B 2 a 2	1	22.97053	86.71078	8.0	1.20	0.6	2.40	0.40	65202.22
40	DLT 3	2 A 2 B 2 a 2	1	22.96999	86.71174	8.0	1.20	0.6	2.40	0.40	65204.20
41	DLT 3	2 A 2 B 2 a 2	1	22.9698	86.71164	8.0	1.20	0.6	2.40	0.40	65206.18
42	DLT 3	2 A 2 B 2 a 2	1	22.97556	86.71275	9.0	1.20	0.6	2.40	0.40	73359.18
43	DLT 3	2 A 2 B 2 a 2	1	22.97556	86.71256	9.0	1.20	0.6	2.40	0.40	73361.40
44	DLT 3	2 A 2 B 2 a 2	1	22.97556	86.71252	9.0	1.20	0.6	2.40	0.40	73363.63
45	DLT 3	2 A 2 B 2 a 2	1	22.97546	86.71166	9.0	1.20	0.6	2.40	0.40	73365.85
46	DLT 3	2 A 2 B 2 a 2	1	22.97546	86.71166	9.0	1.20	0.6	2.40	0.40	73368.08
47	DLT 3	2 A 2 B 2 a 2	1	22.97559	86.71166	9.0	1.20	0.6	2.40	0.40	73370.30
50	DLT 4	2 A 2 B 4 c 7	1	23.12654	86.6497	9.0	1.20	0.6	2.40	0.40	73372.52
51	DLT 4	2 A 2 B 4 c 7	1	23.12654	86.64814	9.0	1.20	0.6	2.40	0.40	73374.75
53	DLT 4	2 A 2 B 4 c 7	1	23.12609	86.64891	9.0	1.20	0.6	2.40	0.40	73376.97
54	DLT 4	2 A 2 B 4 d 5	1	23.12502	86.64725	9.0	1.20	0.6	2.40	0.40	73379.20
58	DLT 4	2 A 2 B 4 c 7	2	23.12769	86.6469	9.0	1.20	0.6	2.40	0.40	73381.42
59	DLT 4	2 A 2 B 4 c 7	2	23.1276	86.6473	9.0	1.20	0.6	2.40	0.40	73383.65
25	DLT 2	2 A 2 B 4 c 7	1	23.12881	86.65387	5.0	1.50	0.6	2.90	0.50	60211.16

* Double Data

Water Harvesting Structure measures Manbazar Beat (Manbazar -I range) Open Map

12.2.1 Pond Renovation- Manbazar Beat (Manbazar-I range) Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
6	D1	2 A 2 B 2 a 6	1	23.0068	86.6409	127127.85

7	B1	2 A 2 B 4 c 7	1	23.1254	86.6573	232570.48
9	A1	2 A 2 B 4 c 7	1	23.1258	86.649	354774.23
10	P1	2 A 2 B 4 d 1	1	23.0908	86.6649	278559.88
11	BB1	2 A 2 B 4 c 8	1	23.1428	86.6725	174363.81
12	BB1	2 A 2 B 4 c 8	1	23.147	86.6733	90938.97

12.3.1 Land Treatment and forest plantation measures- Manbazar Beat (Manbazar-I range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
125	L3	CST	NFP	8.856462	5.5	18	288	3×0.45×0.30	90018	100%	NFP
285	L1	CST / CCT	NFP	1.414547	5.5	18	288	3×0.45×0.45	21543	50%	GF
286	L1	CST / CCT	NFP	2.901193	5.5	18	288	3×0.45×0.45	44250	50%	GF
287	L2	CCT	None	1.124455	5.8	17	272	3×0.45×0.45	16197	100%	NFP
288	L3	CST	NFP	1.57792	6.5	15	240	3×0.45×0.30	13374	100%	NFP
419	L3	CST	NFP	3.719369	5.8	17	272	3×0.45×0.30	35711	100%	NFP

(13) Sindurpur Beat (Manbazar-I range)

Drainage Line Treatment measures

Open Map

13.1.1 Loose Boulder Check Dam- Sindurpur Beat (Manbazar-I range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)

75	DLT 1	2 A 2 B 4 g 3	1	23.13879	86.57019	6.0	0.50	0.4	1.20	0.20	11341.80
76	DLT 1	2 A 2 B 4 g 3	1	23.13443	86.56317	9.0	0.75	0.4	1.50	0.20	26887.81
77	DLT 1	2 A 2 B 4 g 3	1	23.13437	86.56356	2.5	0.60	0.4	1.30	0.20	5683.25
79	DLT 2	2 A 2 B 2 c 6	1	23.09722	86.55972	4.0	0.75	0.4	1.50	0.20	11950.75
80	DLT 2	2 A 2 B 2 c 6	1	23.09722	86.56028	3.5	0.60	0.4	1.30	0.20	7957.01
81	DLT 2	2 A 2 B 2 c 6	1	23.09722	86.56083	4.5	0.75	0.4	1.50	0.20	13445.29
82	DLT 3	2 A 2 B 4 d 3	1	23.09619	86.62712	6.0	1.20	0.6	2.40	0.40	48903.15
83	DLT 3	2 A 2 B 4 d 3	1	23.09619	86.62725	5.0	1.00	0.5	2.00	0.30	27308.17
84	DLT 4	2 A 2 B 4 d 3	1	23.10534	86.63152	6.0	1.00	0.5	2.00	0.30	32770.73
85	DLT 4	2 A 2 B 4 d 5	1	23.1291	86.63103	7.0	1.20	0.6	2.40	0.40	57058.87
86	DLT 4	2 A 2 B 4 d 5	1	23.12852	86.63921	5.0	1.00	0.5	2.00	0.30	27310.49
87	DLT 5	2 A 2 B 4 d 4	1	23.0925	86.62528	4.0	0.75	0.4	1.50	0.20	11953.23
88	DLT 5	2 A 2 B 4 d 4	1	23.09056	86.6225	3.5	1.00	0.5	2.00	0.30	19118.42
89	DLT 6	2 A 2 B 4 d 4	1	23.1162	86.60662	9.0	1.00	0.5	2.00	0.30	49163.05
90	DLT 6	2 A 2 B 4 d 4	1	23.11612	86.60662	7.0	0.75	0.4	1.50	0.20	20919.77
91	DLT 6	2 A 2 B 4 d 4	1	23.1162	86.60643	5.0	0.75	0.4	1.50	0.20	14943.08
92	DLT 7	2 A 2 B 2 c 2	5	23.04333	86.59472	5.0	1.00	0.5	2.00	0.30	27315.12
93	DLT 7	2 A 2 B 2 c 2	1	23.04333	86.59361	4.0	0.75	0.4	1.50	0.20	11955.08
94	DLT 7	2 A 2 B 2 c 2	1	23.04417	86.59389	3.5	0.75	0.4	1.50	0.20	10460.97

13.1.2 Gabion Check-Sindurpur Beat (Manbazar-I range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design height (m)	FD (m)	Estimated Cost (₹)
78	DLT 1	2 A 2 B 2 c 6	1	23.09589	86.56047	4	1.5	0.50	33570.92

Water Harvesting Structure measures Jamtoria Beat (Manbazar -II range) Open Map

13.2.1 Percolation Pond- Sindurpur Beat (Manbazar-I range) Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
20	W8	2 A 2 B 2 f 1	1	23.0912	86.5543	245870.99

13.2.2 Pond Renovation- Sindurpur Beat (Manbazar-I range) Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
13	W1	2 A 2 B 4 g 3	1	23.1381	86.5736	308438.41
14	W2	2 A 2 B 4 g 3	1	23.1386	86.5722	281656.10
15	W3	2 A 2 B 4 g 4	1	23.1481	86.5553	206051.37
16	W4	2 A 2 B 2 f 3	1	23.1306	86.5403	215535.81
17	W5	2 A 2 B 2 f 4	1	23.1383	86.5344	607830.67
18	W6	2 A 2 B 2 f 1	1	23.0931	86.5486	564623.76
19	W7	2 A 2 B 2 c 3	1	23.0894	86.5928	259370.31
21	W9	2 A 2 B 2 f 2	1	23.1062	86.5501	127163.99
22	W10	2 A 2 B 2 f 1	1	23.0986	86.5539	328205.68
23	W11	2 A 2 B 4 d 2	1	23.0958	86.6311	282761.73
24	W12	2 A 2 B 4 d 3	1	23.1033	86.6319	217009.99
25	W13	2 A 2 B 4 d 2	1	23.0942	86.6328	226985.83
26	W14	2 A 2 B 4 d 2	1	23.0928	86.642	247999.12

13.3.1 Land Treatment and forest plantation measures- Sindurpur Beat (Manbazar-I range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
69	L12	CPT & CST	GF 50%	3.702742	6.5	15	240	3×0.45×0.30	31370	100%	NFP
70	L13	CPT & CST	NFP	1.247305	5.8	17	272	3×0.45×0.30	11962	100%	NFP
71	L13	CPT & CST	NFP	0.870563	5.8	17	272	3×0.45×0.30	8363	100%	NFP
126	L1	CPT & CST	Existing Plantation	2.076098	5.8	17	272	3×0.45×0.45	29906	100%	NFP
127	L3	CPT & CST	NFP	0.928231	5.8	17	272	3×0.45×0.30	8892	100%	NFP
128	L4	CPT & CST	NFP	3.698336	5.8	17	272	3×0.45×0.45	53248	50%	GF
129	L5	CPT & CST	Existing Plantation	0.713624	6.5	15	240	3×0.45×0.45	9051	100%	NFP
130	L5	CPT & CST	Existing Plantation	0.571061	5.5	18	288	3×0.45×0.30	5787	50%	GF
131	L5	CPT & CST	Existing Plantation	0.988445	5.8	17	272	3×0.45×0.30	9492	100%	NFP
132	L5	CPT & CST	Existing Plantation	2.208661	6.5	15	240	3×0.45×0.30	18702	100%	NFP
133	L5	CPT & CST	Existing Plantation	2.463268	5.8	17	272	3×0.45×0.30	23642	50%	GF
134	L6	CST	GF 55%	0.783474	5.5	18	288	3×0.45×0.30	7975	100%	NFP
135	L8	CPT & CST	NFP	3.451266	5.8	17	272	3×0.45×0.30	33135	50%	GF
136	L9	CPT & CST	GF 60%	0.571084	5.8	17	272	3×0.45×0.30	5470	80%	GF
137	L9	CPT & CST	GF 60%	2.916512	5.8	17	272	3×0.45×0.30	27983	80%	GF
138	L9	CPT & CST	GF 60%	3.631505	6.5	15	240	3×0.45×0.30	30770	50%	GF
139	L10	CPT & CST	GF 30%	1.187998	5.8	17	272	3×0.45×0.45	17097	100%	NFP
140	L10	CPT & CST	GF 30%	1.13509	6.5	15	240	3×0.45×0.30	9598	50%	GF
141	L10	CPT & CST	GF 30%	0.965806	6.5	15	240	3×0.45×0.30	8187	50%	GF

142	L11	CPT & CST	NFP	1.152465	5.8	17	272	3×0.45×0.45	16567	100%	NFP
143	L11	CPT & CST	NFP	1.639091	5.8	17	272	3×0.45×0.45	23607	100%	NFP
144	L14	CPT & CST	GF 60%	1.029626	5.8	17	272	3×0.45×0.30	9880	50%	GF
145	L14	CPT & CST	GF 60%	0.571061	6.5	15	240	3×0.45×0.30	4834	100%	NFP
146	L14	CPT & CST	GF 60%	2.142085	6.5	15	240	3×0.45×0.30	18138	50%	GF
147	L14	CPT & CST	GF 60%	0.600878	5.5	18	288	3×0.45×0.30	6105	50%	GF
148	L14	CPT & CST	GF 60%	3.553265	5.5	18	288	3×0.45×0.30	36099	100%	NFP
149	L15	CPT & CST	NFP	0.695428	5.8	17	272	3×0.45×0.30	6669	50%	GF
150	L15	CPT & CST	NFP	1.551949	5.8	17	272	3×0.45×0.30	14891	50%	GF
151	L15	CPT & CST	NFP	0.734222	5.8	17	272	3×0.45×0.30	7057	50%	GF
152	L15	CPT & CST	NFP	0.593128	5.8	17	272	3×0.45×0.30	5681	50%	GF
153	L15	CPT & CST	NFP	0.897381	5.8	17	272	3×0.45×0.30	8610	50%	GF
154	L16	CPT & CST	GF 60%	1.076313	5.5	18	288	3×0.45×0.30	10939	50%	GF
155	L17	CPT & CST	GF 50%	2.967333	5.5	18	288	3×0.45×0.45	45256	50%	GF
156	L17	CPT & CST	GF 50%	0.991784	5.8	17	272	3×0.45×0.45	14291	100%	NFP
157	L17	CPT & CST	GF 50%	0.666303	5.5	18	288	3×0.45×0.30	6775	50%	GF
158	L17	CPT & CST	GF 50%	2.215072	6.5	15	240	3×0.45×0.30	18773	50%	GF
159	L18	CPT & CST	NFP	1.146242	5.5	18	288	3×0.45×0.30	11645	50%	GF
160	L18	CPT & CST	NFP	3.587227	5.5	18	288	3×0.45×0.30	36452	100%	NFP
161	L18	CPT & CST	NFP	1.487401	5.8	17	272	3×0.45×0.30	14291	50%	GF
162	L19	CPT & CST	GF 40%	0.962935	5.8	17	272	3×0.45×0.45	13868	100%	NFP
163	L19	CPT & CST	GF 40%	0.919001	5.8	17	272	3×0.45×0.30	8822	50%	GF
164	L19	CPT & CST	GF 40%	1.149011	5.5	18	288	3×0.45×0.30	11680	50%	GF
165	L20	CPT & CST	GF 50%	1.351481	5.8	17	272	3×0.45×0.30	12986	100%	NFP
166	L21	CPT & CST	GF 40%	1.021341	5.8	17	272	3×0.45×0.45	14715	50%	GF
167	L21	CPT & CST	GF 40%	3.115744	6.5	15	240	3×0.45×0.45	39592	50%	GF
168	L22	CPT & CST	GF 35%	1.125535	5.8	17	272	3×0.45×0.30	10798	100%	NFP
169	L24	CPT & CST	GF 55%	1.404245	5.8	17	272	3×0.45×0.30	13480	50%	GF
170	L24	CPT & CST	GF 55%	0.850813	6.5	15	240	3×0.45×0.30	7199	50%	GF
171	L24	CPT & CST	GF 55%	1.207457	5.5	18	288	3×0.45×0.30	12280	50%	GF
172	L24	CPT & CST	GF 55%	2.969007	6.5	15	240	3×0.45×0.30	25160	50%	GF
173	L25	CPT & CST	GF 40%	0.345536	5.5	18	288	3×0.45×0.45	5293	100%	NFP

174	L25	CPT & CST	GF 40%	0.664686	5.8	17	272	3×0.45×0.30	6387	50%	GF
175	L26	CPT & CST	GF 20 %	4.206279	5.8	17	272	3×0.45×0.30	40369	50%	GF
289	L1	CPT & CST	Existing Plantation	2.693452	6.5	15	240	3×0.45×0.45	34193	100%	NFP
290	L2	CPT & CST	NFP	0.988151	5.8	17	272	3×0.45×0.45	14238	100%	NFP
291	L2	CPT & CST	NFP	2.376221	6.5	15	240	3×0.45×0.45	30171	100%	NFP
292	L3	CPT & CST	NFP	2.349011	6.5	15	240	3×0.45×0.45	29853	50%	GF
293	L3	CPT & CST	NFP	1.280351	5.8	17	272	3×0.45×0.30	12280	50%	GF
294	L3	CPT & CST	NFP	0.761331	6.5	15	240	3×0.45×0.30	6458	50%	GF
295	L3	CPT & CST	NFP	0.704837	6.5	15	240	3×0.45×0.30	5964	50%	GF
296	L3	CPT & CST	NFP	1.729628	6.5	15	240	3×0.45×0.30	14644	100%	NFP
297	L3	CPT & CST	NFP	2.168829	6.5	15	240	3×0.45×0.30	18385	100%	NFP
298	L4	CPT & CST	NFP	2.728885	5.8	17	272	3×0.45×0.45	39275	50%	GF
299	L4	CPT & CST	NFP	0.855231	5.8	17	272	3×0.45×0.45	12333	100%	NFP
300	L4	CPT & CST	NFP	0.759771	6.5	15	240	3×0.45×0.45	9633	50%	GF
301	L4	CPT & CST	NFP	0.580583	6.5	15	240	3×0.45×0.45	7357	100%	NFP
302	L5	CPT & CST	Existing Plantation	2.315669	5.8	17	272	3×0.45×0.45	33346	50%	GF
303	L5	CPT & CST	Existing Plantation	4.329706	6.5	15	240	3×0.45×0.45	54995	50%	GF
304	L5	CPT & CST	Existing Plantation	0.762015	5.5	18	288	3×0.45×0.30	7728	50%	GF
305	L5	CPT & CST	Existing Plantation	2.423453	5.5	18	288	3×0.45×0.30	24631	50%	GF
306	L5	CPT & CST	Existing Plantation	2.15266	5.5	18	288	3×0.45×0.30	21878	100%	NFP
307	L5	CPT & CST	Existing Plantation	1.780503	5.8	17	272	3×0.45×0.30	17079	100%	NFP
308	L5	CPT & CST	Existing Plantation	2.059662	6.5	15	240	3×0.45×0.30	17432	50%	GF
309	L6	CST	GF 55%	2.372245	6.5	15	240	3×0.45×0.45	30118	100%	NFP
310	L7	CPT & CST	GF 50%	1.983939	6.5	15	240	3×0.45×0.30	16797	100%	NFP
311	L8	CPT & CST	NFP	1.058144	6.5	15	240	3×0.45×0.30	8963	100%	NFP

312	L8	CPT & CST	NFP	0.96581	6.5	15	240	3×0.45×0.30	8187	100%	NFP
313	L8	CPT & CST	NFP	2.237916	6.5	15	240	3×0.45×0.30	18949	100%	NFP
314	L9	CPT & CST	GF 60%	0.647285	5.8	17	272	3×0.45×0.45	9316	50%	GF
315	L9	CPT & CST	GF 60%	1.371411	5.8	17	272	3×0.45×0.45	19743	100%	NFP
316	L9	CPT & CST	GF 60%	3.249539	6.5	15	240	3×0.45×0.45	41286	50%	GF
317	L9	CPT & CST	GF 60%	2.210882	6.5	15	240	3×0.45×0.30	18738	50%	GF
318	L9	CPT & CST	GF 60%	0.94156	6.5	15	240	3×0.45×0.30	7975	100%	NFP
319	L9	CPT & CST	GF 60%	5.054136	6.5	15	240	3×0.45×0.30	42803	80%	GF
320	L9	CPT & CST	GF 60%	5.597964	6.5	15	240	3×0.45×0.30	47426	80%	GF
321	L10	CPT & CST	GF 30%	0.704712	5.8	17	272	3×0.45×0.30	6775	50%	GF
322	L10	CPT & CST	GF 30%	1.414239	5.8	17	272	3×0.45×0.30	13586	100%	NFP
323	L10	CPT & CST	GF 30%	1.242051	5.8	17	272	3×0.45×0.30	11927	80%	GF
324	L10	CPT & CST	GF 30%	1.789361	6.5	15	240	3×0.45×0.30	15138	50%	GF
325	L10	CPT & CST	GF 30%	1.035028	6.5	15	240	3×0.45×0.30	8751	100%	NFP
326	L10	CPT & CST	GF 30%	0.862182	6.5	15	240	3×0.45×0.30	7304	80%	GF
327	L10	CPT & CST	GF 30%	6.925382	6.5	15	240	3×0.45×0.30	58647	80%	GF
328	L11	CPT & CST	NFP	4.087798	6.5	15	240	3×0.45×0.45	51925	100%	NFP
329	L14	CPT & CST	GF 60%	1.090364	5.8	17	272	3×0.45×0.45	15720	50%	GF
330	L14	CPT & CST	GF 60%	1.167934	5.8	17	272	3×0.45×0.45	16832	100%	NFP
331	L14	CPT & CST	GF 60%	0.892082	6.5	15	240	3×0.45×0.45	11327	100%	NFP
332	L14	CPT & CST	GF 60%	2.122644	5.8	17	272	3×0.45×0.30	20361	100%	NFP
333	L14	CPT & CST	GF 60%	2.696423	5.5	18	288	3×0.45×0.30	27418	100%	NFP
334	L14	CPT & CST	GF 60%	9.262521	5.5	18	288	3×0.45×0.30	94146	100%	NFP
335	L14	CPT & CST	GF 60%	0.744776	6.5	15	240	3×0.45×0.30	6316	50%	GF
336	L14	CPT & CST	GF 60%	1.03943	6.5	15	240	3×0.45×0.30	8787	50%	GF
337	L14	CPT & CST	GF 60%	1.390024	6.5	15	240	3×0.45×0.30	11786	100%	NFP
338	L14	CPT & CST	GF 60%	1.124782	6.5	15	240	3×0.45×0.30	9528	100%	NFP
339	L14	CPT & CST	GF 60%	1.123325	6.5	15	240	3×0.45×0.30	9528	100%	NFP
340	L14	CPT & CST	GF 60%	1.026173	6.5	15	240	3×0.45×0.30	8681	100%	NFP
341	L15	CPT & CST	NFP	0.84537	5.5	18	288	3×0.45×0.30	8575	50%	GF
342	L15	CPT & CST	NFP	0.884799	5.8	17	272	3×0.45×0.30	8504	50%	GF
343	L15	CPT & CST	NFP	2.317583	5.8	17	272	3×0.45×0.30	22231	50%	GF

344	L17	CPT & CST	GF 50%	1.556046	5.5	18	288	3×0.45×0.45	23713	100%	NFP
345	L17	CPT & CST	GF 50%	1.219981	5.8	17	272	3×0.45×0.30	11715	50%	GF
346	L18	CPT & CST	NFP	4.150612	5.8	17	272	3×0.45×0.30	39839	100%	NFP
347	L19	CPT & CST	GF 40%	1.039221	5.8	17	272	3×0.45×0.45	14979	50%	GF
348	L19	CPT & CST	GF 40%	1.472789	5.5	18	288	3×0.45×0.45	22443	50%	GF
349	L19	CPT & CST	GF 40%	2.16019	5.5	18	288	3×0.45×0.45	32923	50%	GF
350	L19	CPT & CST	GF 40%	1.891797	5.5	18	288	3×0.45×0.30	19232	50%	GF
351	L19	CPT & CST	GF 40%	0.87322	5.5	18	288	3×0.45×0.30	8857	50%	GF
352	L19	CPT & CST	GF 40%	1.356869	5.8	17	272	3×0.45×0.30	13021	50%	GF
353	L20	CPT & CST	GF 50%	0.921699	6.5	15	240	3×0.45×0.30	7798	50%	GF
354	L20	CPT & CST	GF 50%	1.484985	6.5	15	240	3×0.45×0.30	12562	100%	NFP
355	L21	CPT & CST	GF 40%	1.122112	6.5	15	240	3×0.45×0.30	9492	50%	GF
356	L21	CPT & CST	GF 40%	0.686419	6.5	15	240	3×0.45×0.30	5822	100%	NFP
357	L22	CPT & CST	GF 35%	1.13205	5.8	17	272	3×0.45×0.30	10868	50%	GF
358	L22	CPT & CST	GF 35%	1.951989	5.8	17	272	3×0.45×0.30	18738	50%	GF
359	L22	CPT & CST	GF 35%	1.533074	6.5	15	240	3×0.45×0.30	12986	50%	GF
360	L22	CPT & CST	GF 35%	1.105671	6.5	15	240	3×0.45×0.30	9351	100%	NFP
361	L22	CPT & CST	GF 35%	1.150542	6.5	15	240	3×0.45×0.30	9739	100%	NFP
362	L23	CPT & CST	GF 30%	2.742244	5.8	17	272	3×0.45×0.30	26324	50%	GF
363	L23	CPT & CST	GF 30%	1.503891	6.5	15	240	3×0.45×0.30	12739	100%	NFP
364	L23	CPT & CST	GF 30%	1.344029	6.5	15	240	3×0.45×0.30	11398	100%	NFP
365	L23	CPT & CST	GF 30%	0.93917	6.5	15	240	3×0.45×0.30	7940	100%	NFP
366	L24	CPT & CST	GF 55%	1.27407	5.8	17	272	3×0.45×0.30	12245	50%	GF
367	L24	CPT & CST	GF 55%	2.282088	5.5	18	288	3×0.45×0.30	23184	50%	GF
368	L24	CPT & CST	GF 55%	0.756529	5.8	17	272	3×0.45×0.30	7269	50%	GF
369	L25	CPT & CST	GF 40%	1.150462	5.8	17	272	3×0.45×0.45	16567	50%	GF
370	L25	CPT & CST	GF 40%	1.416439	6.5	15	240	3×0.45×0.45	17996	50%	GF
371	L25	CPT & CST	GF 40%	2.800015	5.5	18	288	3×0.45×0.30	28442	50%	GF
372	L26	CPT & CST	GF 20 %	1.047812	5.8	17	272	3×0.45×0.30	10057	50%	GF
373	L26	CPT & CST	GF 20 %	0.625928	6.5	15	240	3×0.45×0.30	5293	50%	GF
374	L26	CPT & CST	GF 20 %	0.961748	6.5	15	240	3×0.45×0.30	8151	50%	GF
407	L13	CPT & CST	NFP	12.27777	6.5	15	240	3×0.45×0.30	103992	100%	NFP

420	L4	CPT & CST	NFP	2.355041	6.5	15	240	3×0.45×0.45	29906	50%	GF
421	L7	CPT & CST	GF 50%	4.120971	5.8	17	272	3×0.45×0.30	39557	100%	NFP
422	L8	CPT & CST	NFP	2.996031	5.8	17	272	3×0.45×0.30	28759	100%	NFP
423	L8	CPT & CST	NFP	9.488935	6.5	15	240	3×0.45×0.30	80349	50%	GF
424	L10	CPT & CST	GF 30%	3.599461	6.5	15	240	3×0.45×0.45	45732	100%	NFP
425	L10	CPT & CST	GF 30%	5.531886	6.5	15	240	3×0.45×0.30	46861	100%	NFP
426	L14	CPT & CST	GF 60%	1.622966	5.8	17	272	3×0.45×0.30	15562	50%	GF
427	L14	CPT & CST	GF 60%	2.790618	5.8	17	272	3×0.45×0.30	26783	100%	NFP
428	L14	CPT & CST	GF 60%	10.613009	5.8	17	272	3×0.45×0.30	101874	100%	NFP
429	L15	CPT & CST	NFP	27.33807	5.5	18	288	3×0.45×0.30	277816	50%	GF
430	L17	CPT & CST	GF 50%	3.685821	5.8	17	272	3×0.45×0.30	35393	100%	NFP
431	L22	CPT & CST	GF 35%	10.137493	6.5	15	240	3×0.45×0.30	85854	50%	GF
432	L23	CPT & CST	GF 30%	1.11691	6.5	15	240	3×0.45×0.30	9457	50%	GF
433	L23	CPT & CST	GF 30%	7.359384	6.5	15	240	3×0.45×0.30	62317	50%	GF
434	L26	CPT & CST	GF 20 %	5.631225	6.5	15	240	3×0.45×0.30	47673	50%	GF

(14) Jamtoria Beat (Manbazar-II range)

Drainage Line Treatment measures Open Map

14.1.1 Brushwood Check Dam Jamtoria Beat (Manbazar II range)

Open Design Detailed Excel File

Survey No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design Width (m)	Design Height (m)	Depth of driving Vertical Poles inside the earth(m)	Breath (m) Spacing between two rows	Estimated Cost (₹)
336	DLT181	2 A 2 B 2 b 8	1	22.99622	86.56056	2.0	1.0	0.6	0.50	2105.40

14.1.2 Loose Boulder Check Dam- Jamtoria Beat (Manbazar-II range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
157	DLT2	2 A 2 B 1 d 3	1	22.87917	86.68039	3.0	0.50	0.4	1.20	0.20	5685.55
158	DLT3	2 A 2 B 1 d 3	1	22.87919	86.68044	3.0	0.50	0.4	1.20	0.20	5685.73
159	DLT4	2 A 2 B 1 d 3	1	22.87869	86.68053	3.0	0.50	0.4	1.20	0.20	5685.92
160	DLT5	2 A 2 B 1 d 3	2	22.87928	86.68061	3.5	0.50	0.4	1.20	0.20	6633.79
161	DLT6	2 A 2 B 1 d 3	2	22.87942	86.68056	3.5	0.60	0.4	1.30	0.20	7975.52
162	DLT7	2 A 2 B 1 d 3	2	22.87956	86.68061	4.0	0.50	0.4	1.20	0.20	7581.97
163	DLT8	2 A 2 B 1 d 3	2	22.87964	86.68056	4.5	0.50	0.4	1.20	0.20	8529.99
164	DLT9	2 A 2 B 1 d 3	2	22.87972	86.68058	3.5	0.60	0.4	1.30	0.20	7976.23
165	DLT 10	2 A 2 B 1 d 3	2	22.87986	86.68058	4.5	0.50	0.4	1.20	0.20	8530.55
166	DLT 11	2 A 2 B 1 d 3	2	22.87997	86.68064	5.0	0.50	0.4	1.20	0.20	9478.69
168	DLT 13	2 A 2 B 1 d 3	1	22.87983	86.67994	6.0	0.50	0.4	1.20	0.20	11374.80
169	DLT 14	2 A 2 B 1 d 3	1	22.87992	86.68008	5.5	0.50	0.4	1.20	0.20	10427.24
173	DLT 18	2 A 2 B 1 d 3	2	22.88039	86.68017	6.0	0.60	0.4	1.30	0.20	13676.75
174	DLT 19	2 A 2 B 1 d 3	2	22.88061	86.68014	5.0	0.50	0.4	1.20	0.20	9480.86
175	DLT 20	2 A 2 B 1 d 3	1	22.87667	86.66861	5.0	0.60	0.4	1.30	0.20	11397.96
176	DLT 21	2 A 2 B 1 d 3	1	22.87669	86.66864	2.5	0.60	0.4	1.30	0.20	5699.15
177	DLT 22	2 A 2 B 1 d 3	1	22.87694	86.66869	2.5	0.60	0.4	1.30	0.20	5699.31
178	DLT 23	2 A 2 B 1 d 3	1	22.877	86.66861	3.0	0.75	0.4	1.50	0.20	8985.31
179	DLT 24	2 A 2 B 1 d 3	1	22.87694	86.66878	4.0	0.50	0.4	1.20	0.20	7585.92
180	DLT 25	2 A 2 B 1 d 3	1	22.87694	86.66889	3.0	0.60	0.4	1.30	0.20	6839.78
181	DLT 26	2 A 2 B 1 d 3	1	22.87722	86.66894	4.0	0.50	0.4	1.20	0.20	7586.41
183	DLT 28	2 A 2 B 1 d 3	1	22.8774	86.66666	2.5	0.75	0.4	1.50	0.20	7488.53
184	DLT 29	2 A 2 B 1 d 3	1	22.87746	86.66671	2.5	0.75	0.4	1.50	0.20	7488.73
185	DLT 30	2 A 2 B 1 d 3	1	22.87753	86.66679	3.0	0.75	0.4	1.50	0.20	8986.70
186	DLT 31	2 A 2 B 1 d 3	1	22.8776	86.66681	3.5	0.75	0.4	1.50	0.20	10484.76
187	DLT 32	2 A 2 B 1 d 3	1	22.87778	86.66682	4.5	0.50	0.4	1.20	0.20	8536.11
188	DLT 33	2 A 2 B 1 d 3	1	22.87787	86.66683	7.0	0.60	0.4	1.30	0.20	15962.76

191	DLT 36	2 A 2 B 1 d 3	1	22.87773	86.66807	4.0	0.50	0.4	1.20	0.20	7588.64
192	DLT 37	2 A 2 B 1 d 3	2	22.87778	86.66833	3.0	0.50	0.4	1.20	0.20	5691.67
193	DLT 38	2 A 2 B 1 d 2	1	22.8785	86.66393	5.5	0.50	0.4	1.20	0.20	10435.06
194	DLT 39	2 A 2 B 1 d 2	1	22.87855	86.66395	3.0	0.50	0.4	1.20	0.20	5692.04
197	DLT 42	2 A 2 B 1 d 2	1	22.87853	86.66411	3.0	0.50	0.4	1.20	0.20	5692.59
198	DLT 43	2 A 2 B 1 d 2	1	22.87868	86.66435	3.0	0.50	0.4	1.20	0.20	5692.78
199	DLT 44	2 A 2 B 1 d 2	1	22.87859	86.66457	3.0	0.50	0.4	1.20	0.20	5692.96
202	DLT 47	2 A 2 B 1 d 2	1	22.87874	86.66496	8.5	0.50	0.4	1.20	0.20	16131.64
204	DLT 49	2 A 2 B 1 d 3	1	22.87513	86.66157	6.0	0.50	0.4	1.20	0.20	11387.78
205	DLT50	2 A 2 B 1 d 3	1	22.87512	86.66147	5.0	0.75	0.4	1.50	0.20	14985.57
206	DLT51	2 A 2 B 1 d 3	1	22.87503	86.66128	4.5	0.75	0.4	1.50	0.20	13487.36
207	DLT52	2 A 2 B 1 d 3	1	22.87508	86.66117	3.0	0.50	0.4	1.20	0.20	5694.45
208	DLT53	2 A 2 B 1 d 3	1	22.87507	86.66099	4.5	0.50	0.4	1.20	0.20	8541.95
209	DLT54	2 A 2 B 1 d 3	1	22.87514	86.66086	7.5	0.50	0.4	1.20	0.20	14237.04
210	DLT55	2 A 2 B 1 d 5	1	22.87506	86.66066	5.0	0.50	0.4	1.20	0.20	9491.67
212	DLT57	2 A 2 B 1 d 3	1	22.87114	86.67394	8.0	0.50	0.4	1.20	0.20	15187.66
213	DLT58	2 A 2 B 1 d 3	1	22.87103	86.67383	4.0	0.50	0.4	1.20	0.20	7594.08
215	DLT60	2 A 2 B 1 d 3	1	22.87086	86.67378	4.5	0.50	0.4	1.20	0.20	8543.89
216	DLT61	2 A 2 B 1 d 3	1	22.87078	86.67364	4.5	0.60	0.4	1.30	0.20	10270.21
217	DLT62	2 A 2 B 1 d 3	1	22.87067	86.67358	7.0	0.50	0.4	1.20	0.20	13291.37
218	DLT63	2 A 2 B 1 d 3	1	22.87	86.68078	6.0	1.35	0.6	2.60	0.40	56893.91
219	DLT64	2 A 2 B 1 d 3	1	22.87003	86.68067	4.0	0.75	0.4	1.50	0.20	11992.78
220	DLT65	2 A 2 B 1 a 6	3	22.87008	86.68786	3.5	0.75	0.4	1.50	0.20	10493.95
221	DLT66	2 A 2 B 1 d 3	2	22.86989	86.68047	4.5	0.60	0.4	1.30	0.20	10271.72
222	DLT67	2 A 2 B 1 d 3	2	22.86972	86.68047	6.5	1.35	0.6	2.60	0.40	61642.04
223	DLT68	2 A 2 B 1 d 3	2	22.86958	86.68044	5.0	0.50	0.4	1.20	0.20	9495.69
225	DLT70	2 A 2 B 1 d 3	2	22.86828	86.6805	7.0	0.90	0.5	1.90	0.30	34249.89
244	DLT89	2 A 2 B 1 a 6	1	22.86478	86.68806	7.5	0.90	0.5	1.90	0.30	36717.23
245	DLT90	2 A 2 B 1 a 6	1	22.86461	86.68803	2.5	0.50	0.4	1.20	0.20	4751.24
246	DLT91	2 A 2 B 1 a 6	1	22.8645	86.68806	3.0	0.50	0.4	1.20	0.20	5701.68
248	DLT93	2 A 2 B 1 a 6	1	22.86456	86.68689	5.5	0.50	0.4	1.20	0.20	10453.75
249	DLT94	2 A 2 B 1 a 6	1	22.86464	86.68675	5.5	0.50	0.4	1.20	0.20	10454.09

250	DLT95	2 A 2 B 1 a 6	1	22.86478	86.68656	5.0	1.00	0.5	2.00	0.30	27434.09
251	DLT96	2 A 2 B 1 a 6	1	22.86478	86.68667	5.5	0.50	0.4	1.20	0.20	10454.77
252	DLT97	2 A 2 B 1 a 6	1	22.86503	86.68653	5.0	0.75	0.4	1.50	0.20	15003.72
253	DLT98	2 A 2 B 1 a 6	1	22.86506	86.68647	6.0	0.50	0.4	1.20	0.20	11405.95
254	DLT99	2 A 2 B 1 a 6	1	22.86528	86.68625	5.5	1.00	0.5	2.00	0.30	30180.89
255	DLT100	2 A 2 B 1 a 6	1	22.87186	86.68281	8.0	0.75	0.4	1.50	0.20	24007.80
257	DLT102	2 A 2 B 1 a 6	1	22.87203	86.68281	4.5	0.50	0.4	1.20	0.20	8555.57
258	DLT103	2 A 2 B 1 a 6	1	22.87206	86.68275	4.0	0.50	0.4	1.20	0.20	7605.20
261	DLT106	2 A 2 B 1 a 6	1	22.87153	86.68272	4.5	0.50	0.4	1.20	0.20	8556.69
262	DLT107	2 A 2 B 1 a 6	1	22.87153	86.68258	4.0	0.60	0.4	1.30	0.20	9141.40
264	DLT109	2 A 2 B 1 a 4	1	22.90056	86.6825	8.0	0.50	0.4	1.20	0.20	15213.37
265	DLT110	2 A 2 B 1 a 4	1	22.90056	86.68278	6.0	0.75	0.4	1.50	0.20	18010.49
266	DLT111	2 A 2 B 1 a 4	1	22.90056	86.68306	3.5	0.50	0.4	1.20	0.20	6656.28
267	DLT112	2 A 2 B 1 a 4	1	22.90056	86.68306	6.0	0.50	0.4	1.20	0.20	11411.14
268	DLT113	2 A 2 B 1 a 4	1	22.90056	86.68361	5.5	0.50	0.4	1.20	0.20	10460.55
269	DLT114	2 A 2 B 1 a 4	1	22.90056	86.68361	2.5	0.50	0.4	1.20	0.20	4754.95
274	DLT119	2 A 2 B 1 a 4	2	22.90194	86.68444	6.0	0.50	0.4	1.20	0.20	11413.74
275	DLT120	2 A 2 B 1 a 4	2	22.90222	86.685	3.0	0.60	0.4	1.30	0.20	6858.66
277	DLT122	2 A 2 B 1 a 4	1	22.90222	86.68222	3.0	0.50	0.4	1.20	0.20	5707.42
279	DLT124	2 A 2 B 1 b 3	1	22.90386	86.66278	7.0	0.50	0.4	1.20	0.20	13318.19
281	DLT126	2 A 2 B 1 b 3	1	22.90386	86.66261	6.0	0.50	0.4	1.20	0.20	11416.33
282	DLT127	2 A 2 B 1 b 3	1	22.90394	86.66256	4.0	0.50	0.4	1.20	0.20	7611.13
284	DLT129	2 A 2 B 1 b 3	1	22.90408	86.66236	9.0	0.50	0.4	1.20	0.20	17126.17
285	DLT130	2 A 2 B 1 b 3	1	22.90422	86.66211	8.0	0.50	0.4	1.20	0.20	15223.75
288	DLT133	2 A 2 B 1 b 3	1	22.90428	86.66175	7.0	0.60	0.4	1.30	0.20	16009.63
296	DLT141	2 A 2 B 1 b 3	1	22.90453	86.66064	7.0	0.50	0.4	1.20	0.20	13325.54
300	DLT145	2 A 2 B 1 b 3	2	22.90442	86.65994	9.0	0.50	0.4	1.20	0.20	17135.06
305	DLT150	2 A 2 B 1 b 3	1	22.90425	86.65889	8.5	0.50	0.4	1.20	0.20	16185.74
306	DLT151	2 A 2 B 1 b 3	1	22.90408	86.65892	8.0	0.50	0.4	1.20	0.20	15234.14
307	DLT152	2 A 2 B 1 b 3	1	22.90397	86.65597	8.0	0.50	0.4	1.20	0.20	15234.63
308	DLT153	2 A 2 B 1 b 3	2	22.90386	86.65906	7.5	0.50	0.4	1.20	0.20	14282.93
309	DLT154	2 A 2 B 1 d 2	1	22.87883	86.65775	7.0	1.05	0.6	2.20	0.30	44273.26

310	DLT155	2 A 2 B 1 d 2	1	22.87875	86.65781	7.0	0.75	0.4	1.50	0.20	21036.57
311	DLT156	2 A 2 B 1 d 2	1	22.87867	86.65792	5.0	0.75	0.4	1.50	0.20	15026.51
312	DLT157	2 A 2 B 1 d 2	1	22.87853	86.65803	6.5	0.90	0.5	1.90	0.30	31886.48
313	DLT158	2 A 2 B 1 d 2	1	22.87856	86.65794	4.0	0.50	0.4	1.20	0.20	7618.80
314	DLT159	2 A 2 B 1 d 2	1	22.87844	86.65817	3.5	0.50	0.4	1.20	0.20	6666.66
315	DLT160	2 A 2 B 1 d 2	1	22.87828	86.658	5.5	0.75	0.4	1.50	0.20	16530.86
316	DLT161	2 A 2 B 1 d 2	1	22.87942	86.6585	4.5	0.50	0.4	1.20	0.20	8571.98
317	DLT162	2 A 2 B 1 d 2	1	22.87939	86.65847	4.0	0.60	0.4	1.30	0.20	9156.13
318	DLT163	2 A 2 B 1 d 2	1	22.87922	86.65869	4.5	0.50	0.4	1.20	0.20	8572.54
319	DLT164	2 A 2 B 1 d 2	1	22.87925	86.65878	5.0	0.50	0.4	1.20	0.20	9525.35
330	DLT175	2 A 2 B 1 d 2	1	22.9035	86.66428	8.0	0.50	0.4	1.20	0.20	15246.00
331	DLT176	2 A 2 B 1 d 3	1	22.87806	86.6775	4.5	0.50	0.4	1.20	0.20	8576.15
332	DLT177	2 A 2 B 1 d 3	2	22.87806	86.68333	3.0	0.50	0.4	1.20	0.20	5717.62
333	DLT178	2 A 2 B 1 d 3	1	22.87848	86.68248	3.0	0.60	0.4	1.30	0.20	6870.31
334	DLT179	2 A 2 B 1 d 3	1	22.87838	86.68237	3.0	0.60	0.4	1.30	0.20	6870.51
335	DLT180	2 A 2 B 1 d 3	1	22.87837	86.68227	3.0	0.60	0.4	1.30	0.20	6870.71
337	DLT182	2 A 2 B 1 d 3	2	22.87861	86.68444	6.5	0.75	0.4	1.50	0.20	19547.01
338	DLT183	2 A 2 B 1 d 3	1	22.87806	86.685	8.0	0.75	0.4	1.50	0.20	24058.48
339	DLT184	2 A 2 B 1 d 3	1	22.87806	86.68611	3.0	0.75	0.4	1.50	0.20	9022.16
340	DLT185	2 A 2 B 1 d 3	1	22.87748	86.6831	3.0	0.75	0.4	1.50	0.20	9022.39
341	DLT186	2 A 2 B 1 d 3	1	22.87764	86.68306	3.0	0.75	0.4	1.50	0.20	9022.63
342	DLT187	2 A 2 B 1 a 5	1	22.8776	86.69028	2.0	0.60	0.4	1.30	0.20	4581.28
343	DLT188	2 A 2 B 1 d 3	1	22.87759	86.6834	2.0	0.60	0.4	1.30	0.20	4581.41
344	DLT189	2 A 2 B 1 d 3	1	22.87759	86.6834	2.5	0.60	0.4	1.30	0.20	5726.93
189	DLT 34	2 A 2 B 1 d 3	1	22.87799	86.66702	2.0	0.60	0.4	1.30	0.20	4538.83
203	DLT 48	2 A 2 B 1 d 2	1	22.87889	86.665	2.0	0.50	0.4	1.20	0.20	3773.80
211	DLT56	2 A 2 B 1 d 5	1	22.87516	86.66056	2.0	0.50	0.4	1.20	0.20	3773.93
228	DLT73	2 A 2 B 1 d 3	1	22.86828	86.68097	2.0	0.60	0.4	1.30	0.20	4539.23
230	DLT75	2 A 2 B 1 d 3	1	22.87129	86.67032	2.5	0.50	0.4	1.20	0.20	4717.72
238	DLT83	2 A 2 B 1 b 1	1	22.95489	86.66955	2.0	0.60	0.4	1.30	0.20	4539.50
286	DLT131	2 A 2 B 1 b 3	1	22.90428	86.66194	2.0	0.50	0.4	1.20	0.20	3774.42
298	DLT143	2 A 2 B 1 b 3	1	22.90458	86.66039	3.5	0.50	0.4	1.20	0.20	6605.45

302	DLT147	2 A 2 B 1 b 3	2	22.90433	86.65992	2.0	0.60	0.4	1.30	0.20	4539.90
328	DLT173	2 A 2 B 1 d 2	1	22.90336	86.66436	2.0	0.60	0.4	1.30	0.20	4540.04
329	DLT174	2 A 2 B 1 d 2	1	22.90342	86.66436	2.0	0.50	0.4	1.20	0.20	3774.91
290	DLT135	2 A 2 B 1 b 3	1	22.90444	86.66136	4.0	0.50	0.4	1.20	0.20	7550.08
293	DLT138	2 A 2 B 1 b 3	1	22.90461	86.66089	2.0	0.50	0.4	1.20	0.20	3775.16
156	DLT 1	2 A 2 B 1 d 3	1	22.88189	86.68031	3.0	0.50	0.4	1.20	0.20	5663.30
170	DLT 15	2 A 2 B 1 d 3	1	22.87881	86.68014	4.0	0.50	0.4	1.20	0.20	7551.31
171	DLT 16	2 A 2 B 1 d 3	1	22.88011	86.68017	3.5	0.50	0.4	1.20	0.20	6607.61
172	DLT 17	2 A 2 B 1 d 3	1	22.88019	86.68022	3.5	0.50	0.4	1.20	0.20	6607.83
190	DLT 35	2 A 2 B 1 d 3	1	22.87754	86.66802	5.5	0.50	0.4	1.20	0.20	10384.07
195	DLT 40	2 A 2 B 1 d 2	1	22.87849	86.66398	3.0	0.50	0.4	1.20	0.20	5664.23
196	DLT 41	2 A 2 B 1 d 2	1	22.87851	86.66401	3.0	0.50	0.4	1.20	0.20	5664.41
200	DLT 45	2 A 2 B 1 d 2	1	22.87876	86.66453	3.5	0.50	0.4	1.20	0.20	6608.70
201	DLT 46	2 A 2 B 1 d 2	1	22.87876	86.66473	6.0	0.50	0.4	1.20	0.20	11329.56
243	DLT88	2 A 2 B 1 a 6	1	22.86483	86.68792	4.0	0.50	0.4	1.20	0.20	7553.29
247	DLT92	2 A 2 B 1 a 6	2	22.86439	86.68869	4.0	0.50	0.4	1.20	0.20	7553.54
256	DLT101	2 A 2 B 1 a 6	1	22.87197	86.68281	4.5	0.50	0.4	1.20	0.20	8498.01
259	DLT104	2 A 2 B 1 a 6	1	22.87161	86.68286	4.5	0.50	0.4	1.20	0.20	8498.29
270	DLT115	2 A 2 B 1 a 4	2	22.90083	86.68389	4.0	0.50	0.4	1.20	0.20	7554.28
271	DLT116	2 A 2 B 1 a 4	1	22.90139	86.68389	3.0	0.50	0.4	1.20	0.20	5665.89
272	DLT117	2 A 2 B 1 a 4	2	22.90139	86.68417	3.0	0.50	0.4	1.20	0.20	5666.08
273	DLT118	2 A 2 B 1 a 4	2	22.90167	86.68444	2.5	0.50	0.4	1.20	0.20	4721.89
276	DLT121	2 A 2 B 1 a 4	2	22.9025	86.685	3.0	0.50	0.4	1.20	0.20	5666.45
167	DLT 12	2 A 2 B 1 d 3	2	22.88022	86.68047	7.0	0.60	0.4	1.30	0.20	15924.34
182	DLT 27	2 A 2 B 1 d 3	2	22.8775	86.66917	6.0	0.75	0.4	1.50	0.20	17937.26
227	DLT72	2 A 2 B 1 d 3	1	22.86819	86.68081	9.0	1.35	0.6	2.60	0.40	85075.75
231	DLT76	2 A 2 B 1 b 1	1	22.95462	86.67015	9.0	0.75	0.4	1.50	0.20	26907.27
232	DLT77	2 A 2 B 1 b 1	1	22.95473	86.67014	9.0	0.75	0.4	1.50	0.20	26907.97
233	DLT78	2 A 2 B 1 b 1	1	22.95468	86.66981	9.0	0.75	0.4	1.50	0.20	26908.66
235	DLT80	2 A 2 B 1 b 1	1	22.95477	86.66983	9.0	0.90	0.5	1.90	0.30	43886.31
236	DLT81	2 A 2 B 1 b 1	1	22.95484	86.66977	9.0	0.90	0.5	1.90	0.30	43887.63
239	DLT84	2 A 2 B 1 b 1	1	22.95494	86.66948	9.0	0.75	0.4	1.50	0.20	26910.75

241	DLT86	2 A 2 B 1 b 1	1	22.95501	86.66923	9.0	0.75	0.4	1.50	0.20	26911.44
242	DLT87	2 A 2 B 1 b 1	1	22.95502	86.66914	9.0	0.75	0.4	1.50	0.20	26912.14
260	DLT105	2 A 2 B 1 a 6	1	22.87158	86.68281	9.0	0.75	0.4	1.50	0.20	26912.84
263	DLT108	2 A 2 B 1 a 6	1	22.8715	86.68253	9.0	1.20	0.6	2.40	0.40	73425.92

Water Harvesting Structure measures Jamtoria Beat (Manbazar -II range) Open Map

14.2.1 Dugout Pond- Jamtoria Beat (Manbazar-II range) Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
33	WRD1	2 A 2 B 1 a 6	1	22.8734	86.6952	103227.26
39	WRD7	2 A 2 B 1 d 3	1	22.8707	86.6734	116244.14
49	WRD17	2 A 2 B 1 d 3	1	22.8793	86.6736	148585.96

14.2.2 Pond Renovation- Jamtoria Beat (Manbazar-II range) Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
34	WRD2	2 A 2 B 1 a 6	1	22.8717	86.6832	135037.80
35	WRD3	2 A 2 B 1 a 6	1	22.8732	86.6851	198270.75
36	WRD4	2 A 2 B 1 a 6	1	22.8743	86.6871	183971.92
37	WRD5	2 A 2 B 1 d 2	1	22.8789	86.6576	69058.89
38	WRD6	2 A 2 B 1 a 4	2	22.9036	86.6856	139951.20
40	WRD8	2 A 2 B 1 d 3	2	22.8695	86.6801	216846.58
41	WRD9	2 A 2 B 1 d 3	1	22.8662	86.682	593657.79
42	WRD10	2 A 2 B 1 b 3	2	22.9042	86.6596	163341.07
43	WRD11	2 A 2 B 1 d 3	2	22.8777	86.6688	293545.33
44	WRD12	2 A 2 B 1 d 3	1	22.8794	86.6764	92964.97

45	WRD13	2 A 2 B 1 d 3	1	22.8739	86.6803	331719.42
46	WRD14	2 A 2 B 1 d 2	2	22.8803	86.665	622343.80
47	WRD15	2 A 2 B 1 d 5	1	22.8737	86.6589	124068.43
48	WRD16	2 A 2 B 1 d 5	1	22.8754	86.6603	117324.11

14.3.1 Land Treatment and forest plantation measures- Jamtoria Beat (Manbazar-II range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
32	LTFP2	CCT	Existing Plantation	1.307672	6.5	15	240	3×0.45×0.30	11080	50%	GF
33	LTFP4	None	GF 50%	0.85977	5.8	17	272	3×0.45×0.30	8257	50%	GF
34	LTFP4	None	GF 50%	1.790683	5.8	17	272	3×0.45×0.30	17185	50%	GF
35	LTFP5	None	GF 50%	0.407256	5.2	19	304	3×0.45×0.30	4376	50%	GF
36	LTFP5	None	GF 50%	0.559195	5.8	17	272	3×0.45×0.30	5364	50%	GF
37	LTFP6	None	GF 50%	2.092343	5.2	19	304	3×0.45×0.30	22443	50%	GF
38	LTFP6	None	GF 50%	0.571061	5.8	17	272	3×0.45×0.30	5470	50%	GF
213	LTFP1	CCT	Existing Plantation	1.947137	5.8	17	272	3×0.45×0.45	28053	50%	GF
214	LTFP1	CCT	Existing Plantation	0.916835	5.8	17	272	3×0.45×0.45	13180	100%	NFP
215	LTFP1	CCT	Existing Plantation	1.448811	6.5	15	240	3×0.45×0.45	18420	50%	GF
216	LTFP1	CCT	Existing Plantation	0.87842	6.5	15	240	3×0.45×0.45	11168	100%	NFP
217	LTFP4	None	GF 50%	1.637544	5.5	18	288	3×0.45×0.30	16656	50%	GF
218	LTFP5	None	GF 50%	1.158753	5.5	18	288	3×0.45×0.30	11786	50%	GF
219	LTFP6	None	GF 50%	1.344642	5.8	17	272	3×0.45×0.30	12915	50%	GF

220	LTFP6	None	GF 50%	0.574015	5.5	18	288	3×0.45×0.30	5822	100%	NFP
221	LTFP8	CCT	Existing Plantation	0.532148	5.8	17	272	3×0.45×0.45	7675	100%	NFP
400	LTFP3	CCT	Existing Plantation	3.411032	5.8	17	272	3×0.45×0.30	32747	50%	GF
401	LTFP5	None	GF 50%	7.135064	5.5	18	288	3×0.45×0.30	72515	50%	GF
402	LTFP6	None	GF 50%	8.784929	5.5	18	288	3×0.45×0.30	89277	50%	GF
32	LTFP2	CCT	Existing Plantation	1.307672	6.5	15	240	3×0.45×0.30	11080	50%	GF
33	LTFP4	None	GF 50%	0.85977	5.8	17	272	3×0.45×0.30	8257	50%	GF
34	LTFP4	None	GF 50%	1.790683	5.8	17	272	3×0.45×0.30	17185	50%	GF
35	LTFP5	None	GF 50%	0.407256	5.2	19	304	3×0.45×0.30	4376	50%	GF
36	LTFP5	None	GF 50%	0.559195	5.8	17	272	3×0.45×0.30	5364	50%	GF
37	LTFP6	None	GF 50%	2.092343	5.2	19	304	3×0.45×0.30	22443	50%	GF
38	LTFP6	None	GF 50%	0.571061	5.8	17	272	3×0.45×0.30	5470	50%	GF
213	LTFP1	CCT	Existing Plantation	1.947137	5.8	17	272	3×0.45×0.45	28053	50%	GF
214	LTFP1	CCT	Existing Plantation	0.916835	5.8	17	272	3×0.45×0.45	13180	100%	NFP
215	LTFP1	CCT	Existing Plantation	1.448811	6.5	15	240	3×0.45×0.45	18420	50%	GF
216	LTFP1	CCT	Existing Plantation	0.87842	6.5	15	240	3×0.45×0.45	11168	100%	NFP
217	LTFP4	None	GF 50%	1.637544	5.5	18	288	3×0.45×0.30	16656	50%	GF
218	LTFP5	None	GF 50%	1.158753	5.5	18	288	3×0.45×0.30	11786	50%	GF
219	LTFP6	None	GF 50%	1.344642	5.8	17	272	3×0.45×0.30	12915	50%	GF
220	LTFP6	None	GF 50%	0.574015	5.5	18	288	3×0.45×0.30	5822	100%	NFP
221	LTFP8	CCT	Existing Plantation	0.532148	5.8	17	272	3×0.45×0.45	7675	100%	NFP
400	LTFP3	CCT	Existing Plantation	3.411032	5.8	17	272	3×0.45×0.30	32747	50%	GF
401	LTFP5	None	GF 50%	7.135064	5.5	18	288	3×0.45×0.30	72515	50%	GF
402	LTFP6	None	GF 50%	8.784929	5.5	18	288	3×0.45×0.30	89277	50%	GF

(15) Kumari Beat (Manbazar-II range)

Drainage Line Treatment measures Open Map

15.1.1 Loose Boulder Check Dam- Kumari Beat (Manbazar-II range)

Open Design Detailed Excel File

Sr. No.	Map Id	Watershed	Order of Gully	Latitude	Longitude	Design width (m)	Design Height (m)	Top Width (m)	Bottom Width (m)	FD (m)	Estimated Cost (₹)
345	DLT 1	2 A 2 B 2 b 9	1	22.99672	86.53697	6.0	0.75	0.4	1.50	0.20	18047.10
346	DLT 2	2 A 2 B 2 b 9	1	22.99681	86.53672	8.0	0.75	0.4	1.50	0.20	24063.42
347	DLT 3	2 A 2 B 2 b 9	1	22.99697	86.5365	6.0	0.60	0.4	1.30	0.20	13745.84
348	DLT 4	2 A 2 B 2 b 9	1	22.99703	86.53622	7.0	0.50	0.4	1.20	0.20	13347.60
349	DLT 5	2 A 2 B 1 c 6	1	22.98361	86.58583	4.0	0.75	0.4	1.50	0.20	12032.64
350	DLT 6	2 A 2 B 1 c 6	1	22.98333	86.58583	4.0	0.75	0.4	1.50	0.20	12032.95
351	DLT 7	2 A 2 B 1 c 6	1	22.98306	86.58611	4.0	0.75	0.4	1.50	0.20	12033.26
352	DLT 8	2 A 2 B 2 b 4	1	22.98528	86.58611	6.0	0.75	0.4	1.50	0.20	18050.35
353	DLT 9	2 A 2 B 2 b 4	1	22.98556	86.58583	5.0	0.75	0.4	1.50	0.20	15042.34
354	DLT 10	2 A 2 B 1 c 7	1	22.94278	86.60556	6.0	0.75	0.4	1.50	0.20	18051.28
355	DLT 11	2 A 2 B 1 c 7	1	22.9425	86.60556	6.0	0.75	0.4	1.50	0.20	18051.74
356	DLT 12	2 A 2 B 1 c 7	1	22.94222	86.60556	6.0	0.75	0.4	1.50	0.20	18052.20
357	DLT 13	2 A 2 B 1 c 7	1	22.945	86.60333	7.0	0.75	0.4	1.50	0.20	21061.44
358	DLT 14	2 A 2 B 1 c 7	1	22.94472	86.60306	6.0	0.75	0.4	1.50	0.20	18053.13
359	DLT 15	2 A 2 B 1 m 3	2	22.92474	86.57704	5.0	1.35	0.6	2.60	0.40	47599.05
360	DLT 16	2 A 2 B 1 m 3	2	22.92488	86.57657	4.0	1.20	0.6	2.40	0.40	32872.04
361	DLT 17	2 A 2 B 1 m 3	1	22.92572	86.57682	2.5	0.75	0.4	1.50	0.20	7522.72
362	DLT 18	2 A 2 B 1 k 4	1	22.88111	86.53972	7.0	0.75	0.4	1.50	0.20	21064.15
363	DLT 19	2 A 2 B 1 k 4	1	22.88111	86.54056	7.0	0.75	0.4	1.50	0.20	21064.69
364	DLT 20	2 A 2 B 1 k 4	1	22.88194	86.54278	6.5	0.75	0.4	1.50	0.20	19560.57
365	DLT 21	2 A 2 B 1 k 4	1	22.88361	86.54389	5.0	0.75	0.4	1.50	0.20	15046.98
366	DLT 22	2 A 2 B 1 k 4	1	22.87806	86.54278	6.0	0.75	0.4	1.50	0.20	18056.84
367	DLT 23	2 A 2 B 1 k 4	1	22.87778	86.5425	6.5	0.75	0.4	1.50	0.20	19562.08

368	DLT 24	2 A 2 B 1 k 4	1	22.88	86.53861	6.0	0.75	0.4	1.50	0.20	18057.77
369	DLT 25	2 A 2 B 1 k 4	1	22.88028	86.54333	6.0	0.75	0.4	1.50	0.20	18058.23
370	DLT 26	2 A 2 B 1 k 4	1	22.87944	86.54389	6.0	0.75	0.4	1.50	0.20	18058.69
371	DLT 27	2 A 2 B 2 b 8	1	22.9975	86.55667	6.0	0.75	0.4	1.50	0.20	18059.16
372	DLT 28	2 A 2 B 2 b 8	1	22.99694	86.55806	5.0	0.75	0.4	1.50	0.20	15049.68
373	DLT 29	2 A 2 B 2 b 8	1	22.99639	86.56	4.0	0.75	0.4	1.50	0.20	12040.06

Water Harvesting Structure measures Kumari Beat (Manbazar -II range) Open Map

15.2.1 Dugout Pond- Kumari Beat (Manbazar-II range) Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
55	WRD6	2 A 2 B 2 b 8	1	23.0056	86.5572	159742.84
56	WRD7	2 A 2 B 2 b 8	1	23.0067	86.5558	148585.96
57	WRD8	2 A 2 B 2 b 8	1	23.0064	86.5522	103227.26
58	WRD9	2 A 2 B 2 b 8	1	23.0022	86.5556	132400.63
59	WRD10	2 A 2 B 2 b 9	1	22.9965	86.5375	202526.79
62	WRD13	2 A 2 B 1 c 1	1	22.9786	86.6603	222197.42
64	WRD15	2 A 2 B 1 c 7	1	22.9428	86.6061	74053.88
68	WRD19	2 A 2 B 1 m 5	1	22.958661	86.538333	168083.46
70	WRD21	2 A 2 B 1 m 5	1	22.926111	86.5525	151898.13

15.2.2 Pond Renovation- Kumari Beat (Manbazar-II range) Open Design Detailed Excel File

Survey No.	Map ID	Watershed Code	Gully Order	LATITUDE	LONGITUDE	Estimated Cost (₹)
50	WRD1	2 A 2 B 1 k 4	1	22.8847	86.5417	55144.79
51	WRD2	2 A 2 B 1 k 4	1	22.8789	86.5439	99584.79
52	WRD3	2 A 2 B 2 b 8	1	22.9964	86.5592	111272.11

53	WRD4	2 A 2 B 2 b 8	1	22.9961	86.5636	125061.71
54	WRD5	2 A 2 B 2 b 8	1	22.9997	86.5633	111272.11
60	WRD11	2 A 2 B 2 b 6	1	23.0349	86.5873	181562.54
61	WRD12	2 A 2 B 1 m 1	1	22.9263	86.6177	145591.21
63	WRD14	2 A 2 B 1 c 6	1	22.9783	86.5936	122588.00
65	WRD16	2 A 2 B 1 m 2	1	22.9419	86.6025	122588.00
66	WRD17	2 A 2 B 1 k 5	1	22.85917	86.5575	195166.74
67	WRD18	2 A 2 B 1 k 5	1	22.85639	86.5525	326005.67
69	WRD20	2 A 2 B 1 m 3	1	22.92501	86.5702	501604.19
71	WRD22	2 A 2 B 1 m 5	1	22.92278	86.5525	200450.64

15.3.1 Land Treatment and forest plantation measures- Kumari Beat (Manbazar-II range)

Open Map

Open Design Detailed Excel File

OBJECT ID	Map ID	Proposed Land Treatment Type	Proposed Forest Plantation Type	Area (ha)	Horizontal Interval (m)	No. of Lines of 100 m Length/ha	No. of Trenches/ha	Trench Dimensions	Total Estimated Cost (₹)	Recommended Plantation (%)	Recommended Plantation Type
39	LTFP 9	CCT	GF 50%	2.021619	5.5	18	288	3×0.45×0.30	20537	100%	NFP
40	LTFP 18	CCT	Existing Plantation	0.847483	5.8	17	272	3×0.45×0.30	8151	100%	NFP
41	LTFP 19	CCT	Existing Plantation	1.220881	6.5	15	240	3×0.45×0.30	10339	100%	NFP
42	LTFP 20	CCT	Existing Plantation	1.543947	5.5	18	288	3×0.45×0.30	15703	100%	NFP
43	LTFP 20	CCT	Existing Plantation	0.802216	5.8	17	272	3×0.45×0.30	7693	100%	NFP
44	LTFP 20	CCT	Existing Plantation	1.605547	5.8	17	272	3×0.45×0.30	15421	100%	NFP
45	LTFP 21	None	NFP	1.025702	6.5	15	240	3×0.45×0.30	8681	100%	NFP
46	LTFP 22	None	NFP	2.057694	5.5	18	288	3×0.45×0.30	20925	50%	GF

47	LTFP 22	CCT	Existing Plantation	0.913306	5.8	17	272	3×0.45×0.30	8751	50%	GF
48	LTFP 22	CCT	Existing Plantation	2.864098	6.5	15	240	3×0.45×0.30	24242	50%	GF
49	LTFP 22	CCT	Existing Plantation	3.794339	5.5	18	288	3×0.45×0.30	38569	50%	GF
50	LTFP 24	CCT	Existing Plantation	1.149869	5.5	18	288	3×0.45×0.45	17520	50%	GF
51	LTFP 24	CCT	Existing Plantation	1.533088	5.8	17	272	3×0.45×0.45	22072	50%	GF
52	LTFP 24	CCT	Existing Plantation	1.107408	5.8	17	272	3×0.45×0.45	15932	100%	NFP
53	LTFP 25	CCT	Existing Plantation	0.301417	5.8	17	272	3×0.45×0.45	4340	100%	NFP
54	LTFP 25	CCT	Existing Plantation	2.314636	5.8	17	272	3×0.45×0.30	22231	100%	NFP
55	LTFP 26	CCT	Existing Plantation	1.1505	6.5	15	240	3×0.45×0.30	9739	50%	GF
56	LTFP 26	CCT	Existing Plantation	0.592979	5.8	17	272	3×0.45×0.30	5681	100%	NFP
57	LTFP 28	CCT	Existing Plantation	1.151676	5.5	18	288	3×0.45×0.45	17573	100%	NFP
58	LTFP 28	CCT	Existing Plantation	2.508284	5.8	17	272	3×0.45×0.45	36099	100%	NFP
59	LTFP 28	CCT	Existing Plantation	2.238299	6.5	15	240	3×0.45×0.45	28424	100%	NFP
60	LTFP 28	CCT	Existing Plantation	0.863704	5.8	17	272	3×0.45×0.30	8293	50%	GF
61	LTFP 28	CCT	Existing Plantation	1.479719	6.5	15	240	3×0.45×0.30	12527	50%	GF
176	LTFP 1	CCT	Existing Plantation	1.163385	5.8	17	272	3×0.45×0.30	11151	100%	NFP
177	LTFP 2	CST	Existing Plantation	1.377978	5.8	17	272	3×0.45×0.45	19849	100%	NFP

178	LTFP 2	CST	Existing Plantation	5.645446	5.8	17	272	3×0.45×0.30	54201	50%	GF
179	LTFP 3	CCT	Existing Plantation	2.374367	5.8	17	272	3×0.45×0.45	34193	50%	GF
180	LTFP 4	CCT	Existing Plantation	2.504371	5.8	17	272	3×0.45×0.45	36046	100%	NFP
181	LTFP 5	CCT	Existing Plantation	2.56613	6.5	15	240	3×0.45×0.30	21737	100%	NFP
182	LTFP 6	CCT	Existing Plantation	0.700183	6.5	15	240	3×0.45×0.30	5928	100%	NFP
183	LTFP 6	CCT	Existing Plantation	0.625281	6.5	15	240	3×0.45×0.30	5293	50%	GF
184	LTFP 7	CCT	Existing Plantation	1.733846	5.5	18	288	3×0.45×0.45	26412	100%	NFP
185	LTFP 10	CCT	Existing Plantation	0.664188	5.5	18	288	3×0.45×0.30	6740	50%	GF
186	LTFP 10	CCT	Existing Plantation	2.88121	6.5	15	240	3×0.45×0.30	24383	50%	GF
187	LTFP 11	CCT	Existing Plantation	0.724222	6.5	15	240	3×0.45×0.30	6140	100%	NFP
188	LTFP 11	CCT	Existing Plantation	1.211911	5.8	17	272	3×0.45×0.30	11645	50%	GF
189	LTFP 13	CCT	Existing Plantation	1.989289	5.8	17	272	3×0.45×0.30	19090	100%	NFP
190	LTFP 14	CCT	Existing Plantation	1.745708	6.5	15	240	3×0.45×0.30	14785	50%	GF
191	LTFP 15	CCT	Existing Plantation	2.034926	6.5	15	240	3×0.45×0.30	17220	50%	GF
192	LTFP 17	CCT	Existing Plantation	1.736153	5.8	17	272	3×0.45×0.45	24983	100%	NFP
193	LTFP 17	CCT	Existing Plantation	0.790626	5.5	18	288	3×0.45×0.30	8045	100%	NFP
222	LTFP 18	CCT	Existing Plantation	0.650549	6.5	15	240	3×0.45×0.30	5505	100%	NFP

223	LTFP 22	CCT	Existing Plantation	7.854742	5.5	18	288	3×0.45×0.30	79820	50%	GF
224	LTFP 22	CCT	Existing Plantation	1.002419	5.5	18	288	3×0.45×0.30	10198	100%	NFP
225	LTFP 23	CCT	Existing Plantation	4.45556	5.5	18	288	3×0.45×0.30	45274	50%	GF
226	LTFP 24	CCT	Existing Plantation	1.446004	6.5	15	240	3×0.45×0.45	18367	100%	NFP
227	LTFP 25	CCT	Existing Plantation	2.103853	6.5	15	240	3×0.45×0.30	17820	100%	NFP
228	LTFP 28	CCT	Existing Plantation	4.149169	5.8	17	272	3×0.45×0.30	39839	50%	GF
229	LTFP 28	CCT	Existing Plantation	0.745383	5.8	17	272	3×0.45×0.30	7163	100%	NFP
230	LTFP 28	CCT	Existing Plantation	3.326346	6.5	15	240	3×0.45×0.30	28159	50%	GF
231	LTFP 28	CCT	Existing Plantation	4.014878	6.5	15	240	3×0.45×0.30	34017	50%	GF
232	LTFP 28	CCT	Existing Plantation	1.976508	6.5	15	240	3×0.45×0.30	16726	100%	NFP
233	LTFP 29	CCT	Existing Plantation	0.626854	5.8	17	272	3×0.45×0.45	9051	100%	NFP
234	LTFP 29	CCT	Existing Plantation	2.261868	6.5	15	240	3×0.45×0.45	28741	100%	NFP
375	LTFP 1	CCT	Existing Plantation	1.159873	6.5	15	240	3×0.45×0.30	9810	100%	NFP
376	LTFP 2	CST	Existing Plantation	2.283147	5.8	17	272	3×0.45×0.45	32870	50%	GF
377	LTFP 2	CST	Existing Plantation	2.373438	6.5	15	240	3×0.45×0.45	30171	100%	NFP
378	LTFP 2	CST	Existing Plantation	3.465633	6.5	15	240	3×0.45×0.30	29359	50%	GF
379	LTFP 3	CCT	Existing Plantation	4.129532	6.5	15	240	3×0.45×0.45	52454	50%	GF

380	LTFP 3	CCT	Existing Plantation	5.004161	6.5	15	240	3×0.45×0.45	63570	100%	NFP
381	LTFP 5	CCT	Existing Plantation	4.054886	5.8	17	272	3×0.45×0.30	38922	100%	NFP
382	LTFP 5	CCT	Existing Plantation	3.154788	6.5	15	240	3×0.45×0.30	26712	100%	NFP
383	LTFP 6	CCT	Existing Plantation	1.059982	6.5	15	240	3×0.45×0.30	8963	50%	GF
384	LTFP 8	CCT	Existing Plantation	2.570878	5.5	18	288	3×0.45×0.45	39169	50%	GF
385	LTFP 10	CCT	Existing Plantation	2.054325	5.8	17	272	3×0.45×0.30	19726	50%	GF
386	LTFP 11	CCT	Existing Plantation	0.718438	5.8	17	272	3×0.45×0.30	6881	100%	NFP
387	LTFP 11	CCT	Existing Plantation	4.780857	6.5	15	240	3×0.45×0.30	40474	50%	GF
388	LTFP 11	CCT	Existing Plantation	3.490306	6.5	15	240	3×0.45×0.30	29571	100%	NFP
389	LTFP 12	CCT	Existing Plantation	0.679544	5.8	17	272	3×0.45×0.30	6528	100%	NFP
390	LTFP 13	CCT	Existing Plantation	2.957062	6.5	15	240	3×0.45×0.30	25054	100%	NFP
391	LTFP 16	CCT	Existing Plantation	2.63036	5.8	17	272	3×0.45×0.45	37846	50%	GF
392	LTFP 16	CCT	Existing Plantation	2.796976	6.5	15	240	3×0.45×0.45	35517	50%	GF
393	LTFP 17	CCT	Existing Plantation	3.128961	5.5	18	288	3×0.45×0.45	47691	100%	NFP
403	LTFP 9	CCT	GF 50%	4.850255	5.8	17	272	3×0.45×0.30	46544	100%	NFP
404	LTFP 27	CCT	Existing Plantation	3.495593	5.5	18	288	3×0.45×0.30	35534	50%	GF
435	LTFP 6	CCT	Existing Plantation	7.904365	5.8	17	272	3×0.45×0.30	75868	100%	NFP

Consultancy Project on

Preparation of Catchment Area Treatment Plan (CAT Plans) for 13 Forest Divisions in West Bengal under JICA Funded WB-FBCCCR

Consultant: **ICAR-Indian Institute of Soil and Water Conservation (ICAR-IISWC)**
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