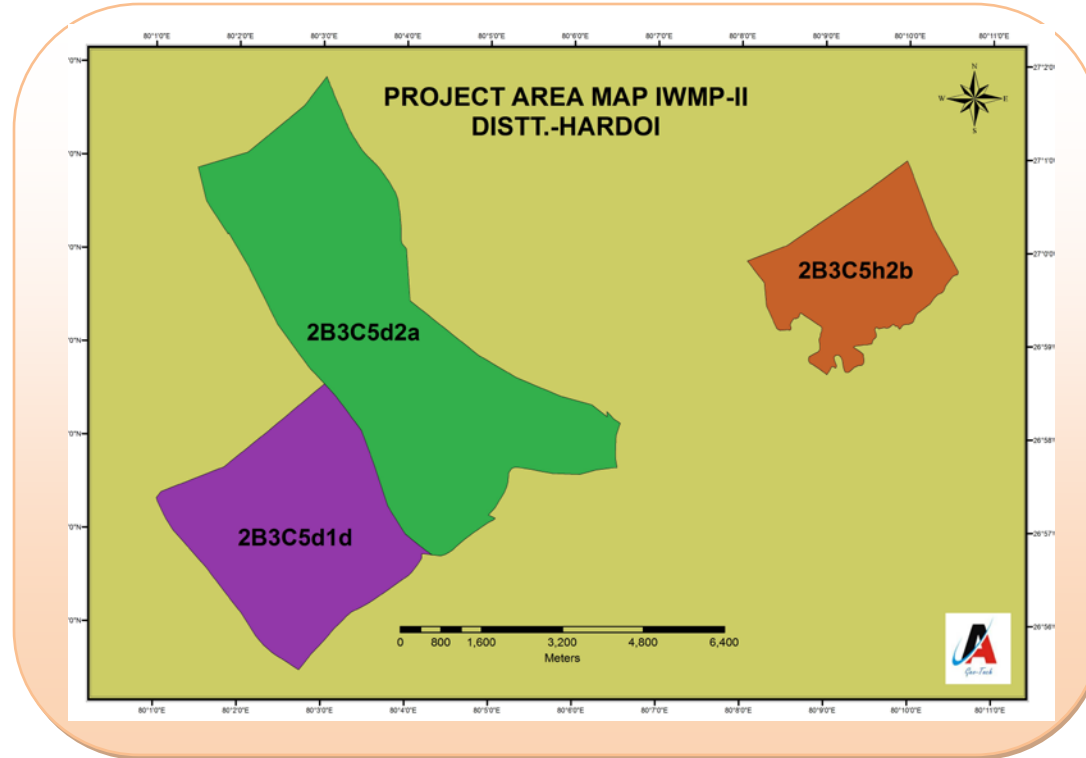


DETAILED PROJECT REPORT (D.P.R.)

(I.W.M.P. 2nd - HARDOI)

INTEGRATED WATERSHED MANAGEMENT PROGRAMME, KALYANI BLOCK- MALLAWAN
DISTRICT - HARDOI (UTTAR PRADESH)



Submitted to: -

Department of Land Development &

Water Resources. Lucknow (U.P.)
Development



Land Development & Water Resources Government of U. P. Lucknow

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EXECUTIVE SUMMARY

The Watershed comprises of Nineteen villages in Mallawan Block of Hardoi IInd District of Uttar Pradesh. All these watersheds has been identified by the Land development and water resources by IWMP scheme proper prioritization of different parameter for watershed selection criteria Hardoi. The watershed is located in the south west of Hardoi District. Its lives between 80°1'4.78"to 80°10'37.104" and latitudes 26°55'29.73" to 27°1'49.25" (**2B3C5d2a, 2B3C5d1d, 2B3C5h2b**) Its altitude 75 to 135 m above the mean sea Level (MSL) The total area of watershed is 5248.00 ha., All these watershed are surrounded by the 16 grampanchayat. A watershed is the entire land areas which drain into a stream from its mouth. The watershed of a steam has not only area, but also depth extending from the top of the vegetation to the confining geologic strata beneath. It is a hydrologic unit. There is an infinite relationship between land & water. In simple words it can be refused to the divide separating one drainage basin from other. It is also used a synonym for catchments over or a drainage basin.

Planning and development of watersheds calls for a rigorous understanding of the occurrence and movement of water in the surface and sub-surface systems along with soil and nutrient losses in a watershed as the need arises for a proper watershed management of that area. In our country, where a lot of running water goes waste, it becomes very important to apply the technology of watershed management to solve its annual problems of droughts and floods.

The Project area comprises villages Harraiya, Kutubapur Panshala, BeriaNazirpur, Kutubapur Sisala, Shahpur Pawnar Sisala, Rampur, Mansoornagar, Shahpur Pawnar Peshala, Matiyamau, Belehara Kamaalnagar, Gadi Rasulpur, Tauklabad, Radhopur Sisala, Newada, Mangrha Sisala, Awsanpur, Hajratpur, Puranmau, Murtjakulipur, Sahimpur, Nekpur, Kodarmau, Kokatmau, Mehmudpur, Akbarpur, Tejipur, Musepur, Rajapur, Shahbuddinpur, Shahpurganga ,namely Mallawan block of Hardoi district of Uttar Pradesh. The nearest town is Atrauli which is center place of the project area and it is well connected by pucca road. This watershed has been identified by the state department under NWDPRAs scheme by proper prioritization of different parameters for watershed selection criteria. The watershed is located along The Kalyani River. It lies between the longitude of 80°1'4.78"to 80°10'37.104" and latitudes 26°55'29.73" to 27°1'49.25", having watershed code no 2B3C5d2a, 2B3C5d1d, 2B3C5h2b. Its altitude ranges from 75 to 135 m above mean sea Level (MSL). The total area of watershed is 5248.00 Ha. Out of which 4198.00 Ha has been undertaken to be treated under Integrated Watershed Management Programme (IWMP) starting from 2010-11.

The climate of the region is characterized as Central Plane Zone with average annual rainfall ranges from 1000 to 1400 mm annually, out of which about 90 percent is received during the monsoon season from July to September. Temperature ranges from high as 35°C in the May-June to as low as 5°C during December-January. The trend of rainfall is highly erratic and maximum (60%) water goes as runoff. The soils are mainly Loamy, Sandy. Agriculture is the main source of income of the farmers of the watershed. Kharif

is the main crop consist of Sugarcane, Paddy and Wheat. Natural vegetation of the watershed area is very poor. Occasionally Mango, Neem, Sheesham, tree are found in this area. There is no reserve pasture in the wasteland area. Due to Lack of the Irrigation water the rate of mortality of planted trees is very high. P.R.A. exercises conducted in the villages of watershed area revealed that inadequate irrigation facilities, low production of field crops.

Fodder shortage, lack of inputs and market facility are some of the major constraints being experienced by the farmers. For this area Amla, Guava, Ber, Bel fruit plants are suitable. is proposed in the selected area to motivate the farmers to adopt the agro horticulture in practice because of inadequate irrigation water.

It is expected that the implementation of different watershed management activities will bring down the run off and soil loss by 70% and 80% of their present level respectively. It is envisaged to increase the water and land utilization index though adoption of bio-engineering measures and improve the eco-development index. The proposed plan will improve the crop diversification index, productivity of existing crops and thereby will lead to self-sufficiency in food with nutritional security. The different enterprises of various sectors and the project as a whole have been found to be economically viable with sound rate of internal return and less payback period.

The agricultural land will be treated with banding along with minor levelling. Waste land will be treated with the engineering measures like staggered trenches and a forestation etc.

Budget for the various components is given as below –

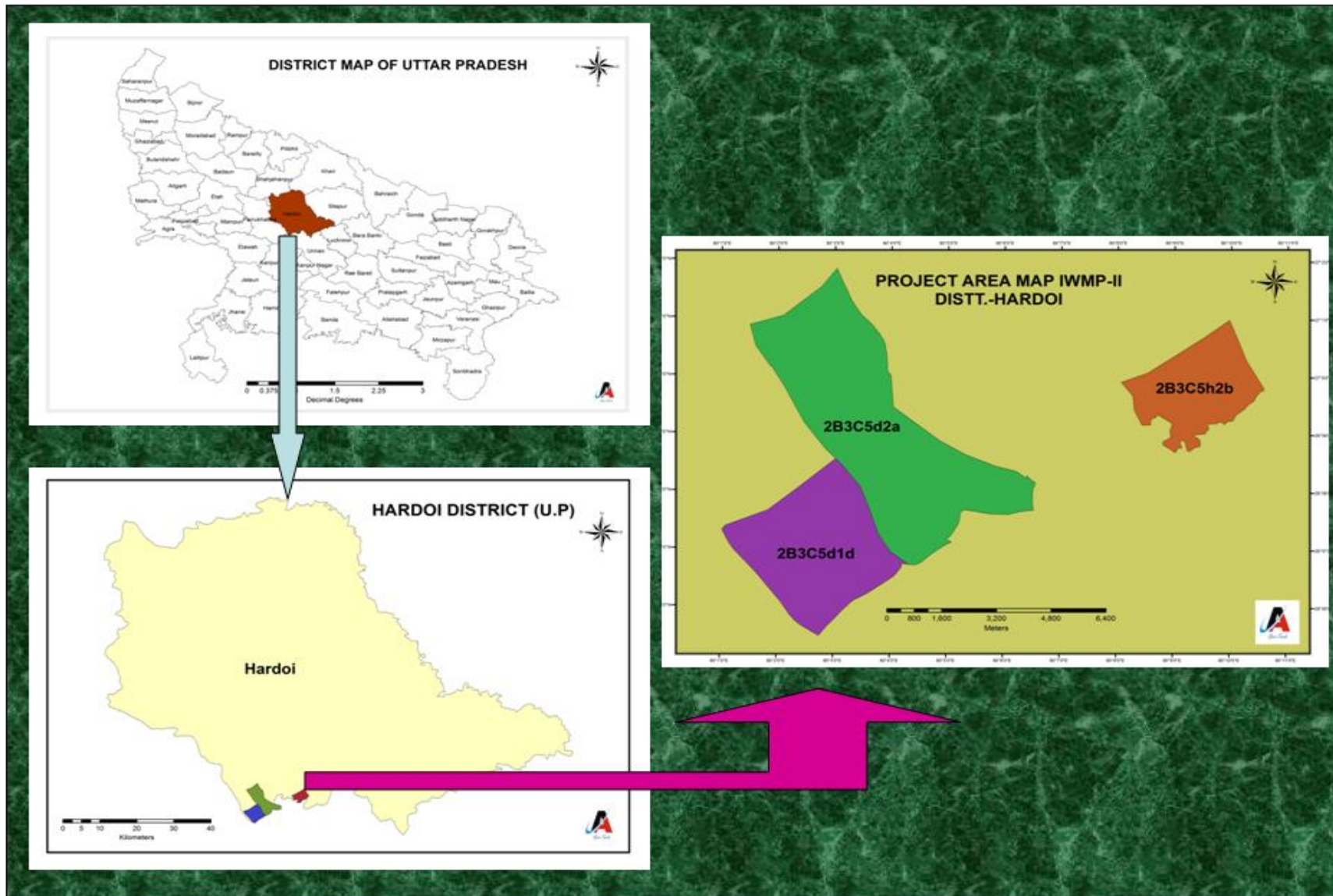
S.No.	Budge Component	Percentage	Total (Lakhs)
1	Management Cost		
	a) Administration Cost	10%	50.37
	b) Monitoring Cost	1%	5.03
	c) Evaluation	1%	5.03
	Sub Total	12%	60.43

2	Preparatory Phase		
	a) Entry Point Activities	4%	20.15
	b) Capacity building	5%	25.18
	c) Preparation of DPR	1%	5.03
	Sub Total	10%	50.37
3	Watershed Works	50%	251.88
4	Livelihood Activities	10%	50.37
5	Production System and Micro-enterprises	13%	65.48
6	Consolidation Phase	5%	25.24
	Sub Total	-	392.97
	Grand Total		503.76

PROJECT AT GLANCE

1	Name of Project	IWMP-IInd , Hardoi
2	Name of Block	Mallawan
3	Name of District	Hardoi
4	Name of State	Utter Pradesh
5	Name of village under micro-watershed	Harraiya, Kutubapur Panshala, BeriaNazirpur, Kutubapur Sisala, Shahpur Pawnar Sisala, Rampur, Mansoornagar, Shahpur Pawnar Peshala, Matiyamau, Belehara Kamaalnagar, Gadi Rasulpur, Tauklabad, Radhopur Sisala, Newada, Mangrha Sisala, Awsanpur, Hajratpur, Puranmau, Murtjakulipur, Sahimpur, Nekpur, Kodarmau, Kokatmau, Mehmudpur, Akbarpur, Tejipur, Musepur, Rajapur, Shahbuddinpur, Shahpurganga.
6	Micro watershed code selected	2B3C5d2a, 2B3C5d1d, 2B3C5h2b.
7	Total area of project	5248.00 Ha.
8	Proposed area for treatment	4198.00 Ha.
9	Cost per Hectare	12000.00 per ha.
10	Project period	2010-11 to 2014-15 2 nd
11	Total cost of project	503.76 lakhs

1. INTRODUCTION AND BACKGROUND



1.1 Project Background

IWMP IInd Hardoi district UP watershed with code No. **2B3C5d2a, 2B3C5d1d, 2B3C5h2b** respectively having area 5248.00 ha. Located in south-east part of Hardoi district of Uttar Pradesh has been taken up by Department of Integrated watershed management programme District – Hardoi.U.P. Under funded Ministry of rural development, GOI. The afare said watershed has also been taken up programme implementation comprising of development & management plan during next five years 2010-11 to 2014-15).. The total area of watershed is 5248.00 ha and treatable area is 4198.00ha

Table no.1: Basic Project information

Name of Project	District	Block	No of Village	No of MWS	Geographical Area	Proposed Area	Treatable Area	Cost (Rs in Lacs)
IWMP II nd	Hardoi	Mallawa	25	3	5248.00	5248.00	4198.00	503.76

1.2 Need and Scope for Watershed Development

Watershed Development Programme is prioritised on the basis of thirteen parameters namely Poverty Index, Percentage of SC/ST, Actual wages, Percentage of small and marginal farmers, Ground water status, Moisture index, Area under rainfed agriculture, Drinking water situation in the area, Percentage of the degraded land, Productivity potential of the land, Continuity of another watershed that has already developed/treated, cluster approach for plain or for hilly terrain. Based on these thirteen parameters a composite ranking was given to these Watershed project as given in Table no. 2 The total number of families under BPL is above 50 percent of the total households of the village. Hence a score of 7.5 is allotted. The percentage of schedule castes in the village is about 35 percent to the total population; hence a score of 10 was allotted. Rainfed agriculture for is the primary occupation of the village due to the fact that ground water is saline and hence unfit for usage. More than 80 percent of the farmers are small and marginal by natural and the actual wages earned by the labour is less than the minimum wages hence a composite rank of 5, and 10 are allotted respected.

Since the rainfall received is erratic and irregular. Drinking water is problematic in the village. The soil is very permeable and production of the land can be significantly enriched with the availability of timely irrigation. These watershed falls in continuity with other watershed. Cluster approach was followed taking into consideration three micro-watersheds covering a total area of 3374.00 ha. Thus a cumulative score of 80.All the parameters taken together give a cumulative score of 90 to the watershed (reference Table below).

Table no. 2: Weightage of the project

Project Name	Project Type	Weightage													Total
		i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	
IWMP-II nd	Eastern plain	5.00	10	5	10	5	0	10	5	10	5	10	5	0	80.00

Table no 2.1: Criteria and weightage for selection of watershed

S. No.	Criteria	Maximum score	Ranges & scores			
i	Poverty index (% of poor to population)	10	Above 80 % (10)	80 to 50 % (7.5)	50 to 20 % (5)	Below 20 % (2.5)
ii	% of SC/ ST population	10	More than 40 % (10)	20 to 40 % (5)	Less than 20 % (3)	
iii	Actual wages	5	Actual wages are significantly lower than minimum wages (5)	Actual wages are equal to or higher than minimum wages (0)		
iv	% of small and marginal farmers	10	More than 80 % (10)	50 to 80 % (5)	Less than 50 % (3)	
v	Ground water status	5	Over exploited (5)	Critical (3)	Sub critical (2)	Safe (0)
vi	Moisture index/ DPAP/ DDP Block	15	-66.7 & below (15) DDP Block	-33.3 to -66.6 (10) DPAP Block	0 to -33.2 (0) Non DPAP/ DDP Block	
vii	Area under rain-fed agriculture	15	More than 90 % (15)	80 to 90 % (10)	70 to 80% (5)	Above 70 % (Reject)
viii	Drinking water	10	No source (10)	Problematic village (7.5)	Partially covered (5)	Fully covered (0)
ix	Degraded land	15	High – above 20 % (15)	Medium – 10 to 20 % (10)	Low- less than 10 % of TGA (5)	
x	Productivity potential of the land	15	Lands with low production & where productivity can be significantly enhanced with reasonable efforts (15)	Lands with moderate production & where productivity can be enhanced with reasonable efforts (10)	Lands with high production & where productivity can be marginally enhanced with reasonable efforts (5)	
xi	Contiguity to another watershed that has already been developed/ treated	10	Contiguous to previously treated watershed & contiguity within the microwatersheds in the project (10)	Contiguity within the microwatersheds in the project but non contiguous to previously treated watershed (5)	Neither contiguous to previously treated watershed nor contiguity within the microwatersheds in the project (0)	
xii	Cluster approach in the plains (more than one contiguous micro-watersheds in the project)	15	Above 6 micro-watersheds in cluster (15)	4 to 6 microwatersheds in cluster (10)	2 to 4 microwatersheds in cluster (5)	
xiii	Cluster approach in the hills (more than one contiguous micro-watersheds in the project)	15	Above 5 micro-watersheds in cluster (15)	3 to 5 microwatersheds in cluster (10)	2 to 3 microwatersheds in cluster (5)	
	Total	150	150	90	41	2.5

1.3 Objectives and Scope of Project

- a. Conservation, development and sustainable management of natural resources including their use
- b. Enhancement of agriculture production and productivity in a sustainable manner.
- c. Restoration of ecological balance in the degraded and fragile rain-fed ecosystem.
- d. Reduction in regional disparity between rain-fed and irrigated areas.
- e. Creation of sustainable employment opportunities for the rural community for livelihood security.

1.4 Watershed Information

S. No.	Name of the Project	Type of watershed	Micro watershed Name	Code	Area (ha)
1	IWMP II nd HARDOI	Micro watershed	Akbarpur	2B3C5h2b	701.00
2		Micro watershed	Newada	2B3C5d2a	2267.00
3		Micro watershed	Pansala	2B3C5d1d	1230.00
	Total				4198.00

Source: secondary data

1.5 Status of previous watershed programmes & other development project/scheme in the watershed area

The IWMP IInd watershed area being very backward, has been on top priority of a number of development project. These programmes are mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Swarnjayanti Gram Swarajgar Yojna (SGSY), Indra Awas Yojna etc.

Table no. 4 Developmental Programmes running in the project area

S. No.	Name of Programmes/Scheme	Sponsored Agencies	Objectives	Commencement (year)	Village Covered
1	MGNREGS	Rural Development Dept.	Employment	2009	17
2	IAY	Rural Development Dept.	Housing	2005	18
3	SGSY	Rural Development Dept.	Self employment	1999	18

Source: Primary data

2. GENERAL DISCRIPTION OF THE WATERSHED

2.1 Location

The selected watershed IWMP-2nd of Hardoi (U.P.) is located in the Kalyani river about 53 – 60 km away from district headquarters. It lies between the longitude of 80°36' to 80°48' and latitudes 27°10' to 27°15'. The project is a cluster of three (3) micro- watersheds with code No. 2B3C5d2a, 2B3C5d1d, 2B3C5h2b. having an area of 5248.00 Ha. Out of which 4198.00 Ha, has been undertaken for treated under Integrated Watershed Management Programme (IWMP) starting year 2010-2011.

Area: Land Use Pattern

The IWMP IInd watersheds has diversified land uses namely agriculture, waste land (open scrub), seasonal water bodies etc. The varied present land use and area under different categories in watershed is shown in Table 5. The mixed land use followed in the watershed is almost similar in other parts of the U.P. During PRA exercise, the villagers prepared land use. One such map of village of IWMP IInd watershed is shown in table 5.

Table 5. Area under major land uses, irrigated and rain fed area, etc

S.N.	Name of Project	No of Micro Watershed	Geographical area	Forest Area	Agriculture land	Rain fed Area	Pasture land	Area in hectare		Treatable Area
								Cultivated	Uncultivable	
1	IWMP II nd	3	5248	46	2394	2350	0.50	918	80.5	4198.00

Source: Primary data

Various agricultural land uses in the watershed are extended to diversified land capabilities starting fro marginal to good class II lands. The watershed distinctly has three types of lands i.e. leveled, sloping and degraded and undulating. The agriculture is practiced on all these soil types though the productivity considerably varies. The total area under agriculture in the watershed is about

2394.00 ha out of which 44.00 ha is irrigated while 2350.00 ha is under rain-fed agriculture. The water (both irrigated and drinking) is most scarce natural resource in the watershed. The problem of tube wells for irrigation of agricultural crops frequently leads to the drinking water problem to the farmers of watershed forcing them to carry drinking water from outside the watershed area. The agricultural field bunds are common in the watershed, however, they frequently breach on heavy rains adversely affecting the in situ percolation of rain water in the soils.

2.2 Physiography

Total area of the IWMP IInd HARDOI is 5248.00 ha with treatable area 4198.00 ha. Elevation range and location of altogether three micro watershed shed are given below above

Table no. 6: Elevation range, longitude latitude, relief height difference etc

Location of watershed						Elevation of watershed from MSL		
District	Mandal	Micro watershed	Habitation	Longitude	Latitudes	Highest	Lowest	Relief height difference
Hardoi	Hardoi	2B3C5h2b	Akbarpur, Tejipur, Shahbuddinpur, Shahpurganga	26° 58' 43.947" to 27° 0' 57"	80° 8' 5.369" to 80° 10' 35.56"	134	112	22
Hardoi	Hardoi	2B3C5d2a	Matiy mau, Balehara Kamalnagar, Taukalabad, Newada, Mangraha Sisala, Hazratpur, Harriya, Puran mau, Berianajirpur, Kokat mau, Mansoornagar, Ausanpur	26° 56' 43" to 27° 1' 47"	80° 1' 31" to 80° 6' 33"	133	110	23

Hardoi	Hardoi	2B3C5d1d	Kutubapur Pansala, Shahpur Pawanr Sisala, Shahpur Pawanr Pansala	26° 55' 30" to 26° 58' 31"	80° 1' 2.87" to 80° 3' 29.16"	134	122	12
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Source : Remote sensing Lknow.& GPS

2.3.1 Major stream

The watershed is in the mid of IWMP IInd Hardoi in the form of Rapti river having precipitous slop and drained in gully of Rapti river. About 4 % of watershed area has slop more than 1% upright ridges. The top of the watershed exhibit extremely precipitous and manifesting moderate to severe erosion class. The lower portion of the watershed has moderate slope (less than 1 %). At the outlet of water shed small gullied are notice , covered with sparse vegetation. In Total (1st order -2 numbers, 2nd order-4 numbers and 3rd order-2 numbers) numbers of streams of different order are found in the watershed, with total stream length of 44100 m. Stream characteristics of watershed are presented in the table.

Table No.7: Stream characteristics of watershed (IWMP IIIHardoi)

Stream order	Stream number	Main stream length
1 st order	2	20250.00
2 nd order	4	20400.00
3 rd order	2	3450.00
Total	8	44100.00

2.4 Climate

The watershed falls under the semi-arid region of tropical climate. The average annual precipitation is 1160 mm spreading over 85 rainy days. Most of the rainfall (about 85 %) is received during July to September. The rainfall is of moderate to high intensity. The area receives on or scanty rainfall in the winter season. The temperature variation ranges from as high as 43°C in the month of May- June to as low as 5°C in December- January.

2.4.1 Climatic Condition

Table no. 8: Climatic Condition

S. No.	Name of Project	Name of the block/	No. of Micro Watershed	No. of revenue villages	Information																		
					Average Rainfall and rainy days (in mm)						Temperature (c)			Relative humidity (%)									
					2007		2008		2009		2007	2008	2009	2007	2008	2009							
					Avg.	No.	Avg.	No.	Avg.	No.	Min-	Min-	Min-	Min-	Min-	Min-							

					in Mm	Of Days	in Mm	Of Days	in Mm	Of Days	Max	Max	Max	Max	Max	Max
1	IWMP II nd HARDOI	Mallawan	3	25	1200	90	1032.00	119	1199.00	85.00	38.00	37.9	35	85	85	82

2.5 Watershed Characteristics

2.5.1 Shape and Size

The watershed shape (IWMP IInd Hardoi) is elongate type. The maximum length and width of IWMP IInd Hardoi the watershed are 23550 m and 20300 m, respectively with the length: width ratio 1.16:1

Table no. 9: Shape and Size of watershed

S. N.	Micro watershed Name	Code	Area (ha)	Shape	Approximate size in meter		Ratio Length: width
					Length	Width	
1	Akbarpur	2B3C5h2b	701.00	Scorpion tail	3650	2400	1.52:1
2	Newada	2B3C5d2a	2267.00	Scorpion head	2300	2100	1.09:1
3	Pansala	2B3C5d1d	1230.00	half leaf	10100	2750	3.67:1

2.5.2 Length of main stream, drainage density, average slope, watershed relief etc.

Table no. 10: Length of main stream, drainage density, average slope, watershed relief etc

S.No.	Project Name	Main stream	Drainage Density	Average Slope	Watershed Relief
1	IWMP II nd HARDOI	I-20250 meter II- 20400 meter III- 3450 meter	0.90-1.20 meter/second	0-4%	10-15 meter

2.6 Geomorphology and Soils

2.6.1 Geomorphology

The IWMP IInd Hardoi watershed is located South-west side of the Hardoi district. The entire watershed is topographically divided into two major landforms. Accordingly, the soils of watershed can be grouped into two major categories. Such as

- Plain land
- Ravinous land

2.6.2 Sloppy Land-Sandy Loam

The topmost portion (western & northwest part) of the watershed is Sloppy land with occasional depressions of flat land. These soils are derived from the Sandy loam and are located at some height of around 10 feet. They have developed from typical alluvial soil slightly alkaline in nature with occasional thin layers of silt in small patches. Near the high level, the soils are coarse and underlying with hard sandstones. The soils of the upper level and very nearby adjoining areas are loamy sand to sand in texture. Depth is the major limitations of these soil groups. As move away upper level, the soil depth gradually increases along with clay content thereby improving the fertility. The soils are alluvial in colour with ferruginous concretions with slightly alkaline in reaction.

2.6.3 Fine textured alluvial soils

These soils are the most extensive soil group found in the IWMP IInd Hardoi watershed. The middle portion of watershed is relatively flat land with fine soil texture. These soils are grey in colour and are inherently high in fertility status. These grey soils are sticky with high pH and on drying develop numerous cracks and fissures. Soil texture is silty clay loam particularly in depressions and loam in the elevated portion. The soils of the lower horizon are invariably heavier than the surface, being a zone of compaction and invariably a zone of calcium carbonate accumulation in the form of Kankar nodules. A subsurface indurate pan of kankar of clay or mixtures of both locally called as Potni soils are prevalent, which impede the downward movement of water thereby creating problems of high runoff.

2.6.4 Coarse textured alluvial soils

These soils are lying mostly near the adjoining areas of rapti River near the outlet and around the lower portion of foot hill of watershed. These soils are coarser in texture and are relatively poor in fertility status. The soils are loamy sand in texture. These soils also occupy significant area of the watershed. The soils are derived from the alluvial deposit and also from residual soils of the hill region. Rill and gully formation in some parts particularly near the outlet of watershed can be seen.

2.6.5 Drainage

Due to prevalence of mild to steep slopes and presence of a number of drainage lines in the watershed, the drainage system is adequate. The watershed forms part of rapti basin.

3- SOCIO-ECONOMIC CONDITION

3.1. Socio Economic Condition

3.1.1 Demographic pattern

The total population of three micro watershed are 34272 and 4284 house holds is with average family size is 8.0 person s.

Table no. 11: Demographic pattern detail

S. No.	Name of Micro Watershed	Name of Villages	Total No of House Hold	Population			Population of SC/ST		
				Male	Female	Total	Male	Female	Total
1	2B3C5h2b	Akbarpur, Tejipur, Shahbuddinpur, Shahpurganga	1428	4326	2814	8568	1526	654	2180
2	2B3C5d2a	Matiymau, Balehara Kamalnagar, Taukalabad, Newada, Mangraha Sisala, Hazratpur, Harriya, Puranmau, Berianajirpur, Kokatmau, Mansoornagar, Ausanpur	1328	3326	1814	8568	1326	454	1780
3	2B3C5d1d	Kutubapur Pansala, Shahpur Pawanr Sisala, Shahpur Pawanr Pansala	1528	5326	2814	17136	1726	854	2580
Total			4284	12980	8443	34272	4578	1962	6540

Source: District statistic magazine

3.1.2. Literacy rate

Table no. 12: Literacy rate detail

S. No.	Name of Micro Watershed	Name of Villages	Total population	% of Literacy		
				Male	Female	Total
1	2B3C5h2b	Akbarpur, Tejipur, Shahbuddinpur, Shahpurganga	7141	62	34	48
2	2B3C5d2a	Matiymau, Balehara Kamalnagar, Taukalabad, Newada, Mangraha Sisala, Hazratpur, Harriya, Puranmau, Berianajirpur, Kokatmau, Mansoornagar, Ausanpur	9141	65	41	53
3	2B3C5d1d	Kutubapur Pansala, Shahpur Pawanr Sisala, Shahpur Pawanr Pansala	5141	67	49	58
Total			21423	64.67	41.33	53.00

3.1.3. Migration pattern

Table no. 13: Migration detail

S. No.	Name of Micro Watershed	No. of Villages	Total population	Migration			Migration by Month			Main reason for migration	Income during migration
				Total	Male	Female	<3Month	3-6 Month	>6 month		
1	2B3C5h2b		7141	5216	3265	1698	3216	1890	15	Employment	Rs 3500/ month
2	2B3C5d2a		9141	7256	5110	2310	5256	1987	20	Employment	Rs 4500/ month
3	2B3C5d1d		5141	4560	2860	1890	2860	1760	25	Employment	Rs 3500/ month

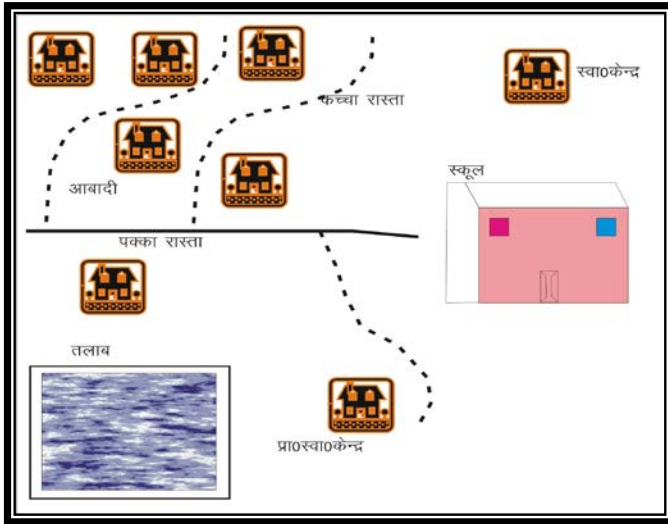
Source: District statistic magazine and Secondary data

3.14 Infrastructure social features

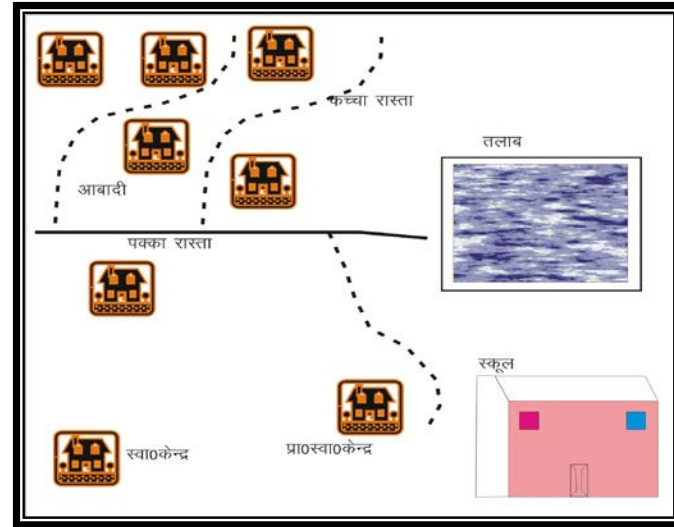
Table no.14: Details of infrastructure in the project area

S.No.	Parameters	Status			
(I)	No. of Villages connected to the main road by an all-weather road	15			
(ii)	No. of villages provided with electricity	19			
(iii)	No. of households without access to drinking water	3284			
(iv)	No. of educational institutions: Primary (p)/Secondary(S)/ Higher secondary(HS)/ vocational Institution (VI)	(P)	(S)	(HS)	(VI)
		10	8	6	-
(v)	No. of villages with access to primary Health Center	4			
(vi)	No. of villages with access to Veterinary Dispensary	10			
(vii)	No. of villages with access to Post office	14			
(viii)	No. of villages with access to Banks	4			
(ix)	No. of villages with access to Markets/mandis	11			
(x)	No. of villages with access to Agro-industries	-			
(xi)	Total quantity of surplus milk	2642 liter			
(xii)	No. of milk collection centers (e.g. Union(U)/Society(S)/ Private agency (PA)/ others (O)	(U) No	(S) No	(PA) 32	(O)
(xiii)	No. of villages with access to anganwadi Center	17			
(xiv)	Any other facilities with no. of villages (please specify)	-			

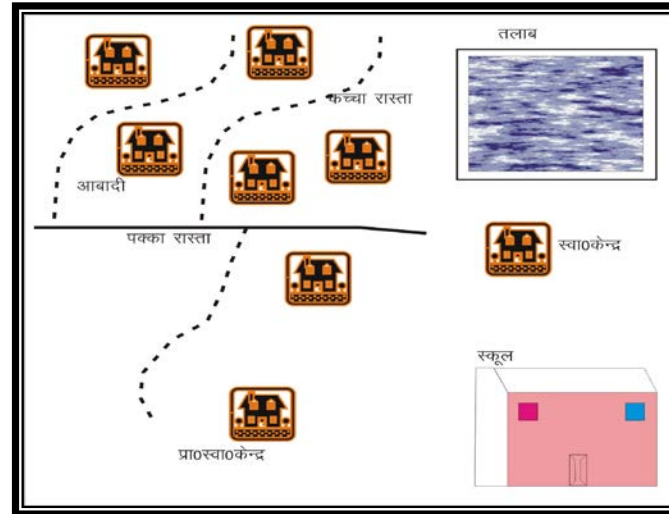
The IWMP IInd watersheds has moderate communication facilities and all 19 villages are approachable through motorable road. Literacy rate in the watershed is very low because all villages are having education upto junior high school. All the villages are electrified and have TV & telephonic connection. Nearest small market is at Mallawan 10, 15 km and nearest big market Hardoi is about 35 km from the watershed. Religious and ritual features are almost common as in other part of the U.P. Small land holding (average less than 2 ha) with large family size (average 7 person) and more than 45% of the labour force of the total population living below poverty line indicate poor socio economic status of the watershed community. However, strong community spirit among the villager's show positive indication for the success of any programmed to be implemented in participatory mode. Traditionally the entire village community participates in the individual works. Various village features is shown in fig



SOCAL MAP-VILLAGE 2B3C5h2b



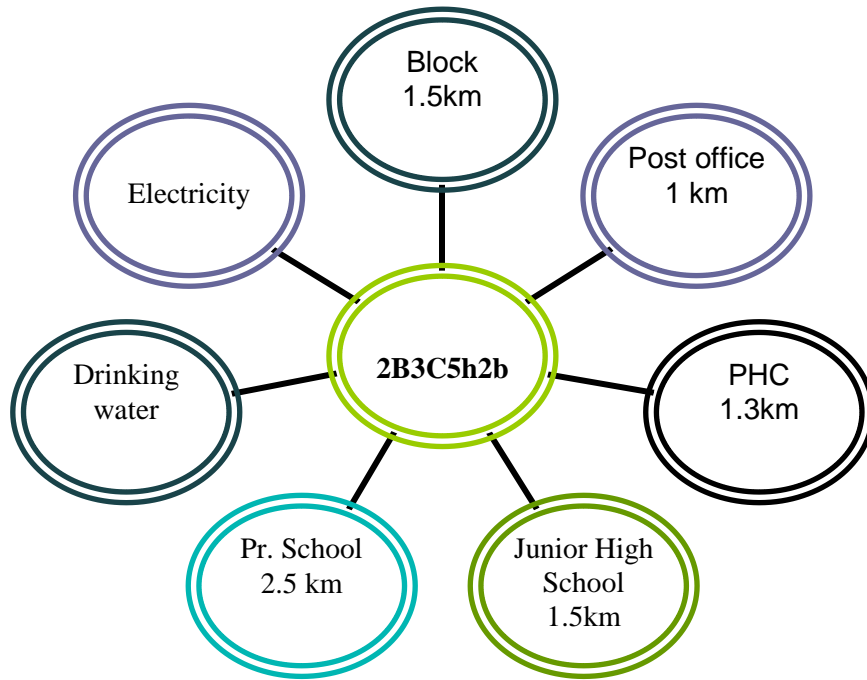
SOCAL MAP-VILLAGE 2B3C5d2a



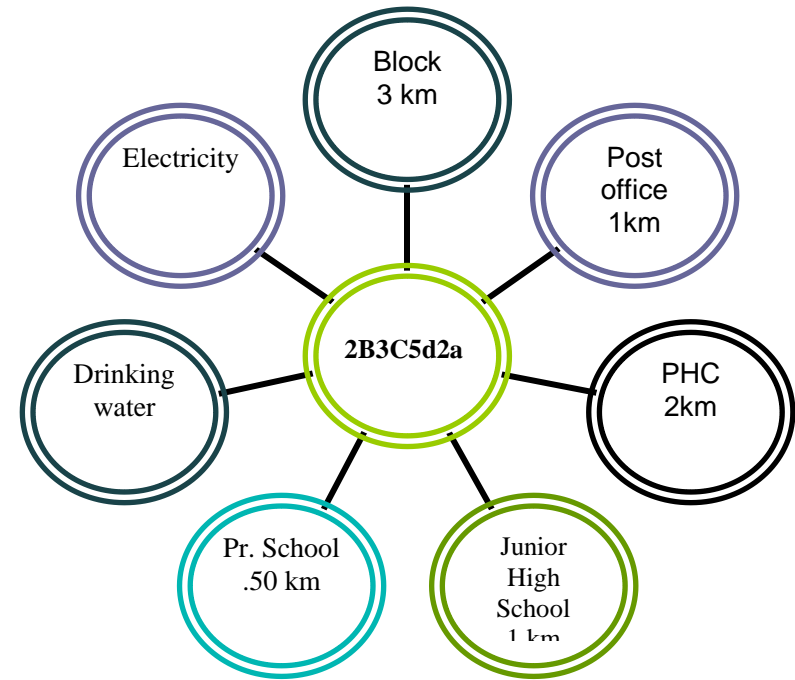
SOCAL MAP-VILLAGE [2B3C5d1d]

3.15 Venn diagram

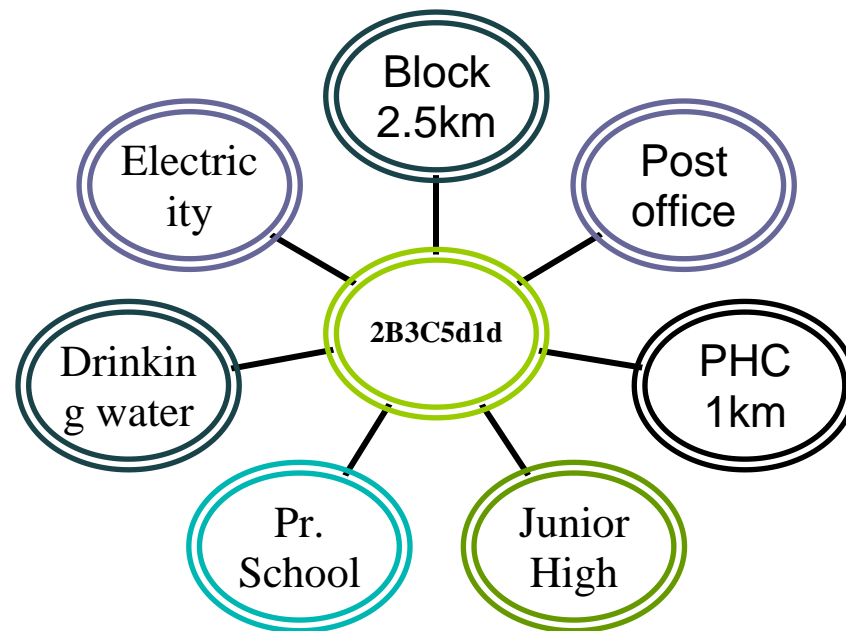
In the Venn diagram, farmers' perceptions were recorded for importance and role of different development institutions in relation to infrastructure development in the villages. Importance has been depicted with the size of the circle, and role with distance from the village circle. The Venn diagram of the IWMP IInd watershed villages are being attached here with



VENN DIGRAM OF VILAAGE **2B3C5h2b**



VENN DIGRAM OF VILAAGE **2B3C5d2a**



VENN DIGRAM OF VILAAGE 2B3C5d1d

3.1.6. Historical timeline

An historical timeline is the chronological record of important events in the history of the village which is useful in understanding its background in the context of five watersheds of Hardoi district. Historical timeline depicting important events in respect of different villages of the IWMP IInd watershed was prepared through PRA. Historical timeline for important villages are given in table .

Village- 2B3C5h2b		Village- 2B3C5d2a	
Year	Activities	Year	Activities
1701	Established	1710	Established
1966	Construction Bandhi (water harvesting structure)	1964	Construction Bandhi (water harvesting structure)
1968	Opening up Primary School	1985	Opening up Primary School
1970	Introduction of Tractor	1980	Introduction of Tractor
1975	Establishment of Gobar gas plant	1978	Establishment of Gobar gas plant
1982	Kacha road	1985	Kacha road
1985	Introduction of thresher	1987	Introduction of thresher
1986	First Tube well	1989	First Tube well
1992	First motorcycle	1991	First motorcycle
1995	TV and DVD player	1993	TV and DVD player
2001	Electricity in the village	2005	Electricity in the village
2005	Bituminous road	2008	Bituminous road
2008	Temple renovation	2009	Temple renovation
2009-10	Planning for watershed project	2009-10	Planning for watershed project
Village- 2B3C5d1d			
Year	Activities	Year	Activities
1702	Established	1989	First Tube well
1960	Construction Bandhi (water harvesting structure)	1991	First motorcycle
1985	Opening up Primary School	1995	TV and DVD player
1980	Introduction of Tractor	2003	Electricity in the village
1978	Establishment of Gobar gas plant	2007	Bituminous road
1983	Kacha road	2008	Temple renovation
1987	Introduction of thresher	2009-10	Planning for watershed project

Source : Secondary data

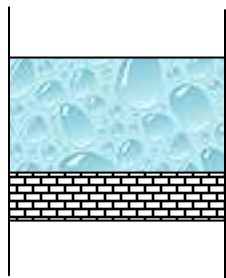
3.2. SOIL AND LAND USE

3.2.1 Soil morphology

The IWMP-IInd, Hardoi watershed is located south-west corner of the Hardoi district. The entire watershed is topographically divided into two major land forms. Accordingly, the soils of watershed have been grouped in two major categories.

- (i) Plain land
- (ii) Sloppy land
- (iii)

Soil profile-A representative soil profile (Dominant soil-Table 8)



1-1.5 m (heavy texture soil-black in colour)

5-6m (Locally called Pathrili soil- clay mixed with CaCO_3)

Parent material/Regolith/bed rock (sand stone)

3.2.2 Morphology of a typical soil profile of micro watershed (dominant soil)

Table no. 15: Morphology of a typical soil profile of micro watershed (dominant soil)

Horizon	Depth (cm)	Morphology
A	0-150	Black in colour, clay content 28%, with free CaCO ₃ , sticky when moist, hard when dry, high elasticity, fissures and cracks, occasional occurrence of tree calcium carbonate granules pH 8.3-8.7.
B	150-600	Whitish-yellow in colour, high effervescence with dilute HCl, very fine mixed with tree CaCO ₃ and granules, very hard when dry, compact & indurate land pan, restricting development of root and downward water transmission (locally called as pathrili soil)
C	>600	Red & White sand stone, Regolith (Parent material)

3.2.3. Soil characteristics and fertility status

Table no. 15.1: Soil characteristics and Fertility Status up to 6''

Soil properties	LCC II	LCC IV	LCC VII/VIII
Sand (%)	45.5	74.30	74.14
Silt (%)	25.03	19.40	19.20
Clay (%)	29.5	6.52	6.53
Texture	Sandy Clay loam	Loamy sand	Loamy sand
pH (1 : 2)	8.01	8.52	6.96
EC (DSm ⁻¹)	0.47	0.11	0.15
Organic carbon (%)	0.36	0.13	0.18
Available N (Kgha ⁻¹)	322	175	222
Available P (Kgha ⁻¹)	28	16	6-7
Available K (Kgha ⁻¹)	180	318	232

Values correspond to soil fraction

3.2.4. Land Capability Classification (LCC)

Land capability classification was done to classify the soils in different groups based upon the capabilities & limitation and to emphasize the hazards prevailing in the watershed under different kinds of soils. Initially reconnaissance survey was carried out for entire watershed in order to find out the different topo-sequences, land forms, soil depth and erosion hazards. This was followed by the detailed investigation of selected land forms to bring out the LCC classes of the IWMP-IInd, Hardoi watershed. Three classes of land capabilities namely II, IV & VII were demarcated in the watershed. The areas under different classes are shown in table 16.

Table no. 16: Area under different land capability class under micro watersheds.

Land capability class	Area (ha)
II	1679.20
IV	1259.40
VII	839.60
VIII	419.80
Total	4198.00

3.2.4.1. Land capability class I (White)

This group is one of the most extensive LCC class of the IWMP-IInd, Hardoi watershed. This group of soil is occupying around 1679.20 ha of the watershed area. The soil are clay loam or silty clay loam in texture. The land under this class is nearly level to wild sloping (1-3%). The soils are deep and erosion hazard in slight. Most of the production agriculture land comes under class II. A considerable area of watershed is seasonally water logged comes under this LCC class, primarily found near the earthen check. These areas are subject to water logging in most part of the year. The lands are almost flat, silty clay or clay loam, in texture,

deep and very mild slopping. These lands have no major limitations other than occasional water logging. During rabi seasons, the water is drained out and cultivation is carried out. These lands potentially very productive but due to water logging during the rainy season, it could not be brought out under cultivation during the kharif season. The mapping unit for this class is given as under-

Land capability class IV = Scl-d₅/B-e₁

3.2.4.2 Land capability class II (whitish yellow)

A considerable area of watershed i.e. 1259.40 ha is under class IV. This class is found in lower portion i.e. near the outlet of watershed. The soils are coarser in texture (loamy sand/sand), deep, susceptible to erosion hazard and undertaking in topography. Limiting factors in this class and steep slopes, severe past erosion, severe credibility, shallow soils, lower water holding capacity, severe alkalinity and salinity with poor drainage are common features. Rill & initiation of gully can be seen near the outlet of the watershed. In some part of calcareous soils particularly near the foot hill, where soils are coarser in texture and shallow in depth, is also coming under this class. The mapping unit for their class is as follows.

Land capability class IV_e = 1s-d₅/C-e₃, IV_{es}=1s-d₃/D-e₃ (calcareous soils)

3.2.4.4. Land capability class III/IV (Greysh yellow)

These lands are occupying an area of 839.60 ha of the watershed. This class of land is mostly found in pathrili area of watershed. The soils are very shallow underlying hard rock, steep slope (>22%) and coarser in texture. Mostly brown soils are found under this class. Class VII and VIII one intermixed in top of the foot trill of watershed. Mostly class VIII (419.80 ha) lands are located on moderately trill topes (Bhita), where soil depth is almost negligible. Soils with admixture of gravels/rock fragments one found in these classes of lands. The mapping unit for this class of land is as follows.

Land capability class VIIe=glS-d₁/H/I-e₄

3.2.4.5. Mapping units symbol

Soils depth (cm) d₅ - > 90 cm; d₃-22.5-45.0; d₁, < 7.5 cm. Texture cl-clay loam; IS-loamy sand; gls-gravelly loamy sand, slop %) B-1-3; C-3-5; D-5-10%, H-25-33; I-33-50

Erosion e₁-25% of A horizon lost; e₂ = 50-75% of a horizon lost; e₄=50-75% B horizon lost.

3.2.4.6 Detail of soil Erosion in the Project Area

Table no. 16 a

1	2	3	4	5
Cause	Type Of erosion	Area affected (h)	Run Off (mm/year)	Average soil loss (Tonnes/ha/year)
Water erosion		IWMP-III		
a	Sheet	3320	70 % of 694 mm	24.00
b	Rill	810		
c	Gully	68		
Sub-Total		4198		
Wind erosion				
Total		4198	NA	24.00

CONCLUSION

The land capability classification of IWMP-IInd, Hardoi Watershed provides reasonable good information with regard to capability of soil. That could be used for agriculture, agri-horticulture, silviculture & pasture development. The majority of land from is coming under class II, which give an insight of good agriculture production potential of this watershed. The productivity of these land could be further enhanced by adoption of simple soil & water conservation measures like mild leveling, bunding, diversion drain and in site moisture conservation practices. The reasonable area is under class VII indicating greater potential of this watershed for forestry and pasture development. The major physical limitation in case of agriculture soils are the sub soil hardness, low limitations in case of agriculture soils are the sub soils hardness, low water in filterability and slope. In case of area under calcareous soils, pronounced limitations of soils depth was noticed following by severe erosion hazard and coarse soil texture. A small portion watershed is under seasonally water logged. The soils under waterlogged are could be used for some other beneficial farming activities during the kharif and season also.

3.3. Land Use Pattern

3.3.1 Land holding

Majority of the farmers are in the category of marginal (< 1 ha) and small (1-2 ha) with average land holding of about 2.2 ha. These small land holding are further scattered at different places, which makes cultivation very difficult. Distribution of farm families according to the size of the land holdings are given in the table.

Table no. 17: Distribution of farm families according to their size of landings.

S.N.	Name of Micro Watershed	Name of Villages	Land holding			
			Marginal (<1 ha)	Small (1-2 ha)	Large (>2 ha)	Total
1	2B3C5h2b	Akbarpur, Tejipur, Shahbuddinpur, Shahpurganga	2859	909	153	3921
2	2B3C5d2a	Matiy mau, Balehara Kamalnagar, Taukalabad, Newada, Mangraha Sisala, Hazratpur, Harriya, Puranmau, Berianajirpur, Kokatmau, Mansoornagar, Ausanpur	1515	516	153	2184
3	2B3C5d1d	Kutubapur Pansala, Shahpur Pawanr Sisala, Shahpur Pawanr Pansala	920	77	55	1152

Source: District statistic magazine and Secondary data

3.3.2. Land Use

The IWMP IInd watersheds has diversified land uses namely agriculture, waste land (open scrub), seasonal water bodies etc. The varied present land use and area under different categories in watershed is shown in Table 18. The mixed land use followed in the watershed is almost similar in other parts of the U.P. During PRA exercise, the villagers prepared land use. One such map of village of IWMP IInd watershed is shown in table

Table no 18: Land use pattern

S.N.	Name of Project	No of Micro Watershed	Geographical area	Forest Area	Agriculture land	Rain fed Area	Pasture land	Area in hectare		Treatable Area
								Wastelands		
								Cultivated	Uncultivable	
1	IWMP II nd	3	5248	46	2394	2350	0.50	918	80.5	4198.00

3.3.2.1 Agriculture

Various agricultural land use in the watershed are extended to diversified land capabilities starting from marginal to good class-II land. The watershed distinctly has three types of land i.e. leveled, sloping & degraded and undulating. The agriculture is practiced on all these soil types through the productivity considerably vary. The total area under agriculture in the watershed is about 2394.00 ha out of which 44.00 ha is irrigated while 2350 ha is under rainfed agriculture. The water (both irrigated and drinking) is most scarce natural resource in the watershed. The operation of tube wells for irrigation of agricultural crops frequently leads to the drinking water problem to the formers of watershed & occasionally forcing them to carry drinking water from another side of the watershed area. The agricultural field bund are common in the watershed, however, they have poor thickness & usually water flow feely from top of bunds as well as frequently breach on heavy rains adversely affecting the in site percolator of rain water in the soils.

The agriculture soils are in the watershed have diversified texture i.e. clay loam, sandy clay loam and Kankar mixed textures which are located in patches throughout the watershed. The heavy soils and almost used by paddy crop during rainy season. The sodic soils also have hard calcium pan at variable depths. The irrigation water is conveyed either by earthen channels or plastic pipes and surface irrigation methods following mainly border method or flood method of irrigation by the farmers in the watershed. These factors substantially reduce the water use efficiency of limited available & valuable irrigation water in the watershed. The quality of irrigation water needs to be tested for assessing fitness of the quality for irrigation & other purposes. Rehabilitation of waste lands with appropriate drought hardy species like Karanj (*Pongamia glabra*), introduction of suitable multi-purpose trees, promoting agro-forestry on agricultural lands with appropriate fruits & forest species, suitable vegetative barriers on sloping lands can of high future value in meeting out not only fire wood & fodder demands in the watershed but also for soil & water conservation, eco-friendly environment, rehabilitation of watershed and substantial income generation for socio-economic upliftment of resource poor farmers in the watershed.

One year rotation

Single cropping : Fallow-mustard/wheat/gram/pea/lentil/winter vegetables (In BESU & SONG watershed area rabi crops are mostly raised on fallow fields of rabi season while kharif crops are grown on fallow of zaid season).

Double cropping : Bajra/Jowar/sesame/black gram/green gram-mustard/wheat/gram/lentil/winter vegetables. growing of two or more than two crops simultaneously in the same field at the same time with an objective to mitigate the risk factors as well as enhancement in the productivity & profitability in the per unit area e.g. wheat mustard, lentil+ line seed, Sugarce + mustard Gram + Line seed , Maize + Arhar etc.

Irrigated Agriculture

One Year Rotation : Growing of number of crops in such a way that must complete their life cycle within agricultural year in a strict rotation without deteriorating soil fertility is called one year crop rotation. Examples Rice-wheat, Rice- mustard, maiz-potato, maize-gram/pea/lentil, rice-barley-zaid maize, maize-potato-urd/mung etc.

3.3.2.2. Crop Productivity

Table no. 19 Production and productivities of important commodities in IWMP II HARDOI

Sl.	Name of Crop	2004			2005			2006			2007			2008		
		A (Ha.)	P (Tons)	Y (Qt./Ha)	A (Ha.)	P (Tons)	Y (Qt./Ha)	A (Ha.)	P (Tons)	Y (Qt./Ha)	A (Ha.)	P (Tons)	Y (Qt./Ha)	A (Ha.)	P (Tons)	Y (Qt./Ha)
1	Paddy	4966.00	149277.96	30.06	4966.00	153946.00	31.00	4966.00	163878.00	33.00	4966.00	173810.00	35.00	4966.00	178776.00	36.00
2.	Wheat	3569.00	103501.00	29.00	3569.00	107070.00	30.00	3569.00	114208.00	32.00	3569.00	107070.00	30.00	3569.00	117777.00	33.00
3.	Mustard	180.00	1440.00	8.00	180.00	1710.00	9.50	180.00	1620.00	9.00	180.00	1440.00	8.00	180.00	1620.00	9.00
4.	Lentil	70.00	560.00	8.00	70.00	665.00	9.50	70.00	560.00	8.00	70.00	525.00	7.50	70.00	595.00	8.50
5.	Pea	88.00	440.00	5.00	88.00	704.00	8.00	88.00	748.00	8.50	88.00	792.00	9.00	88.00	792.00	9.00
6.	Potato	58.00	8236.00	142.00	58.00	8584.00	148.00	58.00	8990.00	155.00	58.00	9396.00	162.00	58.00	8584.00	148.00
8.	Banana	2.00	354.00	177.00	2.00	354.00	177.00	2.00	364.00	182.00	2.00	380.00	190.00	2.00	410.00	205.00

Source: District statistic magazine and Secondary data

Crop productivity : The agricultural productivity is primarily driven by the amount and distribution of rain water specifically during two cropping seasons i.e. rabi & kharif. Productivity of kharif crops is also affected by the late onset or early withdrawal of monsoon as well as intermittent droughts of variable duration & intensity. The farmers also do not have suitable cropping systems to deal aberrant weather, weeds impose considerable constraint in productivity of both kharif and rabi crops under irrigated as well as rainfed production system. Farmers undertake normally one manual weeding in paddy & other valuable crops, however, practice is energy and time consuming. Use of we divided is rare in the watershed.

The mixed cropping is in practice in limited area with kharif crops like Arher, maize, mung, urd, bajra & jowar but it is not only irrational but also unscientific and be set with low productivity. Subsequent rabi crops in general and mustard, gram pea, barley crops, in particular are raised on residual soil moisture under rainfed production system during post monsoon season. Imbalanced use of fertilizers is common is not only rabi & kharif crops but also in rainfed and irrigated production system. The recommended deep ploughing for enhanced in sites residual soil moisture conservation and higher production is also not followed in the watershed.

The shallow ploughing through tractor drawn till age implements are available with the farmers in the watershed but deep ploughing implements are available with the farmers in the watershed but deep ploughing implements yet need to be introduced. The soil fertility/health restoration practices like green manuring, crop rotations and intercropping specifically with legumes, use of FYM/compost, vermi-compost, bio fertilizers, soils & water conservation measures use of brought up or in sites mulches are widely lacking in the watershed. The soil and water conservation measures are limited to mechanical/earthen measures created by the state Govt. agencies. Conservation agronomical measures like seeding and ploughing across the slope, weed mulching, agro-forestry, vegetative barriers etc also completely lack in watershed.

3.3.2.3. Indigenous technological knowledge (ITK)

The agriculture is an old traditional practice of farmers in the watershed who have improved themselves with passage of the time according to their domestic need and technological reforms in the nearby areas. The villagers have their traditional village ponds, practice of field bunding which typically constitute agriculture related ITKs in the watershed. The mustard being a cash/fire wood crop of the watershed is being cultivated in self designed manner

by the farmers. However, limited fertilizer application specifically the DAP came in to practice since about 20 years.

3.4 Horticulture

The subtropical fruits and vegetables have very good potential in the watershed. The fruit trees has limited in number like mango, guava, papaya, lemon, lime, ber, aonal, bael as vegetables like cucurbits, okra, radish, tomato,cauliflower cabbage, garlic, onion, brinjal, chilly, but they are found surviving well in the watershed villages. Organized orchards, commercial vegetable cultivation, horti-agri and other systems of agro-forestry etc are lacking but have good potential in the water shed.

3.5 Live Stock Population

Total livestock population of the IWMP IInd watersheds is 2952 bufallow is preferred as milch animal compared to cow, but milk yield is very low. Goats are also kept for milk as well as for meat purpose. The detail of live stock population is given in table below

Table no. 20: Live stock population

S. N.	Name of Micro Watershed	Name of Villages	Cows	Buffaloes	Sheep	Goat	Cock	Pig	Fish	Total
1	2B3C5h2b	Akbarpur, Tejipur, Shahbuddinpur, Shahpurganga	692	984	125	1321	9735	378	Yes	13235
2	2B3C5d2a	Matiymau, Balehara Kamalnagar, Taukalabad, Newada, Mangraha Sisala, Hazratpur, Harriya, Puranmau, Berianajirpur, Kokatmau, Mansoornagar, Ausanpur	800	980	123	1320	2230	380	Yes	13235
3	2B3C5d1d	Kutubapur Pansala, Shahpur Pawanr Sisala, Shahpur Pawanr Pansala	896	988	75	1322	1935	376	Yes	26470
Total			2388	2952	323	3965	13900	1135	0	52940

Source: District statistic magazine and Secondary data

3.6 Fisheries

Commercial fish farming was not done by the farmers of in IWMP IInd , but there is a big scope for fish farming in these area. Aware farmers gated 25.00q/ha production, it was very low.

3.7. Forest and other Vegetation

3.7.1. Forests

The watershed has no forest area only some wild trees are found in scattered manner.

3.7.2. Horticulture/ Agro-forestry

No horticulture and Agro forestry practices were observed in the watershed.

3.7.3. Agro-forestry

The agro-forestry practices are highly lacking in the watershed though it has good potential under existing dispositions and may play a vital role particularly with respect to minimization of cropping risk, build up soil fertility and productivity, soil conservation, partly meeting out the fire wood demand of rural community and moreover, optimizing the economical return from system as a whole under typical semi arid climate in the watershed. The other agro-forestry systems like agri-silvi, silvi-pastoral, bund and boundary plantations also have good potential to cater the fire wood and fodder demands of the rural community in the watershed. The existing area under agro-forestry is almost negligible. Prosopis juliflora may be planted as block or sole plantation specifically on marginal and degraded lands in the watershed. The agro-forestry interventions comprising of ber, bail, aonla, guava, popular etc may be applied to benefit of the farmers under rain-fed to irrigated production systems on leveled to sloping and marginal agricultural using proper planting techniques and termite control measures. The multipurpose trees may also help in supplementing fire wood and fodder demands of the rural community in the watershed and may be planted as hedge rows on rain-fed, marginal and degraded lands.

Conclusions

The land capability classification of IWMP II watershed provides reasonable good information with regard to capability of soil, that could be used for agriculture, agri-horticulture, silviculture and pasture development. The majority of land form is coming under class II, which give an insight of good agriculture production potential of this watershed. The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like mild leveling, bunding, diversion drain and in-situ moisture conservation practices. The reasonable area is under class III indicating greater potential of this watershed for forestry and pasture development. The major physical limitations in case of agriculture soils are the sub soil hardness, low water infiltrability and slope. In case of area under topes of watershed, the most pronounced limitation of soil depth was noticed followed by severe erosion

hazard and coarse soil texture. A small portion of watershed is under seasonally waterlogged. The soils under waterlogged area could be used for some other beneficial farming activities during the kharif season also.

3.7 Livelihood Pattern

The people of watershed area earn their livelihood from agriculture and animal husbandry. During lean period they migrate for daily wage labourers in block and district head quarter and as agriculture labour in other parts of the state. Another occupation of the people is parental small scale occupation.

Table no. 21: Livelihood pattern (Occupational Distribution)

S. N.	Name of Micro Watershed	Total Workforce	Agriculture	A. Husbandry	Agriculture + A. Husbandry	Casual Labour	Service	Handcraft	Daily wage labour
1	2B3C5h2b	8845	3265	1256	2365	789	5	3	2365
2	2B3C5d2a	3525	1256	963	563	845	10	2	252
3	2B3C5d1d	12823	3265	4562	569	856	9	3	456

Source: District statistic magazine and Secondary data

3.7.1. Per capita income

Table no. 22: Per capita income in IWMP II

S. no.	Name of Project	Agriculture (Rs)	A. Husbandry (Rs)	Casual labour (Rs)	Others (Rs)	Total (Rs)
1	IWMP IInd HARDOI	6750.00	4825.50	4200.00	3760.00	19535.50

3.8 Hydrology and water resource

3.8.1. Table no 23: Hydrology status

S.No.	Name of Project	Item	Unit of measurement	Status
1	IWMP II nd HARDOI	Status of water table	Meters	6-7
2		Ground water structures repaired/ rejuvenated	No.	-
3		Quality of drinking water	Quality	Poor
4		Availability of drinking water	Days	300
5		Irrigation potential	%	4

3.8.2. Water Resource

Table no. 24: Information about water resources

S. N.	Name of Micro Watershed	Canal		Wells/Borewells		Tubewells		Ponds		Govt. handpump		Pvt. handpumps		Others	
		D	N	D	N	D	N	D	N	D	N	D	N	D	N
1	2B3C5h2b	-	-	325	7	250	5	310	7	235	18	284	42	-	-
2	2B3C5d2a	-	-	325	7	250	5	310	7	235	18	284	32	-	-
3	2B3C5d1d	-	-	320	2	250	2	310	9	235	14	284	10	-	-

D= Availability of water in days

N= Number

Source: District statistic magazine and Secondary data

3.9 PROBLEMS AND NEEDS OF THE AREA

3.9.1 Problem Identification and prioritization

Food sufficiency, economic growth and environmental security were identified as the major issues to be addressed in the watershed area. The area has undulating topography, steep unstable slopes, and excessive channel gradient and hence highly prone to soil erosion. Effective soil depth is limited and spatially highly variable hampering good crop growth (Table 11).

Problems identified and prioritized during the transect walk and PRA exercises in all the villages of this IWMP IInd watershed were pooled and a list of nine problems representing the whole watershed was prepared. Problems were ranked as per their total weight age in the three villages. Lack of irrigation water was the greatest problem experienced by the people followed by low production of field crops, lack of fodder availability and low animal productivity (Annexure- I).

Strength, weakness, opportunity and threat (SWOT) analysis is a useful decision support tool, A SWOT analysis of the Micro watersheds is presented in Table 25.

Table no. 25: Problem identification and prioritization for Micro Watersheds

S.No.	Problem	Rank
1	Low production of field crops	5
2	Lack of drinking water	1
3	Lack of irrigation water	2
4	Lack of fodder availability and low annual productivity	3
5	Non-availability of fuel wood	4
6	Lack of inputs like quality seeds, fertilizer, pesticides etc.	6
7	Lack of market facility	9
8	Lack of medical, educational and transportation facilities	8
9	Medical and health care facilities for mulching animals and low productivity.	7

Table no. 26: SWOT analysis of the Micro Watersheds

Strengths (S)		Weakness (W)	
i.	Cooperative work culture in traditional activities	i.	Poor water management
ii.	Close ethnic ties	ii.	Resource poor farmers
iii.	Road at the top as well as outlet of the watershed	iii.	Out migration of youth
iv.	Hard Working	iv.	Low and erratic rainfall
v.	Resource pool of crop genetics diversity	v.	Fragile geology
vi.	Awareness of farmers about watershed management programme	vi.	Fragmented land holding
vii.	Well established CPR maintaining and sharing system	vii.	Heavy infestation of wild animals
viii.	Stall feeding of animals	viii.	Problem of fuel and fodder
ix.	Well maintained seasonal water bodies	ix.	Shallow soil depth and with high percentage of gravel
x.	Social outlook of the community towards land less		
Opportunities (O)		Threats (T)	
i.	Wide range of annual and perennial crops	i.	Prone to adverse climate like drought
ii.	Scope of regular employment opportunities	ii.	High market risk
iii.	Strengthening of existing irrigation system	iii.	Social conflicts owing to PRI and WSM polices and local politics
iv.	Conducive climate for rain fed crop diversification	iv.	Weak coordination among lin departments
v.	Good Scope for Agro forestry and dry land horticulture	v.	Lack of expertise of implementing agency in different aspects of WSM
vi.	Potential for collective action and management of CPR		

4. INSTITUTION BUILDING AND PROJECT MANAGEMENT

4.1 Participatory Rural Appraisal (PRA)

The past experience of watershed has given tremendous input to focus on creating accountability of the stakeholders towards the programme. This has created an emphasis to include the all stakeholders' communities and their local indigenous technological knowledge while planning for any activity. Participatory approach provides a new path for planning, implementing, monitoring and post withdrawal activities with a complete accountability of the stakeholders. Various PRA techniques like resource mapping, social mapping, matrix ranking and season calendar were used to understand the physical and social orientation of the village in general and watershed specific. These tools put the villagers in ease than the complicated questionnaires. Various tool like matrix ranking, Venn diagramme were used to identify various local vegetation (apt for afforestation), fodder crops, various institution and their significance in the life of the farmers.

4.2 Social Mobilization and Community Organization

Table no. 27: Physical outlays oh PIA,U.G., S.H.G., W.D.T. and W.C.

S. No.	Name of watershed	Code No.	U.G. (No.)	SHG (No.)	WDT (No.)	PIA	WC (No.)
1	2B3C5h2b	2B3C5h2b	20	18	1	1	1
2	2B3C5d2a	2B3C5d2a	22	20			1
3	2B3C5d1d	2B3C5d1d	10	12			1

4.2.1 Watershed Committee

Watershed committee has been constituted in all three nos of micro-watersheds partially by WDT and Gram Sabha village of micro watershed. These committee are registered under society Registration Act 1860. Capacity building trainings given to the watershed committee by WDT. The watershed committee has a pivotal role to play during and after the project implementation period. Detail of W.C. is given below

Table no. 28: Details of Watershed Committees (WC)

S. No.	Name of WCs	Date of Registration as a Society	Name	Designation	M/F	SC	S T	SF	M F	LF	Landless	UG	SHG	GP	Any other	Ed. qualification	Function (s) assigned #	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	Berianajeerpu r	Under Progress	Mr. Devi Prasad	President	M	√		√					√			H.S.	A,B, E	
			Mr. Kuldeep	Secretary	M		√					√		√			B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2	2						
2	Ausanpur		Smt. R. Kuwari	President	M			√				√	√			B.A.	A,B, E	
			Mr. Vijay Kr	Secretary	M	√			√				√	√		√	M.Sc.	C, D, G
			10 members	Member	M/F	2		4	5	1					1			
3	Akbarpur		Mr. Manoj Kr.	President	M						√					Inter	A,B, E	
			Mr. Sanjeev	Secretary	M							√					Inter	C, D, G
			10 members	Member	M/F	2		2	2	2			2					
4	Gadi Rasulpur		Mr. Mevalal	President	M	√		√					√			H.S.	A,B, E	
			Mr. Sushil	Secretary	M		√						√		√		B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2	2						
5	Tejipur		Mr. Divanshu Singh	President	M	√		√					√			H.S.	A,B, E	
			Smt. Visnukanti Singh	Secretary	M		√						√		√		B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2	2						
6	Kutubapur		Mr. Prem Narayan	President	M	√		√					√			H.S.	A,B, E	
			Mr. Jagdeesh	Secretary	M		√						√		√		B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2	2						
7	Sahabuddinpu r		Mr. Arjun	President	M	√		√					√			H.S.	A,B, E	
			Mr. Girvar	Secretary	M		√						√		√		B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2	2						
8	Shahpur		Mr. Gangaram	President	M	√		√					√			H.S.	A,B, E	
			Sobaran	Secretary	M		√						√		√		B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2	2						
9	Ganga		Mr. Sadanpal	President	M	√		√					√			H.S.	A,B, E	
			Babulal	Secretary	M		√						√		√		B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2	2						
10	Rampur		Smt. Ram Kali	President	M	√		√					√			H.S.	A,B, E	
			Mr. Vijay Kumar	Secretary	M		√						√		√		B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2	2						

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
11	Hajrat Pur		Mr. Ram	President	M	√		√					√			H.S.	A,B, E	
			Mr. Javed	Secretary	M		√					√		√			B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2	2						
12	Puranmau		Mr. Bhuja Singh	President	M	√		√					√			H.S.	A,B, E	
			Mr. Sanjay	Secretary	M		√					√		√			B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2							
13	Nekpur		Smt. Veena Devi	President	M	√		√					√			H.S.	A,B, E	
			Mr. Naresh	Secretary	M		√					√		√			B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2							
14	Tarraiya		Mr. Uma Shanker	President	M	√		√					√			H.S.	A,B, E	
			Mr. M V Singh	Secretary	M		√					√		√			B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2							
15	Sadimpur		Mr. R Swarup	President	M	√		√					√			H.S.	A,B, E	
			Mr. Pawan Kr	Secretary	M		√					√		√			B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2							
16	Manghara		Mr. M Prasad	President	M	√		√					√			H.S.	A,B, E	
			Mr. Ram Asray	Secretary	M		√					√		√			B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2							
17	Sisala		Mr. Abdul	President	M	√		√					√			H.S.	A,B, E	
			Mr. Abdul Sufian	Secretary	M		√					√		√			B.A	C, D, G
			10 members	Member	M/F	2		2	2	2	2							

In column 17, only the letter assigned, as below, needs to be typed, except for 'J', where the type may be specifically mentioned.

A PNP and PRA

C Maintenance of Accounts

E Supervision of Construction activities

G Verification & Measurement

I Social Audit

B Planning

D Signing of cheques and making payments

F Cost Estimation

H Record of labour employed

J Any other (please specify).

Watershed Development Team

As per as common guide line direction/ instruction given in para 5.3 point 40 P.I.A. has been constitute watershed development team as given below

Table no.29 : Details of Watershed Development Teams (WDTs) in the project area

<i>S. No.</i>	<i>Name of the PIA</i>	<i>Name of the Project</i>	<i>Names of WDT members</i>	<i>M/F</i>	<i>Age</i>	<i>Qualification/ Experience</i>	<i>Description of professional training</i>	<i>Role/ Function##</i>	<i>Date of appointment of WDT member</i>
1	Bhomi Sanrakshan Adhikari Land development and water resources Department Hardoi (U.P.)	IWMP IInd	Shri Kunwar Bahadur Singh	M	51	Civil Engineer	Engineering work	Team Leader	Under Process
			Shri Ram Murti Mishra	M	35	Civil Engineer	Agriculture	Technical Expert	
			Dr. Surendra Nath Ram	M	40	Civil Engineer	Field Worker	Technical Expert	
			Smt. Ram Sakhi	F	25	Graduate in Sociology	Social Mobilizer	Social Mobilization Expert	
			Mr. Rambachan Maurya	M	45	B.Sc. Ag.	Field worker	Agriculture Expert	

In column 8, only the letter, assigned as below, needs to be typed, except for '3', where the type may be specifically mentioned.

- | | | | |
|---|---|---|---------------------------------------|
| A | Participatory Net Planning (PNP) and Participatory Rural Approach (PRA), Training and Capacity Building | C | Maintenance of Accounts |
| B | Planning | E | Social audit |
| D | Signing of cheques and making payments | G | Physical verification & measurement |
| F | Engineering surveys, drawings and cost estimations | I | Livelihood opportunities for landless |
| H | Record of labour employed | K | Any other (please specify) |
| J | Post project operation, maintenance of assets | | |

4.2.3 Self Help Group

The constitution of Self Help Groups have been constituted by W.C. in all micro watershed for generating income & improved their social status with the help and financial support through scheme by technical support of P.I.A., detail of 24 SHG_s is given below

Table no. 30 SHG detail

S.No.	Names of Watershed	Total no. of registered SHGs				No. of Members				No. of SC/ST in each category			No. of BPL in each category			Date of formation of SHGs
		With only Men	With only Women	With Both	Total	Categories	M	F	Total	M	F	Total	M	F	Total	
1.	2B3C5h2b	10	5	3	18	(i) Landless	20	4	24	12	8	20	16	8	24	UNDER PROCESS
						(ii) SF	27	8	35	10	4	14	10	2	12	
						(iii) MF	13	4	17	4	-	4	-	-	-	
						(iv) LF	6	2	8	-	-	-	-	-	-	
	Total	10	5	3	18		66	18	84	26	12	38	26	10	36	
2.	2B3C5d2a	10	7	3	20	(i) Landless	25	42	67	32	26	58	28	19	47	
						(ii) SF	70	30	100	15	14	29	22	6	28	
						(iii) MF	20	13	33	7	-	7	-	-	-	
						(iv) LF	10	-	10	-	-	-	-	-	-	
	Total	10	7	-	20		125	85	210	54	40	94	50	25	75	
3.	2B3C5d1d	8	4	-	12	(i) Landless	24	22	44	27	18	45	28	12	40	
						(ii) SF	69	20	89	18	7	25	17	5	12	
						(iii) MF	19	8	27	7	-	7	-	-	-	
						(iv) LF	9	-	9	-	-	-	-	-	-	
	Total	8	4	-	12		120	50	170	52	25	77	45	17	62	
GRAND TOTAL		28	16	6	50		311	153	464	132	77	209	121	52	173	

(M- Male, F- Female)

4.2.4 User Group

The following user's group are identified and constituted in all micro watershed committee in presence of Watershed Development Team for implementation of watershed work proper use and management of all engineering and vegetative measure to be creating/ constructing under watershed through scheme. Detail of user's group are given below

Table no. 31: UGs detail

S.No.	Names of Watershed	Total no. of registered SHGs				No. of Members				No. of SC/ST in each category			No. of BPL in each category			Date of formation of SHGs
		With only Men	With only Women	With Both	Total	Categories	M	F	Total	M	F	Total	M	F	Total	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	2B3C5h2b	8	4	2	15	(i) Landless	10	6	30	15	10	10	12	8	24	UNDER PROCESS
						(ii) SF	27	8	35	10	4	14	10	2	12	
						(iii) MF	13	4	17	4	-	4	-	-	-	
						(iv) LF	6	2	8	-	-	-	-	-	-	
		Total	8	4	2	15		56	20	90	29	14	28	22	10	
2	2B3C5d2a	6	5	2	10	(i) Landless	20	30	67	10	10	30	28	19	47	
						(ii) SF	40	25	50	2	5	20	22	6	28	
						(iii) MF	20	10	33	7	-	7	-	-	-	
						(iv) LF	10	-	10	-	-	-	-	-	-	
		Total	6	5	2	10		90	65	160	19	15	57	50	25	
3	2B3C5d1d	8	4	-	12	(i) Landless	9	-	9	7	-	7	8	-	8	
						(ii) SF	12	-	12	3	-	3	2	-	2	
						(iii) MF	3	-	3	-	-	-	-	-	-	
						(iv) LF	1	-	1	-	-	-	-	-	-	
		Total	8	4	-	12		25	-	25	10	-	10	10	-	
GRAND TOTAL		22	13	4	37		171	85	275	58	29	95	82	35	121	

(M- Male, F- Female)

4.2.5 Focused group discussion

FOCUSSED GROUP DISCUSSION



PRA OF VILLAGES – (DURING DATA COLLECTION)





PRA OF VILLAGES – (DURING DATA COLLECTION)



4.3 PROJECT IMPLEMENTING AGENCIES

U.P. Government, Land Development Water Resources Department Section-1 Lucknow has nominated as PIA to Bhoomi Sanrakshhan Unit, Land Development Water Resources Department Hardoi for IWMP IInd vide letter no-666(10)/54-1-10-1(9)02008 dated 25-05-2010

Table no. 32: Project Implementing Agency (PIA)

S.No.	Particulars of PIA	
(i)	Date of selection of PIA	25.05.2011
(ii)	Type of organization	Govt. organization
(iii)	Name of organization #	DoLR
(iv)	Designation & Address	BSA, IWDP, Hardoi
(v)	Telephone	
(vi)	Fax`	
(vii)	E-Mail	iwmp_Hardoiup@rediffmail.com

Only the letter assigned to each type, as given below, needs to be typed.

- | | | | |
|---|-------------------------|---|-----------------------------|
| A | Line Dept. | B | Autonomous organization |
| C | Govt. Institute | D | Research Bodies |
| E | Zila Parishad | F | Intermediate Panchayat |
| G | Voluntary Organisations | H | Any other (please specify). |

4.4 Project Implementation Strategy

Watershed management as a strategy has been adopted by Government of India especially in the rainfed region of semi arid tropics. These region are characterized by low and undependable rain, low soil fertility, poor infrastructure development, low literacy and high incidence of migration. Several studies have identified that there is a dire need of a systematic and scientific approach to deal with the watershed development. The common guideline generates a fresh and flexible framework for the next generation watershed development.

4.4.1 Scientific Planning

i) Cluster Approach

This envisages a broader vision of Geo-hydrological unit which involves treating a cluster of micro watershed. The IWMP 2nd Hardoi watershed project consist of five micro watershed

ii) Base line Survey

To access the impact of any watershed development programme a detailed baseline survey has to be conducted. This acts a benchmark for any intervention during and post implementation of any development programme. A detailed baseline survey was undertaken which involved household census survey, Bio-physical survey and Village level data collection from *PIA*. Household census survey includes a detailed questionnaire which was been filled by visiting each and every household in the village. This gave in the details of the demographic profile of the village, the literacy percentage, SC/ST population, number of BPL household, cattle population, net consumption rate in the IWMP-2nd, average milk production of the cattle and various schemes running and their benefits. Bio-physical survey was undertaken to identify various natural resources available in the village. It included the soil typology, well in the area, crop taken in the field, Cropping pattern, fertilizer used and various sources of irrigation in the field.

iii) Participatory Rural Appraisal (PRA)

The past experience of watershed has given tremendous input to focus on creating accountability of the stakeholders towards the programme. This has created an emphasis to include all the stakeholder communities and their local and indigenous Technological Knowledge (ITK) while planning for any activity. Participatory approach provides a new path for planning, implementing, and monitoring

and post- withdrawal activities with a complete accountability of the stakeholders. Various PRA techniques like resource mapping, social mapping, and season calendars were used to understand the physical and social orientation of the village in general and watershed in specific. These tools put the villagers in ease than the complicated questionnaires. Various tools like Matrix ranking, Venn diagram were used to identify various local vegetations (apt for afforestation) , Fodders crops , various institution and their significance in the life of the farmers

iv) Use of GIS and Remote sensing for planning

Use of various high science tools has been promoted at various stages of watershed development.

a) Prioritization

Geographical Information System (GIS) has been used for prioritization process. Various layer maps were created like Geo-morphological, Soil, BPL Population, SC/ST population, Ground water Status, Drinking water situation Slope percent. These were all given proper weight age according to the DoLR specification. This helped in prioritization of various watershed areas.

b) Planning

A action plan matrix was formulated by State Level Nodal Agency (SLNA) taking into account various features like the slope percent, soil Depth, Soil Texture, Soil erosion in the area for wasteland, forest land and agricultural land. Global positioning System (GPS) was used to identify each and every water conservation structures available in the project area. This was used to create a map. Contour Map of vertical interval of 1 meter at a scale of 1:8000 was used for identifying various locations for soil and water conservation structures.

c) Hydrological modelling

Hydrology modelling technique was used for locating drainage, stream length, flow direction, sink, and flow accumulation. This model overlaid over cadastral map to calculate the catchments area of each structures like the gully plug etc. This has helped to remove the human error which generally occurs while calculating the catchments area of a check dam.

Table no. 34: Details of Scientific Planning and Inputs in IWMP II projects

Scientific criteria/ inputs used	Whether scientific criteria was used
1	2
(A) Planning	
Cluster approach	Yes
Whether technical back-stopping for the project has been arranged? If yes, mention the name of the Institute	
Baseline survey	Yes
Hydro-geological survey	Yes
Contour mapping	Yes
Participatory Net Planning (PNP)	Yes
Remote sensing data-especially soil/ crop/ run-off cover	
Ridge to Valley treatment	
Online IT connectivity between	
(1) Project and DRDA cell/ZP	Yes
(2) DRDA and SLNA	Yes
(3) SLNA and DoLR	Yes
Availability of GIS layers	
1. Cadastral map	Yes
2. Village boundaries	Yes

3. Drainage	Yes
4. Soil (Soil nutrient status)	Yes
5. Land use	Yes
6. Ground water status	Yes

1	2
7. Watershed boundaries	Yes
8. Activity	Yes
Crop simulation models#	No
Integrated coupled analyzer/ near infrared visible spectroscopy/ medium spectroscopy for high speed soil nutrient analysis	No
Normalized difference vegetation index (NDVI)#	No
Weather Station	
(B) Inputs	No
1. Bio-pesticides	No
2. Organic manures	Yes
3. Vermicompost	Yes
4. Bio-fertilizer	Yes
5. Water saving devices	Yes
6. Mechanized tools/ implements	Yes
7. Bio-fencing	Yes
8. Nutrient budgeting	No
9. Automatic water level recorders & sediment samplers	No

4.5 Convergence of watershed programmes

4.5.1 Earthen bund, contour bund, percolation tank, injection well will be made in watershed area convergence with MNREGS

- 4.5.2 Soil health card, crop demonstration, kisan gosthi, kisan mela, farmer's school also organized in watershed area under many scheme of department of Agriculture.
- 4.5.3 Composite fish farming or mixed fish farming popularized in this area with Department of fisheries.
- 4.5.4 Animal health camp, fodder development, vaccination work also made through Veterinary Department.
- 4.5.5 Aforestation in project area also done with Forest Department.
- 4.5.6 Dry land horticulture also convergence with department of horticulture.

Table no. 35 : Details of Convergence of other Schemes in the Project area with IWMP Project

S.No.	Name of the MW	Names of Departments with Schemes converging with IWMP*	Fund made available to IWMP project due to convergence (Rs. In lakh)	Was this fund included in Rs. 12,000/15,000 Per ha		Name of activity/task/structure undertaken with converged funds (a) Structures (b) Livelihoods (c) Production System	Reference no. of activity/task/structure in DPR	Level at which decision for convergence was taken \$
				Yes	No			
1	2	3	4	5	6	7	8	9
1	2B3C5h2b	MNREGS	20.00		NO	a	5	DRDA
		DA	0.40		No	b, c	5	PIA
		DHO	0.10		No	b, c	5	PIA
		DF	0.20		No	b, c	5	PIA
		F	0.30		No	b, c	5	PIA
		Total	21.00		No			
2	2B3C5d2a	MNREGS	23.00		No	a	5	DRDA
		DA	1.50		NO	b, c	5	PIA
		DHO	0.30		No	b, c	5	PIA
		DF	0.40		No	b, c	5	PIA
		F	0.30		No	b, c	5	PIA
		Total	25.50		No			
3	2B3C5d1d	MNREGS	11.00		No	a	5	DRDA
		DA	1.70		No	b, c	5	PIA
		DHO	0.50		NO	b, c	5	PIA

		DF	0.50		No	b, c	5	PIA
		F	0.30		No	b, c	5	PIA
		Total	19.00		No			
		Grand Total	65.50					

- # only letter (a) or (b) or (c) needs to be filled. In case more than one activity has been undertaken all the concerned letters may be indicated e.g. (a) + (b)
 \$ WC/GP/WDT/PIA/DRDA cell/ZP/DPC/SLNA / DoLR- only initials as indicated here need to be entered.
 * DA= Department of Agriculture, DHO= Department of Horticulture, VO= Department of Veterinary, DF= Department of Fisheries, F= Forest

CHAPTER 5 MANAGEMENT ACTION PLAN

5.1 PREPARATORY PHASE

5.1.1 Entry Point Activities

Integrated Watershed Development Programme IInd is aimed at the socio economic upliftments of the dweller of watershed area and to create trust about the programme to be implemented so that they can coordinate in participatory mode for the success of the programme. As per the new common guidelines total financial outlay for the entry point activities is 4 % of the total project cost. To increase the per capita availability of drinking water older wells of the village will be renovated as well as pacca jagat will be constructed, to increase the irrigation water availability older bundhies which are already existed but not functioning will be reconstructed/ renovated. Repairing and maintenance of water bodies have been proposed on priority basis. School lies in the watershed areas will be equipped with drinking water facility. To approach watershed village construction and repairing of damaged pulia has also been proposed and construction of women bathrooms besides hand pump or wells. Total estimated cost for these activities is Rs 20.15 Lacs.

Table no. 36: Entry point activities (EPA)

(All financial figures in lakh Rs.)

S.no.	Names of the Villages	Amount earmarked for EPA	Entry point Activities planned	Estimated cost	Expected outcome	Name of agency which selected the EPA#	Expected month & year of completion (mm/yyyy)
1	2	3	4	5	6	7	8
1	2B3C5h2b	3.37	Repair of well/ Pacca jagat-2	1.000	-	WC, PIA, WDT	2011
			Repairing of damaged Pulia-4	1.200	-	WC, PIA, WDT	2011
			Traveler Tin shed-1	1.000	-	WC, PIA, WDT	2011
			Repairing of P.School Class Room	0.170	-	WC, PIA, WDT	2011
2	2B3C5d2a	10.88	Repair of well/ Pacca jagat-6	3.000	-	WC, PIA, WDT	2011
			Repairing of damaged Pulia-7	2.100	-	WC, PIA, WDT	2011
			Traveler Tin shed-5	5.000	-	WC, PIA, WDT	2011

			Repairing of P.School Class Room	0.780	-	WC, PIA, WDT	2011
3	2B3C5d1d	5.90	Repair of well/ Pacca jagat-4	2.000	-	WC, PIA, WDT	2011
			Repairing of damaged Pulia-4	1.200	-	WC, PIA, WDT	2011
			Repairing of P.School Class Room	0.700	-	WC, PIA, WDT	2011
			Traveler Tin shed-2	2.000	-	WC, PIA, WDT	2011
			Total	20.15		20.15	

Was the EPA selected by Gram Panchayat/WC/PIA/WDT/Any other (please specify)

Table no. 37 : Other activities of preparatory phase

S. No	Item	Initiation of village level institution	Capacity building	IEC activities	Baseline survey	Hydro-geological survey	Identifying technical support agencies	Resource agreements	Preparation of DPR	Evaluation of DPR	Any other (please specify)
1	Estimated cost	1.18	22.00	2.00	2.51	1.006	-	-	1.006	0.503	-
2	Status of the activity #	Under Complete	Under Complete	Under Complete	Complete	Complete	Complete		Complete	-	
3	Expected month & year of completion (mm/yyyy)	2012	2012	2012	2011	2011	2011	-	2011	-	

5.1.2 Institution and Capacity Building

5.1.2.1 Institution

Table no. 38 : List of approved Training Institutes for capacity Building in the project area

S.No.	Name of the Training Institute	Full Address with contact no., website & e-mail	Name & Designation of the Head of Institute	Type of Institute	Area (s) of specialization	Accreditation details
1	District training centre Hardoi	Bawan Road Hardoi	Principal	Training centre	Agriculture, Horticulture, A. Husbandry, Fisheries, Entrepreneurship, Livelihood and Capacity building etc	GOI
2	Din Dayal Upadhyay training centre, Bakshi Ka Talab, Lucknow	Bakshi Ka Talab, Lucknow	Director General	Training centre	Agriculture, Horticulture, A. Husbandry, Fisheries, Entrepreneurship, Livelihood and Capacity building etc	GOI
3	C.S.W.C. Research and Training Institute Chaleser, Agra	Chaleser, Agra	Director	Research and Training Institute	Agriculture	GOI
4	District training centre Hardoi	Bawan Road Hardoi	Principal	Training centre	Agriculture	GOI

5	Gramsthali Sikshha Parishad	29 rajrajeshwari nagar colony, Gilat Bajar, Varanasi-221002, abhaigkp@rediffmail.com, +91532107394	President, Dr R. K. Singh	NGO	Capacity Buildings, Production System	NGO
6	G.K.S.S.	SA-19/13 K-2 Janak nagar, Pandeypur Varanasi, +919838001699 Ashwini.yes21@gmail.com	President, Dr. A.K. Singh	NGO	Capacity Buildings, Production System	NGO

5.1.2.2 Capacity Building

Capacity building and training are the most important components of watershed management programme both for the field level project staff/ officers and functionaries of people institutions i.e. watershed community. Apart from enhancing technical skill of the project staff, this would also provide opportunities to community members to develop their capacity as the future custodians of the programmes after project's withdrawal. IWMP IInd HARDOI financial outlay for capacity buildings is 5% (Rs. 25.18) of the total project cost and out of which Rs 1.158 will be expended for initiation of village level institution.

Table no 39 : Capacity Building activities in the project

S.No.	Project Stakeholders	Total no. of persons	No. of persons trained so far	No. of persons of be trained during current financial year	Sources of funding for training		Name and Address of the Institute where Trained
					a) DoLR	b) any other (pl. specify)	
1	PIAs	3	-	3	DoLR		DTC, GSP,GKSS
2	WDTs	16	2	14	DoLR		DTC, GSP,GKSS
3	UGs	10	-	10	DoLR		DTC, GSP,GKSS
4	SHGs	110	-	110	DoLR		DTC, GSP,GKSS
5	WCs	70	-	70	DoLR		DTC, GSP,GKSS
6	GPs	230	-	230	DoLR		DTC, GSP,GKSS

7	Community	560	-	560	DoLR		DTC, GSP, GKSS
8	Others (pl. specify)						

Table no 40: Detail of activities undertaken

Strategy	Proposed activity	No. of Units	Unit cost	Total Cost
Capacity building Activities	Stakeholders - Scientists Interaction,	6	0.50	3.00
	Training (2 days)	25	0.20	5.00
	Vocational/employment Generation Training (5-10 days)	20	0.20	4.00
	In-service Training. (3 days)	5	0.20	1.00
	Exposure visit within State	5	0.40	2.00
	Exposure visit out of State	4	0.50	2.00
	Field days	5	0.20	1.00
	Workshop	2	2.00	4.00
	Total			22.00

Table no 41 : Information, Education & Communication (IEC) activities in the project area

S.no.	Activity	Executing agency	Estimated expenditure (Rs.)	Expected Outcome (may quantify wherever possible)
1	Street plays	Local Drama Groups	50000.00	Awareness about importance of watershed project
2	Video Shows	IWMP, Hardoi	50000.00	
3	Pamphlets and Poster	IWMP, Hardoi	50000.00	

4	Banners and Hoardings	IWMP, Hardoi	50000.00	
		Total	200000.00	

5.1.3 Detail Project Report

See table no. 37.

5.2 WORK PHASE

5.2.1 Soil and moisture conservation

For soil and moisture conservation, water resource development, horticulture, besides agro forestry vegetation / plantation work, engineering structure have also been proposed under the project. Engineering structure are important components of soil and water conservation that can play a vital role in erosion control on arable land. Engineering measure usually involves in creating mechanical barriers across the direction of flow of water and thus retards or retains runoff on the following principles:

- Increase the time of concentration.
- Break a long slope into short ones.
- Protection of drainage channel against damage.
- Prevent excessive soil and water losses.

1. **Ridge Area Treatment Plans:**

It is very important to treat the ridge as this is where the major water resources originate. For the ridge area treatment of IWMP II watershed following structure are been Proposed after interaction between the watershed committee, Range Forest Officer (RFO) and other field staff of forest.

A. Contour Bunding :

Contour bunding is and effective in erosion control and moisture conservation in dry areas having less than 2 % slop to reduce the length of slope. Contour bund constructed against the slope in 850.00 ha of lands with total estimated cost of Rs. 51.00 lacs

B. Graded/Marginal and Peripheral Bund:

Marginal bunds are the engineering structure to reduce the volume and speed of runoff. Those locations where change in slope and soil texture founded there is peripheral bund will be constructed along with nala bank. Total proposed treatable area is 755.00 ha with financial outlay of Rs. 45.34 lacs

C. Submergence Bundhies and Gully Plug:

Submergence bundhies will be constructed at middle reaches of watershed have in lesser slop. However, gully plug structure has been proposed to be formed on upper reaches / Ist order stream. Total propped area for the structures jointly is 283 ha with total financial outlay of Rs. 17.00 lacs.

This generally includes water conservation or surface water storage structures. This being highly labour intensive, will involve more of manual labour; so, funds from National Rural Employment Guarantee Scheme (NREGS) can be taken.

2. Water Harvesting bundhies:

Water harvesting bundhies are primarily aimed at collecting and storing any form of water enter through rainfall, runoff or subsurface flow for multiple purpose. There will be 65 water harvesting bundhies with farm ponds structure on 2099.00 h of land will be constructed on lower reaches of the watershed. Estimated financial outlay is Rs. 95.77 lacs.

3. Pucca check damStructure:

These structure of built of mossonary. Pucca structure have been proposed constructed in big gullies / ravines carrying relatively high run off and sediment load. Water stored in Pucca structure will be utilized as source of irrigation water during post mansoon season. Construction of five Pucca structure has been proposed with total estimated cost of Rs 14.00 lacs

4. Agroforestry:

About 33.00 ha lands will be taken from the waste land falling in the class-VII category in the watershed. These lands will be planted with subabool in which urd, moong, til etc planted as intercrop, subabool will be used as fuel as well as fodder

5. Dry Land Horticulture

About 177.00 ha area will taken for the plantation of fruit trees like aonla, bael, ber, karaunda, mango, will be planted at suitable spacing in the watershed.

Table no 42 : Activities related to Surface Water resources in the project areas

S. No	Names of villages	Type of structures	Pre-project			Proposed target										
			No.	Area irrigated (ha)	Storage capacity	Augmentation/repair of existing structures				Construction of new structures				Total target		
						No.	Area irrigated (ha)	Storage capacity (lit)	Estimated cost (Rs in lacs)	No.	Area irrigated (ha)	Storage capacity (lit)	Estimated cost(Rs in lacs)	Area irrigated (ha)	Storage capacity (lit)	Estimated cost (Rs in lacs)
1	2B3C5h2b	(ii) Pond	5	25	25000	5	37.5	37500	5.00	30	30	30000	8.00	67.5	67500	13.00
		(iv) Injection well	-	-	-	-	-	-	-	-	38	-	38000	0.95	-	38000
2	2B3C5d2a	(ii) Pond	3	15	15000	3	22.5	22500	3.00	15	15	15000	4.000	37.5	37500	7.00
		(iv) Injection well	-	-	-	-	-	-	-	-	6	-	6000	0.15	-	6000
3	2B3C5d1d	(ii) Pond	3	15	15000	3	22.5	22500	3.00	-	-	-	-	22.5	22500	3.00

	(iv) Injection well	-	-	-	-	-	-	-	3	-	3000	0.075	-	3000	0.075
	Total	11	55	55000	11	82.5	82500	11	92	45	92000	13.175	127.5	174500	23.32

@ 50 % work will be done on public asset and 50% done on community asset.

Table no. 43: Technical detail of Farm Ponds and Injection Well

S. No	Particulars	Value	Ponds	Injection Well
1	Top area	M ²	500.00 (25X20)	1.00
2	Bottom area	M ²	300.00 (20X15)	1.00
3	Depth	M	2.50	1.00
4	Side Slope	-	2:1	-

Table no 44 : Activities related to recharging ground water resources in the project areas @

S. No	Names of villages	Type of structures	Pre-project		Proposed target							Expected month & year of completion (mm/yyyy)	
			No.	Area irrigated (ha)	Augmentation/repair of existing structures			Construction of new structures			Total target		
					No.	Area irrigated (ha)	Estimated cost	No.	Area irrigated (ha)	Estimated cost	Area irrigated (ha)		Estimated cost
1	2B3C5h2b	(i) Open wells	3	1.50	2	4.00	0.24	-	-	-	4.00	0.24	2013
		(ii) Bore wells	6	6.00	3	11.00	0.66	-	-	-	11.00	0.66	2013
2	2B3C5d2a	(i) Open wells	2	1.00	2	5.00	0.30	-	-	-	5.00	0.30	2013
		(ii) Bore wells	5	5.00	5	20.00	1.20	-	-	-	20.00	1.20	2013
3	2B3C5d1d	(i) Open wells	1	0.50	1	2.00	0.12	-	-	-	2.00	0.12	2013
		(ii) Bore wells	4	4.00	4	18.00	1.08	-	-	-	18.00	1.08	2013

		Total for the project	21	18	17	60	3.6	-	-	-	60	3.60	
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Above all the assets only 20 % under community and rest related with private sector.

Table 45 : Activities executed by User Groups in the Project

S.no	Names of Project	Major activities				No. of UGs involved	Estimated Cost (Rs.)	Amount of WDF to be collected (Rs.)
		Structure/activity proposed			Expected month & year of completion (mm/yyyy)			
		Type	No.#	Treatment				
1	IWMP II Hardoi	Structure work		Engineering	2015	12	164.00	8.22 Lacs

Table no 46 : Details of engineering structures in watershed works

S. No	Names of villages	Name of structure	Type of treatment			Type of land			Executing agency	Total target	Total target						
			(i) Ridge area (R)	(ii) Drain age line (D)	(iii) Land dev. (L)	(i) Private	(ii) Community	(iii) Others (pl. specify)			(i)UG (ii) SHG (iii) Others (pl. specify)	No. of units (no./cu. m./rmt)	Estimated cost (Rs. In lakh)				Expected month & year of completion (mm/yyyy)
													M	W	O	T	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
1	2B3C5h2b	Contour bunding	R	-	-	P	C	-	UG &DoLR	52805				16.0	2012		
		Graded bunding	-	D	-	-	C		UG &DoLR	18571.43				13.0	2012		
		Gully plug	-	D	-	-	C	-	UG &DoLR	17500				7.00	2014		
		Field bunds	-	-	L	P	C	-	UG &DoLR	98011.76				35.0	2014		
2		Contour bunding	R	-	-		P	-	UG &DoLR	49505				15.0	2012		

	2B3C5d2a	Graded bunding	-	D	-	-	C		UG &DoLR	17142.86				12.0	2012
		Gully plug	-	D	-	-	C	-	UG &DoLR	15000				6.00	2014
		Field bunds	-	-	L	P	C	-	UG &DoLR	84010.08				30.0	2014
3	2B3C5d1d	Contour bunding	R	-	-		P	-	UG &DoLR	46205				14.0	2012
		Graded bunding	-	D	-	-	C		UG &DoLR	17142.86				12.0	2012
		Gully plug	-	D	-	-	C	-	UG &DoLR	12500				5.00	2014
		Field bunds	-	-	L	P	C	-	UG &DoLR	84010.08				30.0	2014
		Field bunds	-	-	L	P	C	-	UG &DoLR	37524.50				13.4	2012
	Total								549928	-	-	-	128		

(M- Materials, W- wages, O- others, T- Total)

Table no 48: Total Treatment of Micro Watershed of IWMP II

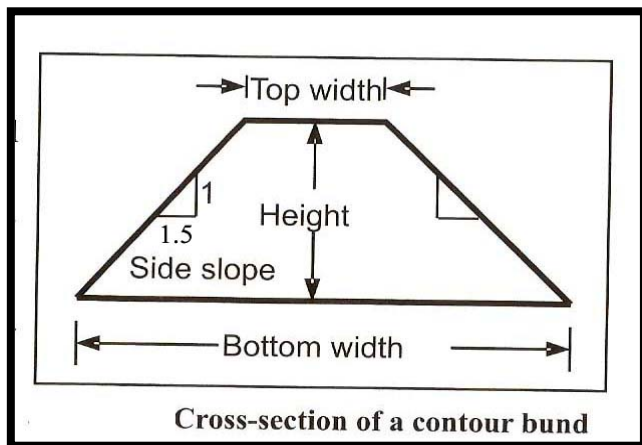
S.N.	Watershed Reaches	Proposed Work	Treatable Area (ha.)	CMT	Rate (Rs CMT)	Proposed Cost (Rs in lacs)
1	Upper Reaches	Contour Bund	850.00	883168	30.30	51.00
		Guly Plug	283.36	223	40.00	17.00
2	Middle Reaches	Graded Bund (Marginal bund, Peripheral bund, Submergance bund, earthen check dam)	755.54	339857	70.00	45.34
		Agroforestry/ Horticulture	210.00		60000/ha	12.60
3	Lower Reaches/ Drainage	Water Harvesting Bundhi Pond	2099.00	704004	35.71	95.17

	Line Treatment	Check dams	-	2 no	-	14.00
		Farm Ponds, Injection well	-	*	*	16.77
		Total	4198			251.88

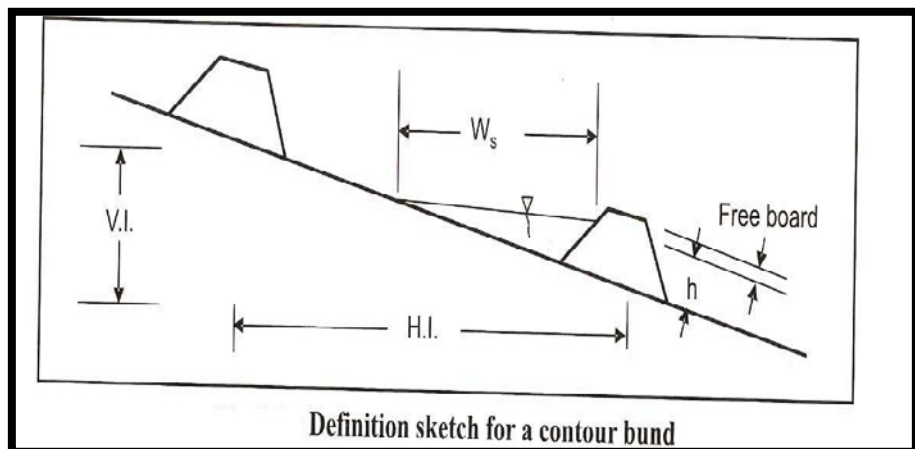
* details in table no 42 and 44

Table no 49: Technical detail of engineering works in project area

S. No.	Project	No of villages	Type of bund	Type of soil	Particulars (meter)				
					Top	Base	Height	Slope	Cross section
1	IWMP II	25	Field Bund	Normal	0.30	1.65	0.45	1.5:1	0.438
			Contour Bund	Clay	0.45	1.65	0.60	1.0:1	0.63
				Loam	0.45	2.25	0.60	1.5:1	0.81
				Sandy	0.45	2.85	0.60	2.0:1	0.99
			Marginal/CRB & peripheral Bund	Plain land	0.60	3.60	1.00	1.5:1	2.10
				Undulating land	1.00	4.00	1.00	1.5:1	2.50
Gully Plug	At 3% or above 3 % slope gully plug will be made between two drainage line with emergency temporary spill way								



CONTOUR BUND



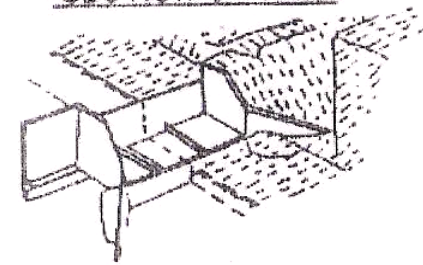
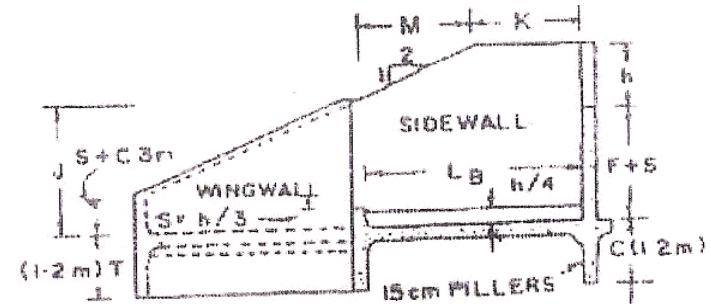
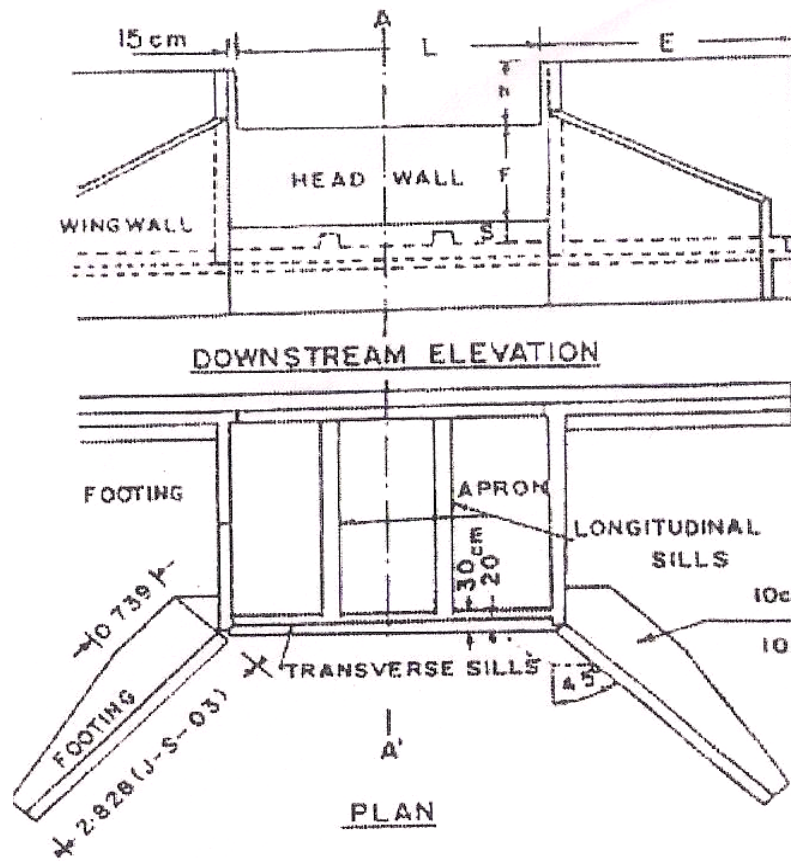
MARGINAL BUND



PERIPHERAL BUND



AFORESTATION



PERSPECTIVE VIEW

- T - Depth of toewall below top of apron
- L - Length of weir
- L_B - Length of apron
- dc - Critical depth of weir
- C - Depth of cutoff wall below top of apron
- J - Height of wingwall
- F - Drop through spillway from crest of weir to top of transverse sill.
- h - Depth of weir
- S - Height of transverse sill
- E - Length of headwall extension
- B - sidewall at junction

NOMENCLATUR AND SYMBOLS OF TYPICAL DROP SPILLWAY



चेक डैम (डाउन स्टीम)



जल संवय बंधी



कूप गरम्मत एवं प्लेटफार्म निर्माण



जल संवय बंधी ड्राप स्पील वे स्ट्रक्चर के साथ

5.2.2 PROPOSED LAND USE

Watershed management plan for IWMP-IInd Hardoi watershed was prepared with specific objectives of food sufficiency and income and employment generation with environment security. In plan preparation due importance was given to topographic, land suitability, irrigation potentially, prevailing farming systems, micro farming situation, farming, farmers preferences and priorities along with economic and environment securities. Crop and tree selection and area distribution was done as per farmers priorities revealed through PRA exercise.

Technological options were blended with the ITK based on the latest available research/ experiment findings for this region. Due attention was given to the resource of the farmers and adjustments were made in capital intensive/high resource demanding technological outputs while making them adoptable to the resource poor farmers. Emphasis was given on maximum use of farm yard manure. The proposed land use plan of the watershed is shown in table.

Table no. 50: Present and proposed land use plan of the IWMP-II watershed

S.No.	Land use	Present (ha)	Proposed area (ha)
1	Agriculture	2394.00	2925.00
	a. Rain fed	2350.00	2425.00
	i. Crops	2340.00	2305.00
	ii. Horticulture	8.00	85.00
	iii. Agro-forestry	2.00	35.00
	b. Irrigated	44.00	500.00
	i. Assured	14.00	200.00
	ii. Partial	30.00	300.00
2	Waste Land	700.00	169.00
	a. A forestation	58.00	88.00
	b. Pasture	0.50	0.50
	c. Untreatable	80.50	80.50
3	Village Land	280.00	280.00
	Total	5248.00	5248.00

5.2.3 WATER RESOURCE DEVELOPMENT AND SOIL CONSERVATION MEASURES

Status of Present Water Resources Utilization

The micro watersheds are having four seasonal water bodies on private as well as on community land. Management and maintenance of these water bodies is still in the hand of minor irrigation department. During good rainfall year these water bodies having full of water during kharif season. Before sowing of rabi season crops water from these water bodies is either used for supplementary irrigation for kharif crops or irrigating fields for rabi sowing or allowed to go as waste. After releasing water from bodies, submergence area also put under cultivation for rabi crops.

Proposed plan for Irrigation Development of existing water resources

For efficient utilization of available water resources in the IWMP-IInd watersheds, present system of irrigation and wastage of water during October-November need to be made more efficient from water management point of view by minimizing conveyance losses in the existing water courses. The up gradation of the existing system of irrigation will result in:

- a. Minimization of conveyance losses
- b. Increase in frequency of irrigation
- c. Adoption of high yielding varieties of crops, and
- d. Assured cultivation of cash Crops
- e. Drinking water problem will also solved
- f. Local eco system will also improved

New water harvesting structures (Ponds)

Two new dug type water harvesting structures (pond) of capacity about 1400 cum (each) have been proposed to harvest excess runoff of the watershed. Harvested water will be used for supplementary irrigation and fish rearing. Details of these ponds have been given in the estimated budget in last.

Crop production

Mulching and crop residue management

The sources of mulching material as brought up mulch i.e. litter or pruned material of trees etc are scarce in the watershed. The weeds, in situ grown legume and multi purpose trees (as hedge row on marginal and degraded lands) are some of the options available with growers for mulching the rain-fed crops for moisture conservation, fertility restoration and other purposes. Therefore, weed mulching and hedge row of MPTs will be demonstrated in the watershed for benefit of the rural community.

Green manuring

Intensive cropping with inadequate application of organic manures i.e. FYM, compost etc, has over exploited the existing agricultural production system in the watershed. In order to improve the fertility as well as physico- chemical properties of soils green manuring *in-situ* and *ex-situ* with suitable crops like dhaincha, sun-hemp and neel are proposed to be demonstrated in the watershed areas of IWMP-IInd watersheds.

Vermi composting

In order to provide quality manure with high nutrient content to various field crops, vegetables and cash crops, to save time and proper disposal of on farm organic refuse and cow dung as well as to promote organic farming, vermin-composting will be demonstrated to the farmers so that within a short period they can be able to produce manure from organic waste.

Crop rotation and intercropping

In order to diversify farm produce, minimize the farming risk, mitigate soil erosion, to ensure nutritional security and to optimize farm return, intercropping of legumes (black gram and green gram) in inter row spaces of bajra are proposed to be undertaken in the watershed during kharif season. Sustainable and profitable crop-rotations suiting to various needs of the people of the watershed will be demonstrated.

Bio-fertilizers

The various beneficial bio-fertilizers like nitrogen fixers, phosphate solubliser and organic matter decomposers for both legumes and non legumes will be demonstrated in the farmers field under the watershed villages.

Tillage operations

Deep tillage technology developed at the NDUAT, Faizabad holds promising in enhancing post monsoon residual soil moisture conservation and improving the yield of subsequent mustard crop. This technology is proposed to be demonstrated for benefit of farmers in the watershed.

Introduction of improved seeds of high yielding varieties (HYV)

Replacement of low yielding traditional varieties of Paddy, wheat, jowar, gram and lentil in the villages in the watershed with improved varieties is necessary for improving the productivity and farm income. These HYVs will be demonstrated in the watershed for the benefit of the farmers.

Balanced fertilizer use

Inadequate and imbalanced fertilizer use in the Paddy, bajra and jowar during kharif season and in wheat, mustard, gram and lentil in rabi season are one of the major constraints in agricultural production system of the watershed. Therefore, fertilizer use in different crops will be demonstrated in the watershed for the benefits of the farming community.

Control of insect pest and diseases

Aphid in the mustard and pod borer in gram are the major insects in the watershed areas leading to loss in crop productivity. Similarly white blister is also a common disease in the mustard crop. The management strategies of these insect pests and diseases will also be demonstrated in the watershed for benefit of the growers.

Management of the crop

The recommended technology of crop management will be demonstrated to the farmers in half plot trial approach so as to enable the farmers to assess the benefits and impact of each technology or package of practice for their ultimate adoption in the watershed. The interventions scheduled on prioritization of problems in the crop production following PRA and surveys target specifically solution of the each and problem related to the crop production as per interventions. The specific problems, if any shall be dealt with contingency budget.

Dry land Horticulture

About 77.00 ha of land is suitable for horticultural development. Species like Bael and Ber will be planted at suitable spacing in the watershed.

Agri-Horticulture

Anola and sahjan would be a suitable horticultural crop to the locality. Therefore, about 33.00 ha land in the farmers field shall be selected and brought under Agri-horti system. The cropping system followed will be Bajra and Wheat.

Plantation :

Fuel wood plantation: About 88.00 ha land will be taken the waste land falling in the class-IV category in the watershed. These lands will be planted with species like *Prosopis juliflora* *Acacia nilatica*, *Prosopis cineraria* and *Holoptelia integrifolia*.

Table no. 51 : Details of activities connected with vegetative cover in watershed works

S . N o .	Names of villages	Name of structure/work	Type of treatment			Type of land			Executing agency	Total target			
			(i) Ridge area (R)	(ii) Drainage line (D)	(iii) Land dev. (L)	(i) Private	(ii) Community	(iii) Others (pl. specify)		(i)UG (ii) SHG (iii) Others (pl. specify)	Area (ha)	No. of Plants	Estimated cost (Rs. In lakh)
1	2B3C5h2b	Afforestation	R	D	L	P	C	-	DoLR, DF	3.00	4680	0.50	2012
		Agro-forestry	-	-	L	P	C	-	DoLR, UG, DF	5.00	8268	0.50	2012
		Fodder	-	-	L	P	-	-	DoLR,UG, DV	3.00	-	0.18	2011
		Horticulture	R	-	L	P	C	-	DoLR, UG, DH	6.00	10608	1.10	2012
		Pasture dev.	R	-	L	-	C	-	DoLR,SHG, DV	1.00	-	0.06	2011
		Nursery raising	-	-	L	-	C	-	DoLR, SHG, DH	0.50	-	0.03	2010
	Total								33.00		1.98		
2	2B3C5d2a	Afforestation	R	D	L	P	C	-	DoLR, DF	2.00	4368	1.68	2012
		Agro-forestry	-	-	L	P	C	-	DoLR, UG, DF	5.60	7894	2.00	2012
		Fodder	-	-	L	P	-	-	DoLR,UG, DV	0.50	-	0.15	2011
		Horticulture	R	-	L	P	C	-	DoLR, UG, DH	6.00	2496	0.96	2012
		Pasture dev.	R	-	L	-	C	-	DoLR,SHG, DV	1.00	-	0.06	2011
		Nursery raising	-	-	L	-	C	-	DoLR, SHG, DH	0.50	-	0.03	2010
									18.60		2.40		
3	2B3C5d1d	Afforestation	R	D	L	P	C	-	DoLR, DF	10.00	1560	0.66	2012
		Agro-forestry	-	-	L	P	C	-	DoLR, UG, DF	2.30	4103	1.78	2012
		Fodder	-	-	L	P	-	-	DoLR,UG, DV	10.00	-	0.60	2011
		Horticulture	R	-	L	P	C	-	DoLR, UG, DH	50.00	7800	3.00	2012
		Pasture dev.	R	-	L	-	C	-	DoLR,SHG, DV	5.00	-	0.30	2011
		Nursery raising	-	-	L	-	C	-	DoLR, SHG, DH	2.00	-	0.12	2010

	Total									13.30		3.10	
	Grant Total									110	-	6.60	

Table no. 52: Technical Details of Afforestation and Agro forestry Activities in 1ha

Particulars	Value	Unit
Crop Name	<i>Prosopis juliflora Acacia nilatica, Prosopis cineraria</i>	
Plant To Plant Spacing	8.00	M
Row to Row Spacing	8.00	M
Pit Length	1.00	M
Pit Width	1.00	M
Pit Depth	1.00	M
No. of Plants	156	Nos.
Plantation Area	1.00	ha.
No. of Plants per ha	1,56	Nos.
Gap Filling	20	%

Table no. 53: Cost Estimation for afforestation and Agro forestry activity in 1ha

S. No.	Description	No.	Length (m.)	Width (m.)	Depth (m.)	Unit	Quantity	Rate	Amount
1	Digging of pits for plants	156	1	1	1	Cum	156.00	10	1560.00
2	Plants samplings for plantation in Govt. pasture area, sampling not less than 30 cm. height	156				Nos.	156.00	10	1560.00
3	Transportation of plants from nursery to camp site up to 15Km	156				Nos.	156.00	2	312.00
4	Loading and unloading of plants	156				Nos.	156.00	2	312.00

5	Rehandling of plants from camp site to actual planting site upto 200m.	156				Nos.	156.00	2	312.00
6	Cost of fertiliser & insecticides incl. application	156				Nos.	156.00	10	1560.00
7	Weeding and Hoeing two times (Twice in year)	156				Nos.	156.00	2.46	384.00
Total									6000.00

Table no. 54: Technical Details of Horticultural Activities in 1ha

Particulars	Value	
Crop Name	<i>Aonla, bael Ber, Guava etc</i>	
Plant To Plant Spacing	8.00	M
Row to Row Spacing	8.00	M
Pit Length	1.00	M
Pit Width	1.00	M
Pit Depth	1.00	M
No. of Plants	156	Nos.
Plantation Area	1.00	ha.
No. of Plants per ha	1,56	Nos.
Gap Filling	20	%

Table no. 55 : Cost Estimation for Horticultural Activities in 1ha

S. No	Description	No.	Length (m.)	Width (m.)	Depth (m.)	Unit	Quantity	Rate	Amount
1	Digging of pits for plants	156	1	1	1	Cum	1,56.00	10	1560.00
2	Plants samplings for plantation in Govt. pasture area, sampling not less than 30 cm. height	156				Nos.	1,56.00	10	1560.00
3	Transportation of plants from nursery to camp site up to 15Km	156				Nos.	1,56.00	2	312.00
4	Loading and unloading of plants	156				Nos.	1,56.00	2	312.00
5	Rehandling of plants from camp site to actual planting site upto 200m.	156				Nos.	1,56.00	2	312.00
6	Cost of fertiliser & insecticides incl. application	156				Nos.	1,56.00	10	1560.00

7	Weeding and Hoeing two times (Twice in year)	156				Nos.	1,56.00	2.46	384.00
Total									6000.00

5. **PRODUCTION SYSTEM AND MICRO ENTERPRIZES** (Financial out lays 13% i.e., Rs. 65.48 lacs)

PROPOSED EXTENSION STRATEGIES

The following feasible extension strategies have been proposed based on the analysis of data collected through PRA & related issues/problems in IWMP II Hardoi district.

Strategies :

- B. Improvement of productivity and income of farmers in the existing enterprises and farming system.*
- C. Diversification and intensification of existing farming system.*
- D. Sustainability in productivity/income.*
- E. Integrated nutrient management.*
- F. Integrated pest management.*
- G. Seed multiplication and replacement.*
- H. Horticulture planting material*
- I. Success story.*
- J. Natural resources management.*
- K. Issue for Policy consideration*
- L. Farm mechanization.*
- M. Marketing & Media strategies.*
- N. Human Resource Development.*
- O. Farmers Organization.*

A. Improvement of Productivity and income for farmers in the existing enterprises and farming system

Table no. 56 : Agriculture Production

Crop	Critical Gap	Strategic issue	Strategies
1	2	3	4
1.Wheat	Yield stagnation	Use of recommended seed rate, Weed management, Popularizing Seed production programme, Popularizing Organic farming	Demonstration, Exposure visits, Training
	Use of untreated seeds	Encouraging sowing with treated seeds	Demonstration, Exposure visits, Training
	Un judicious use of Irrigation water	Irrigation management	Demonstration, Exposure visits, Training
2. Paddy	Imbalance use of Fertilizer	To promote INM	Demonstration, Soil testing, Exposure visits, - Training
	Un Availability of Quality Seed	In crease seed replacement ratio Promote seed production Programme	Demonstration, Exposure visits, Training
	1. Improper nursery raising	-Raised seed beds	Demonstration, Exposure visits, Training
	2. Inadequate Pest and disease management	Popularization of Integrated pest and disease management	- Demonstration - Exposure visits - Training
	3. Weed management	Populazation of chemical Pesticide	Demonstration, Exposure visits, Training
3..Maize	1. Non adoption of seed treatment	Application of seed treatment	Demonstration, Exposure visits, Training
	2. Excess application of fertilizes	Use of recommended dose of fertilizer	Demonstration, Exposure visits, Training
	3. Use of Micro nutrients	-Use of recommended quantity of micro nutrients	Demonstration, Exposure visits, Training
	4. Non adoption of hand pollination practices	Following hand pollination	Demonstration, Exposure visits, Training
4. Mustard	1. Higher plant population	Popularization of plant population technique per	Demonstration, Exposure visits, Training
	2. Low production	-Suitable agronomical practices will be popularized	Demonstration, Exposure visits, Training
	3. Imbalance use of fertilizer	-Use of balanced fertilizer promote, sulphur	Demonstration, Exposure visits, Training
	4. Pest & disease management	-Adoption of proper pest and disease management practice	Demonstration, Exposure visits, Training
	5. Post harvest technology	Popularization of improved storage method	Demonstration, Exposure visits, Training

5. Lentil	1. Yield stagnation	Timely sown, line sown, seed rate as per recommendation	Demonstration, Exposure visits, Training
	2. Imbalance use of fertilizers	Popularization of phasphetik fertilizer	Demonstration, Exposure visits, Training
	3. Low quantity of F.Y.M.	Use of recommended practice of F.Y.M.	Demonstration, Exposure visits, Training
	4. Inadequate use of sowing techniques	Use of Recommended techniques	Demonstration, Exposure visits, Training

1	2	3	4
6. Sugarcane	1. Late sowing	-Timely sowing	Demonstration, Exposure visits, Training
	2. Non application of fertilizers	Application of seed treatment	Demonstration, Exposure visits, Training
	3. Excess application of fertilizers	Use of recommended dose of fertilizer, Popularization of recommended dose of F.Y.M./Green Manure	Demonstration, Exposure visits, Training
	4. Use of Micro Nutrients	-Use of recommended quantity of micro nutrients	Demonstration, Exposure visits, Training
	5. Inadequate pest and disease management	- Adoption of IPM/IDM	Demonstration, Exposure visits, Training
	6. Injudicious use of water	-Irrigation management	Demonstration, Exposure visits, Training

Table no. 57: Horticultural Production :-

(1) Potato	1. Un Identified verities	Popularization of Identified Recommended verities	Demonstration, Exposure visits, Training
	2. No seed treatment	Adoption of recommended seed treatment	Demonstration, Exposure visits, Training
	3. Non use of Micro nutrients	-Application of recommended Micro nutrients	Demonstration, Exposure visits, Training
	4. Non Adoption of pest and disease management	-IDM	Demonstration, Exposure visits, Training
(2) Tomato	1. No seed treatment	Adoption of recommended seed treatment	Demonstration, Exposure visits, Training
	2. Imbalace use of fertilizers	Application of recommended dose of fertilizers	Demonstration, Exposure visits, Training
	3. Low quantity use of F.Y.M.	Adoption of recommended doseOf F.Y.M.	Demonstration, Exposure visits, Training

	4. Inadequate plant protection measure	Popularization of recommended plant protection techniques	Demonstration, Exposure visits, Training
(3) Banana	1. Low quantity use of F.Y.M.	Use of Recommended dose of F.Y.M	Demonstration, Exposure visits, Training
	2. No seed treatment	Popularization of bio agents, <i>Tricoderma</i> and <i>Pseudomonas</i> For seed treatments	Demonstration, Exposure visits, Training
	3. Inadequate plant protection technique	Popularization of plant protection technique	Demonstration, Exposure visits, Training

Table no. 58: ANIMAL HUSBANDRY

Animal	Critical gap	Strategy	Activities
Cow & Buffalo	a) Artificial Insemination partial adoption of AI	a) Improving knowledge about advantage and disadvantages of AI	a) Awareness campaign b) Ensure the availability of technical staff. c) Ensure the availability of semen f) Conducting fertility improvement camps. g) Conducting camps for castration of scrub bulls at village level h) Providing wide mouth cry can & 1 Lit. Thermos for easy transportation of semen to remote villages
	b) Unavailable of quality fodder feed.	Improving the knowledge about animal production capacity and its fodder requirement	a) Organizing awareness camp about animal production capacity, its requirements and dairy economics. b) ensure the supply of good quality fodder seeds. c) Demonstration of conservation of fodder by silage making
	c) Minerals & vitamins. Full gap in adoption of feeding	Motivating farmers about importance of minerals & vitamins.	a) Intensify the awareness programmes about importance of feeding minerals & vitamins by promoting stall feeding
	d) Inter-calving period is long period	Awareness about "a calf a year"	a) Awareness camp for reduction calving period
	e) Health care gap in health care management	Providing knowledge about animal health and hygiene	a) organizing awareness programme about animal health & hygiene through trainings and field visits. b) Awareness campaign about animal health camps
	f) General management Partial gap in Adoption of general Management	Technology dissemination about animal management and its importance	a) organizing awareness programme about animal management through training and field visits.

	g) Average milk yield. Full gap in average milk yield.	Technology dissemination about complete dairy management	By providing awareness about complete dairy management
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1	2	3	4
Goat, Goat & Pig, Poultry	<u>Breed up gradation</u>	Awareness about feed and fodder management	a) Providing awareness programme through training and field visits. b) Refresher training course to technical
	<u>b) Feed management</u> Partial adoption of feed management	Awareness about feed and fodder management	a) Providing awareness programme about the feed and fodder requirement of the animal. b) Intesify the supply of fodder seeds
	<u>d) Health care</u> -gap in health care management -non adoption of deworming schedule	-Popularizing the importance of deworming. - Providing knowledge about animal health and hygiene	a) awareness camp about importance of deworming b) Conducting deworming comps c) Organizing awareness programme about animal health and hygiene through training and field visit.
	<u>d) General Management</u> - Partial gap in adoption of general management	- Technology dissemination about animal management and its importance	- Organizing awareness programme about animal management through training and field visit

Table no. 59: Fish Production

1. Fish production	1 Poor ground water resource during summer	Water storage facilities from on going schemes	Linkage with credit institution
	2. Silt & weed problem in existing ponds	Desalting of ponds & eradication of weed	Demonstration, Exposure visits, Training
	3. Improper stocking measures	Promotion of proper stocking measures	Demonstration, Exposure visits, Training
	4. Unawareness about composite fish farming	Creating awareness about composite fish farming	Demonstration, Exposure visits, Training
	5. Improper artificial feeding	Promotion of proper artificial feeding	Demonstration, Exposure visits, Training
	6. Marketing of fish through unorganized sectors	To promote marketing of fish through organized sectors	Demonstration, Exposure visits, Training
	7. Unawareness about cold storage and processing of fish	To create awareness about storing fish in cold storage and process the fish	Demonstration, Exposure visits, Training

Table no. 60 : Details of allied/ other activities (Total of the production system and micro enterprises intervention)

S.no	Names of the villages	Name of activity	Type of land			Executing agency	Total target	
			(i) Private	(ii) Community	(iii) Others (pl. specify)		(i)UG (ii) SHG	Estimated cost (Rs. In lakh)
1	2	3	4	5	6	7	8	9
A. PRODUCTION SYSTEM AND MICRENTERPRIZES INERVENTION (50 % BUDGET OF EACH INTERVENTION USE AS REVOLVING FUND AND 50 % USE AS TRAINING & TRAINING MATERIOALS)								
1	2B3C5h2b	Milk Collection Centre	-	Community	-	SHG	1.00	2015
		Bee Keeping	-	Community	-	SHG	0.00	2015
		Fruit preservation	-	Community	-	SHG	0.00	2015
		Small ruminants (Goatry)	-	Community	-	SHG	1.00	2015
		Fisheries	-	Community	-	SHG	1.00	2015
		Portable hatchery	-	-	-	SHG	1.00	2015
		Nursery raising	-	Community	-	SHG	1.00	2015
		Medicinal Plant	Private	-	-	SHG	1.50	2015
		Rural craft	-	Community	-	SHG	1.00	2015
		Vermi composting	-	Community	-	SHG	2.50	2015
		Animal Nutrient	Private	-	-	UG	0.94	2015
Total							10.94	2015
2	2B3C5d2a	Milk Collection Centre	-	Community	-	SHG	5.00	2015
		Bee Keeping	-	Community	-	SHG	4.00	2015
		Fruit preservation	-	Community	-	SHG	5.00	2015
		Small ruminants (Goatry)	-	Community	-	SHG	4.00	2015
		Fisheries	-	Community	-	SHG	2.00	2015
		Portable hatchery	-	-	-	SHG	4.00	2015
		Nursery raising	-	Community	-	SHG	4.00	2015
		Medicinal Plant	Private	-	-	SHG	2.00	2015
		Rural craft	-	Community	-	SHG	2.00	2015
		Vermi composting	-	Community	-	SHG	3.00	2015
		Animal Nutrient	Private	-	-	UG	0.36	2015
Total							35.36	2015
3	2B3C5d1d	Milk Collection Centre	-	Community	-	SHG	2.00	2015
		Bee Keeping	-	Community	-	SHG	2.00	2015
		Fruit preservation	-	Community	-	SHG	2.00	2015
		Small ruminants (Goatry)	-	Community	-	SHG	2.00	2015

		Fisheries	-	Community	-	SHG	3.00	2015
		Portable hatchery	-	-	-	SHG	4.00	2015
		Nursery raising	-	Community	-	SHG	2.00	2015
		Rural craft		Community	-	SHG	1.50	2015
		Animal Nutrient	Private	-	-	UG	0.68	2015
	Total						19.18	
	G. Total (for 25 village)						65.48	

Table no. 61: Item wise total for the project

S.no	Names of the villages	Name of activity	Type of land			Executing agency (i)UG (ii) SHG (iii) Others (pl. specify)	Total target	
			(i) Private	(ii) Community	(iii) Others (pl. specify)		Estimated cost (Rs. In lakh)	Expected month & year of completion (mm/yyyy)
1	25 villages in IWMP II nd	Milk Collection Centre	-	Community	-	SHG	8.00	2015
		Bee Keeping	-	Community	-	SHG	6.00	2015
		Fruit preservation	-	Community	-	SHG	7.00	2015
		Small ruminants (Goatry)	-	Community	-	SHG	7.00	2015
		Fisheries	-	Community	-	SHG	6.00	2015
		Portable hatchery	-	Community	-	SHG	9.00	2015
		Nursery raising	-	Community	-	SHG	7.00	2015
		Medicinal Plant	Private	-	-	SHG	3.50	2015
		Rural craft	-	Community	-	SHG	4.50	2015
		Vermi composting	-	Community	-	SHG	5.50	2015
		Animal Nutrient	Private	-	-	UG	1.98	2015
	Total						65.48	

Table no 62: Activities related production system and micro enterprizes intervention by Self Help Groups (SHGs) in the Project areas

S.no	Names of the Villages	Major activities of the SHGs				No. of SHGs require training	Total assistance planned for the SHG (Amount in Rs.)				Total annual Income to be generated (Rs.)	Total annual Savings to be done (Rs.)
		Name of activity	No. of SHGs involved	Average annual income from activity per SHG	Expected month & year of completion (mm/yyyy)		Loan from revolving	Training	Material	Others (pl. specify)		
1	25 villages in IWMP II nd	Milk Collection Centre	8	120000.00	March, 2016	8	400000.00	24000.00	160000.00	-	960000.00	500000.00
		Bee Keeping	6	70000.00	2015	6	300000.00	180000.00	120000.00	-	420000.00	300000.00
		Fruit preservation	7	75000.00	2015	7	350000.00	210000.00	240000.00	-	525000.00	500000.00

	Small ruminants (Goatry)	7	70000.00	2015	7	350000.00	210000.00	240000.00	-	490000.00	400000.00
	Fisheries	6	100000.00	2015	6	300000.00	180000.00	120000.00	-	600000.00	500000.00
	Portable hatchery	9	150000.00	2015	9	450000.00	270000.00	230000.00	-	1350000.00	900000.00
	Nursery raising	7	40000.00	2015	7	350000.00	210000.00	240000.00	-	280000.00	300000.00
	Rural craft	4	50000.00	2015	4	200000.00	120000.00	130000.00	-	200000.00	200000.00
	Vermi composting	5	50000.00	2015	5	250000.00	150000.00	150000.00	-	250000.00	200000.00

5.2.5 LIVELIHOOD ACTIVITIES

Income generating activities through self help groups for landless farmers like goat farming, poultry farming bee keeping, livestock development activities, vocational training given with the involvement of KVK, Mau and NGOs. Financial out lays for this component is 10 % i.e., Rs 50.37 lacs, details are given below in table.

Table no. 63 : Details of allied/ other activities (Total of livelihood intervention)

S.no	Names of the villages	Name of activity	Type of land			Executing agency (i)UG (ii) SHG	Total target	
			(i) Private	(ii) Community	(iii) Others (pl. specify)		Estimated cost (Rs. In lakh)	Expected month & year of completion (mm/yyyy)
A. PRODUCTION SYSTEM AND MICRENTERPRIZES INERVENTION (50 % BUDGET OF EACH INTERVENTION (EXCEPT CROP DEMONSTRATION, MEDICINAL PLANT, HORTICULTURE) USE AS REVOLVING FUND AND 50 % USE AS TRAINING & TRAINING MATERIOALS)								
1	2B3C5h2b	Crop demonstration	Private	-	-	UG	0.50	2015
		Medicinal plant	Private	-	-	UG	0.50	2015
		Horticulture	Private	-	-	UG	0.50	2015
		Nursery raising	Private	-	-	UG	1.00	2015
		Fruit preservation	-	Community	-	SHG	0.50	2015
		Rural craft	-	Community	-	SHG	1.00	2015
		Goatery	-	Community	-	SHG	2.00	2015
		Piggery	-	Community	-	SHG	2.00	2015
	Animal Nutrient	Private	-	-	UG	0.41	2015	
	Total					8.41	2015	
2	2B3C5d2a	Crop demonstration	Private	-	-	UG	5.00	2015
		Medicinal plant	Private	-	-	UG	5.00	2015
		Horticulture	Private	-	-	UG	4.00	2015
		Nursery raising	Private	-	-	UG	5.00	2015
		Fruit preservation	-	Community	-	SHG	2.00	2015
		Rural craft	-	Community	-	SHG	2.00	2015
		Goatery	-	Community	-	SHG	2.00	2015
		Piggery	-	Community	-	SHG	2.00	2015
	Animal Nutrient	Private	-	-	UG	0.20	2015	
	Total					27.20	2015	
3	2B3C5d1d	Crop demonstration	Private	-	-	UG	2.00	2015
		Medicinal plant	Private	-	-	UG	2.00	2015
		Horticulture	Private	-	-	UG	2.00	2015

		Nursery raising	Private	-	-	UG	2.00	2015
		Fruit preservation	-	Community	-	SHG	1.00	2015
		Rural craft	-	Community	-	SHG	2.00	2015
		Goatery		Community		SHG	2.00	2015
		Piggery		Community		SHG	1.00	2015
		Animal Nutrient	Private	-	-	UG	0.76	2015
	Total						14.76	
Grand Total							50.37	

Table no. 64: Item wise total for the project

S.no	Names of the villages	Name of activity	Type of land			Executing agency	Total target	
			(i) Private	(ii) Community	(iii) Others (pl. specify)		(i)UG (ii) SHG (iii) Others (pl. specify)	Estimated cost (Rs. In lakh)
8	25 villages in IWMP II nd	Crop demonstration	Private	-	-	UG	7.50	2015
		Medicinal plant	Private	-	-	UG	7.50	2015
		Horticulture	Private		-	UG	6.50	2015
		Nursery raising	Private	-	-	UG	8.00	2015
		Fruit preservation	-	Community	-	SHG	3.50	2015
		Rural craft	-	Community	-	SHG	5.00	2015
		Goatery		Community		SHG	6.00	2015
		Piggery		Community		SHG	5.00	2015
		Animal Nutrient	Private	-	-	SHG	1.37	2015
	Total					50.37		

Table no. 65: Activities related to livelihoods by Self Help Groups (SHGs) in the Project areas

S.no	Names of the Villages	Major activities of the SHGs				No. of SHGs require training	Total assistance planned for the SHG (Amount in Rs.)				Total annual Income to be generated (Rs.)	Total annual Savings to be done (Rs.)
		Name of activity	No. of SHGs involved	Average annual income from activity per SHG	Expected month & year of completion (mm/yyyy)		Loan from revolving	Training	Material	Others (pl. specify)		
1	25 villages in	Fruit	2	75000.00	2015	2	100000.00	60000.00	19000.00	-	150000.00	200000.00

	IWMP IInd	preservation											
		Rural craft	5	50000.00	2015	5	250000.00	150000.00	100000.00	-	250000.00	300000.00	
		Goatery	5	70000.00	2015	5	250000.00	150000.00	100000.00	-	350000.00	300000.00	
		Piggery	5	100000.00	2015	5	250000.00	150000.00	100000.00	-	500000.00	300000.00	

Table no 66 : (A) Details of livelihoods created for landless people*- including micro enterprises

S.no	Names of the villages	Name of activity	No. of beneficiaries					Pre-project income (Rs.)	Expected change in income from project intervention	Funds required for the activity (Rs.)	Sources of funding(Rs.)					Expected month & year of completion (mm/yyyy)
			SF	MF	LF	Land less	Total				Project Fund	Beneficiary	Financial institution	NGO	Others	
1	25 villages in IWMP IInd	Fruit preservation	10	2		138	150	12000.00	75000.00	650000	650000	-	-	-	-	2015
		Rural craft	22	5	-	128	155	12000.00	50000.00	1100000	1100000	-	-	-	-	2015
		Goatery	11	4	-	60	70	12000.00	70000.00	800000	800000	-	-	-	-	2015
		Piggery	-	-	-	160	160	7000.00	100000.00	750000	750000	-	-	-	-	2015

Table no. 67: (B) Details of other livelihoods created for farmers

S.no	Names of the villages	Name of activity	No. of beneficiaries					Pre-project income (Rs.)	Expected change in income from project intervention	Funds required for the activity (Rs.)	Sources of funding(Rs.)					Expected month & year of completion (mm/yyyy)
			SF	MF	LF	Other	Total				Project Fund	Beneficiary	Financial institution	NGO	Others	
1	25 villages in	Crop demonstration	400	600	150	-	1150	1150000	1500000.00	2300000	2300000	-	-	-	-	2015
		Medicinal	25	35	10	-	70	-	7000000.00	700000	700000	-	-	-	-	2015

	IWMP IInd	plant Horticulture	100	150	25	-	275	275000.00	5000000.00	1100000	1100000	-	-	-	-	2015
		Nursery raising	10	6	4	-	20	-	2000000.00	500000	500000	-	-	-	-	2015

5.2.6 Marketing linkage

The direct livelihood activities need good forward and backward support. Without such support system the activities may fail to deliver the desired results. These linkages would involve credit, machinery, input supply, marketing, etc.

Table no. 68: Backward and Forward Linkage

S. No.	Project	Type of Marketing Facility	Pre-project (no.)	During the project (no.)	Post-project (no.)
1	<i>IWMP IInd</i>	Backward linkages			
		Seed certification	1	1	1
		Seed supply system	5	10	15
		Fertilizer supply system	5	10	15
		Pesticide supply system	6	6	10
		Credit institutions	Bank-3	Bank-7	Bank-10
		Water supply	-	-	-
		Extension services	3	3	12
		Nurseries	1	1	12
		Tools/machinery suppliers	-	-	2
		Price Support system	-	-	4
		Labour	-	-	-
		Any other (please specify)	-	-	-
		Forward linkages			
		Harvesting/threshing machinery	4	8	12
		Storage (including cold storage)	1	1	4
		Road network			
		Transport facilities	-	-	-
		Markets / Mandis	8	9	12
		Agro and other Industries	1	5	6
		Milk and other collection centres	-	2	6
		Labour	-	-	-
		Hatchery (Portable)	-	5	8
Vermi-compost unit	-	2	5		
Animal Mineral Mixture	-	-	50 gm/day/animal		

5.3 Convergence Planning for various activities

5.3.1 Earthen bund, contour bund, percolation tank, injection well will be made in watershed area convergence with MNREGS

- 5.3.2 Soil health card, crop demonstration, kisan gosthi, kisan mela, farmer's school also organized in watershed area under many scheme of department of Agriculture.
- 5.3.3 Composite fish farming or mixed fish farming popularized in this area with Department of fisheries.
- 5.3.4 Animal health camp, fodder development, vaccination work also made through Veterinary Department.
- 5.3.5 Aforestation in project area also done with Forest Department.
- 5.3.6 Dry land horticulture also convergence with department of horticulture.

Table no. 69: Details of Convergence of other Schemes in the Project area with IWMP Project

S.No.	Name of the MW	Names of Departments with Schemes converging with IWMP*	Fund made available to IWMP project due to convergence (Rs. In lakh)	Was this fund included in Rs. 12,000/15,000 Per ha		Name of activity/task/structure undertaken with converged funds (a) Structures (b) Livelihoods (c) Production System	Reference no. of activity/task/structure in DPR	Level at which decision for convergence was taken \$
				Yes	No			
1	2	3	4	5	6	7	8	9
1	2B3C5h2b	MNREGS	20.00		NO	a	5	DRDA
		DA	0.40		No	b, c	5	PIA
		DHO	0.10		No	b, c	5	PIA
		DF	0.20		No	b, c	5	PIA
		F	0.30		No	b, c	5	PIA
		Total	21.00		No			
2	2B3C5d2a	MNREGS	23.00		No	a	5	DRDA
		DA	1.50		NO	b, c	5	PIA
		DHO	0.30		No	b, c	5	PIA
		DF	0.40		No	b, c	5	PIA
		F	0.30		No	b, c	5	PIA
		Total	25.50		No			
3	2B3C5d1d	MNREGS	11.00		No	a	5	DRDA
		DA	1.70		No	b, c	5	PIA
		DHO	0.50		NO	b, c	5	PIA

		DF	0.50		No	b, c	5	PIA
		F	0.30		No	b, c	5	PIA
		Total	19.00		No			

only letter (a) or (b) or (c) needs to be filled. In case more than one activity has been undertaken all the concerned letters may be indicated e.g. (a) + (b)

\$ WC/GP/WDT/PIA/DRDA cell/ZP/DPC/SLNA / DoLR- only initials as indicated here need to be entered.

* DA= Department of Agriculture, DHO= Department of Horticulture, VO= Department of Veterinary, DF= Department of Fisheries, F= Forest

6. CAPACITY BUILDING PLAN

Capacity Building is the process of assisting the group or individuals to identify and address issues and gain the insights, knowledge and experience needed to solve problems and implement change.

There is a realization in the development sector that there is a need to appraise the success of development interventions by going beyond the conventional development targets and measures of success (e.g. in the form of commodities, goods and services) to take into account improvements to human potential. Capacity building of stakeholders is also increasingly viewed as an important factor in developmental projects that involve participation of stakeholders at all levels for effective implementation of projects.

Scope of capacity building at IWMP IInd

- Alternative Land Use Plan
- Scientific technique of Soil and Moisture conservation
- Improved and Scientific agriculture practices
- Fodder development and Management
- Afforestation
- Meteorological Information
- Dairy Development and Management
- Rural Craft
- Income Generation Activities
- Stitching

- Food Processing
- Post Harvest management practices
- Fish Production

Capacity building and training are the most important components of watershed management programme both for the field level project staff/ officers and functionaries of people institutions i.e. watershed community. Apart from enhancing technical skill of the project staff, this would also provide opportunities to community members to develop their capacity as the future custodians of the programmes after project's withdrawal. IWMP IInd HARDOI financial outlay for capacity buildings is 5% (Rs. 25.18) of the total project cost and out of which Rs 1.158 will be expended for initiation of village level institution.

Table no 70 : Capacity Building activities in the project

S.No.	Project Stakeholders	Total no. of persons	No. of persons trained so far	No. of persons of be trained during current financial year	Sources of funding for training		Name and Address of the Institute where Trained
					a) DoLR	b) any other (pl. specify)	
1	PIAs	3	-	3	DoLR		DTC, GSP,GKSS
2	WDTs	16	2	14	DoLR		DTC, GSP,GKSS
3	UGs	10	-	10	DoLR		DTC, GSP,GKSS
4	SHGs	110	-	110	DoLR		DTC, GSP,GKSS
5	WCs	70	-	70	DoLR		DTC, GSP,GKSS
6	GPs	230	-	230	DoLR		DTC, GSP,GKSS
7	Community	560	-	560	DoLR		DTC, GSP,GKSS
8	Others (pl. specify)						

Table no 70.1: Detail of activities undertaken

Strategy	Proposed activity	No. of Units	Unit cost	Total Cost
Capacity building Activities	Stakeholders - Scientists Interaction,	6	0.50	3.00
	Training (2 days)	25	0.20	5.00
	Vocational/employment Generation Training (5-10 days)	20	0.20	4.00
	In-service Training. (3 days)	5	0.20	1.00
	Exposure visit within State	5	0.40	2.00
	Exposure visit out of State	4	0.50	2.00
	Field days	5	0.20	1.00
	Workshop	2	2.00	4.00
	Total			22.00

Table no 70.2 : Information, Education & Communication (IEC) activities in the project area

S.no.	Activity	Executing agency	Estimated expenditure (Rs.)	Expected Outcome (may quantify wherever possible)
1	Street plays	Local Drama Groups	50000.00	Awareness about importance of watershed project
2	Video Shows	IWMP, Hardoi	50000.00	
3	Pamphlets and Poster	IWMP, Hardoi	50000.00	
4	Banners and Hoardings	IWMP, Hardoi	50000.00	
		Total	200000.00	

7. PHASING OF PROGRAMMES AND BUDGETING

7.1 FUNDING OF THE PROJECT

Table no. 72: Funding for the IWMP Project *

(All financial figures in lakh Rs.)

S.No.	Names of Project	IWMP fund		Funds from other sources in addition to IWMP funds										Total
		Central share	State share	Convergence funds		PPP		Community		Institutional finance		Others (pl. specify)		
				Name of Scheme	Amount	Name of Private sector	Financial contribution	Name	Financial contribution	Name	Financial contribution	Name	Financial contribution	
1	IWMP II nd	503.76	-	*	65.50	-	-	-	-	-	-	-	-	569.26

*For detail please see table no. 69 it is additional budget and not included in fund budget (Rs. 12000.00). this budget will be use in watershed area according requirement and need during work phase by PIA.

7.2 YEAR WISE PHASING OF WORK (Physical and Financial)

Phasing of various works/ activities during different year of the project for treatable area 2203 ha out of Geographical area 3374ss ha presented in table

Table no. 73: COMPONENT WISE AND YEAR WISE PHASING OF PHYSICAL AND FINANCIAL OUTLAY

S.N.	Particulars	1 st Year (2010-11)		2 nd Year (2011-12)		3 rd Year (2012-13)		4 th Year (2013-14)		5 th Year (2014-15)		Total	
		Finncial lac	Phy. Hc	Finncial lac	Phy. Hc	Finncial lac	Phy. Hc	Finncial lac	Phy. Hc	Finncial lac	Phy. Hc	Finncial lac	Phy. Hc
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Administrative 10%	10.075		10.075		15.113		7.557		7.556		50.376	
2	Monitoring 1%	-		1.00		1.40		1.57		1.067		5.037	

3	Evaluation 1%	-		1.50		1.40		1.07		1.067		5.037	
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1	2	3	4	5	6	7	8	9	10	11	12	13	14
4	Entry Point Activity 4%	20.151	14	-	-	-		-		-		20.151	14
5	Institutional and Capacity building 5%	-		15.188		4.00		4.00		2.00		25.188	
6	D.P.R Preparation 1%	5.037		-		-		-		-		5.037	
7	Watershed Dev. Works 50%	-		75.58	1256	75.50	1250	75.50	1250	25.30	428	251.88	4184
8	Livelihood & Income Generating 10%	-		5.376		25.00		20.00		-		50.037	
9	Production System development 13%	-		5.376		20.00		15.00		25.112		65.488	
10	Consolidation Phase 5%	-		10.180		10.008		2.15		2.85		25.188	

	Total	35.263		124.275	1256	152.421	1250	126.847	1250	64.952		503.76	4198
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Table no. 74: ABSTRACT OF COMPONENT WISE WORK AND FINANCIAL OUTLAY OF THE SELECTED 5 WATERSHED

S.No.	Component	Total (Rs. in Lakhs)
1	Administration Cost	50.37
A	TA & DA, POL/Hiring of vehicles/office and payment of electricity and phone bill etc, computer, stationary and office consumable and Contingency.	
B	Monitoring	5.03
C	Evaluation	5.03
	Sub Total	60.43
2	Preparatory Phases	20.15
A	Entry Point activities, like improvement of drinking water system, repairing & Renasation Bundhies, check dam and school Activities & const/repair of culverts.	
B	Capacity Building	25.18
C	Preparation of DPR	5.03
	Sub Total	50.37
3	WATERSHED WORKS	251.88
A	Soil and Moisture Conservation	
	Contour Bund	51.00
	Graded Bund	45.34
	Gully Plug	17.00
B	Water Resource Development	
	Water harvesting Bundhi, Farm ponds, check dam injection well, open well, bore well etc	125.94
C	Agro-forestry & Horticulture	12.60
	Agro-forestry	
	Horticulture	
	Sub Total	251.88
4	Livelihood Activities	50.37
	Income generation Activities through SHGs for landless and Marginal formers (Goat farming, Bee keeping, Candle making, Dona Pattal making and live stock development Activities, Rope & Basket Making)	
	Sub Total	50.37
5	Production system & Micro enterprises	65.48
	Demonstration and assessment of of improved composting system.	
	i. Seed	
	ii. Chemical Fertilizer/Bio Fertilizer	
	iii. Pest control	
	iv. Advance Agriculture Equipment	
	v. Production of Compost	

S.No.	Component	Total (Rs. in Lakhs)
	Sub Total	65.48
6	Consolidation Phase	25.24
	Sub Total	25.24
	Grand Total	503.76

8. CONSOLIDATION/EXIT STRATEGY

8.1 Quality and Sustainability Issues

8.1.1 Plans for Monitoring and Evaluation

A Web-based GIS System is being developed for monitoring and evaluating the project in its planning & implementation phases. The system would be available on a public domain and can be accessed by all the stakeholders of the project. The system shows the entire state of Uttarpratesh and all of those areas selected over the next 18 years. Filtering allows the user to zoom onto one particular project. Details related to soil type, Land-use classification, inhabitation etc., can be obtained village-wise. Furthermore, survey-number wise details related to ownership, irrigation source, yield etc., can also be accessed by the users of the system. This system is being used for pooling up the details obtained from the DPR. In other words, the DPR is made available online in the form of a database which will help the stakeholders know areas of importance viz., already treated areas/historical works in the area, proposed areas for treatment etc., for further treatment and planning. The system would also show the satellite imageries of various years from the project inception stage to the project closing stages. This allows the user to evaluate the effectiveness of the treatment and thereby plan corrective measures for the project area. The system would serve as an aiding tool to the planners and evaluators for judging the efficacy of the project.

Yet another component of the Web-based GIS system is the Mobile based Monitoring & Evaluation System, which will help the ground staff alias WDTs (Watershed Development Team) to transmit information from the ground level to the central server. Also, any higher-up official in charge of the project can obtain information regarding the project area on their mobile phone by means of an

SMS. The system works in the following manner. The WDT equipped with a GPS instrument marks the latitude-longitude information of various treatment areas during the DPR. The probable sites are then transferred onto the central server. During the works phase, any progress in the treatment areas is reported to the server by means of an SMS by the WDT. Similarly, any nodal officer or higher-up official can view the progress in a project by means of summarized reports generated over frequent periods of time.

8.1.2 Plans for Project management:

The Project management of any watershed programme is very important. It mainly depends upon the community organization and the village level institutes in IWMP IInd watershed committee and various user group have been formulated for post project operation and maintenance of assets created during project period. Major emphasis will be on equity and sustainable benefit of the project even after implementation stage. A proper link-up will be built during project period with various institutes and capacity building organization. They will act as a major kingpin during post implementation for scaling up the successful experience during project.

8.1.3 Watershed Development Fund:

The major source of financial assistance after post implementation period is watershed Development Fund. The contribution of it will come mainly from the following: Attention:

8.1.4 User Charges:

Various user groups will be formed in village. These user groups will collect user charges according to the designated rules formed during the formation of user group. These funds will be transferred to the WDF funds as per these formulated rules. The secretary of watershed committee (WC) shall maintain the records of the following.

8.2 Activities in the CPRs in the project area

Table no. 75: Details of activities in the CPRs in the Project areas

S.no	Name (s) of the villages	CPR particulars	Activity Proposed	Target				
				Target area under the activity (ha)	Estimated expenditure (laks.)	Expected no. of beneficiaries	Estimated contribution to WDF (Rs.)	Expected month & year of completion
1	2B3C5h2b	Wasteland	Engineering work	60.00	3.60	240	18000.00	2015
		Forest	Afforesttion	25.00	1.50	100	7500.00	2012
		Pasture	Land development	4.00	0.24	60	1200.00	2012
		Orchard	Horticulture	10.00	0.60	180	3000.00	2012
		Village Pond	Moisture Conservation	2 no	2.00	140	10000.00	2011
		Total		99.00	7.94	720.00	39700.00	2011
2	2B3C5d2a	Wasteland	Engineering work	110.00	6.60	440	33000.00	2015
		Forest	Afforesttion	25.00	1.50	100	7500.00	2012
		Pasture	Land development	3.00	0.18	92	1000.00	2012
		Orchard	Horticulture	10.00	0.60	192	3000.00	2012
		Village Pond	Moisture Conservation	2 no	2.00	140	10000.00	2011
		Total		148.00	10.88	964.00	54500.00	2011
3	2B3C5d1d	Wasteland	Engineering work	82.50	4.95	290	24750.00	2015
		Forest	Afforesttion	22.00	1.32	82	7000.00	2012
		Pasture	Land development	5.00	0.30	75	1500.00	2012
		Orchard	Horticulture	10.00	0.60	192	3000.00	2012
		Village Pond	Moisture Conservation	2 no	2.00	140	10000.00	2011

	Total		119.50	9.17	779.00	46250.00	
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8.3 Sustainability and environment security

In the proposed watershed management plan of watershed, proper blending of bio engineering measures will be applied on 60% of the total watershed area, Bases on the results of studies conducted in this region, it is estimated that more than 50% of the watershed area will be treated and consequently the soil loss and runoff from the area is expected to be reduced by 70% and 65%, respectively, The proposed land use plan will improve the land utilization index and crop diversification index signification index significantly as compared to the existing one. It will help in maintaining ecosystem integrity on sustained basis along with improving the livelihood security of the farming community.

8.4 Economic Analysis

Economic analysis of the project was carried by taking direct benefits and costs considering 25 years project life at 10 percent discount rate for this purpose of economic analysis. Whole watershed development plan was divided into three sector namely agriculture, horticulture and forest/Fuel wood plantation, Benefit Cost ratio (BC ratio) criteria was employed to judge the economic efficiency of each enterprise and sector.

8.4.1 Agriculture

At present agriculture is being done on well maintained field, therefore, the development cost can be recovered within few year as it does not require much investment. Horticultural plantations of dry land fruit will be done on 77.00 ha of land with a proposed BC ratio of 1.85:1 Agro-forestry which not practiced in the watershed area will be promoted on 33.00 ha land with a proposed BC ratio of 1.85:1.

Table no. 76: Proposed economics of agriculture sector

S.No.	Sector	Area (ha)	NPV (Rs.)	BC ratio
1	Agriculture	2925.00	92150000	1.55:1
2	Horticulture	85.00	1690000	1.52:1
3	Agro-forestry	35.00	220100	1.85:1

Table no. 76.1: Economics of agriculture sector

S.No.	Sector	Area (ha.)	NPV (Rs.)	BC ratio
1	Irrigated agriculture	500.00	93745610	1.7 ;1
2	Rainfed agriculture	2425.00	15631828	1.3:1
Total		2925.00	109377438	1.5:1

8.4.2 Horticulture

Economic analysis of horticulture plantation in agri-horti system at IWMP-IInd watershed Project life is considered to be 25 years and discount rate for NPV estimation is 10%

Table no. 77: Economics of Horticulture sector

S.No.	Common name	Scientific name	Area (ha)	NPV of net Benefit	BC ratio
1	Aonla	<i>Embelica officinalis</i>	35.00	1857725	3.97:1
2	Ber	<i>Zyziphus mauritiana</i>	25	1251962	2.81:1
3	Beil	<i>Aegle marmelos</i>	25	1069887	2.84:1
Total		-	85.00	4179574	-

8.4.3 Forest/ Fuel wood plantation

Economic analysis of fuel wood plantation at IWMP-IInd watershed. Project life is considered to be 25 years and discount rate for NPV estimation is 10%

Table no. 78: Economics of aforestation sector

S.No.	Common name	Scientific name	Area (ha)	NPV of net benefit (Rs.)	BC ratio
1	Vilayati Babul	<i>Pongamoa glabra</i>	88.00	736427	2.11:1

8.4.4 Food sufficiency

Achieving self sufficiency in food production is one of the prime objectives of the project. The status of food requirement and production before and after the project is presented in Table.

Table no 79: Status of food requirement and availability per annum in IWMP-II watershed

S.No.	Items	Requirement (q/yr)	Before project		Proposed	
			Deficit or surplus (q/yr)	Availability (q/yr)	Availability (q/yr)	Deficit or surplus (q/yr)

1	Cereals	150000	-34300	115700	162460	+12460
2	Pulses	30000	-10000	20000	40800	+10800
3	Oilseeds	20000	-10000	10000	38000	+18000
4	Vegetable	50004	-19996	70000	80020	+30016

9. EXPECTED OUTCOMES

9.1 Employment

Employment has always been a problem in the village. The principal occupations of the people are dry land agriculture, animal husbandry and casual labour work. However, rain fall being very limited and erratic, agriculture suffers, i.e. at best they can take only a single crop, which keeps them partially engaged for about 4 months. Lack of fodder makes animal husbandry very difficult too. So, animal husbandry does not keep them engaged full time. Thus the people mainly depend upon casual labour, either in the village itself or outside it.

The project plans for creation of both wage employment and self employment opportunities. Wage employment would be created by engaging people in watershed physical works like construction of earthen bunds, farm bunds, village pond, plantation, etc. Self employment would be created by providing the people with cash support in the form of direct livelihood activities like agriculture, animal husbandry and enterprise development.

Table no. 80: Employment in Project area

S.no.	No. of the villages	Wage employment										Self employment				
		No. of man days					No. of beneficiaries					No. of beneficiaries				
		SC	ST	Others	Women	Total	SC	ST	Others	Women	Total	SC	ST	Others	Women	Total
1	25	0.66	-	0.52	0.13	1.31	774	-	1206	114	2094	96	-	88	21	266

(IWMP II nd)																		
-----------------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

9.2. Migration

Low rainfall results in very little fodder availability in the locality.. On account of agriculture and animal husbandry providing only part time employment for some part of the year, the people migrate for a better half of the year for wage labour. Employment opportunities in the local area as mentioned above will ensure lessening seasonal migration from the area.

Table no. 81: Details of seasonal migration from Project area

S.no.	Names of villages	No. of persons migration	No. of days per year of migration	Major reason(s) for migration	For reduced migration identify major activities of IWMP responsible		Expected reduction in No. of persons migration
					(a) Structures	(b) Livelihoods	
1	IWMP II nd (25 village)	1570	85	Due to employment	Structure	Livelihood	480

9.3 Drinking water

As a result of the watershed activities, it is expected that the quantity and quality of drinking water would improve.

Table no. 82: Status of Drinking water

S. No.	Names of Villages	Availability of drinking water (no. of months in a year)		Quality of drinking water		Comments
		Pre-project	Expected Post project	Pre-project	Expected Post-project	
1	IWMP II nd (25 village)	10 month	12 month	General water	Good water	-

9.4 Vegetative cover

There is negligible area under tree cover. The village has a negligible forest area which consists of only Juliflora Prosopis (babool). Trees like Neem and _Alianthus_ are seen just here and there, not concentrated in any area.

It is planned that 88.00 ha land to be covered under new plantation.

Table no. 83: Forest/vegetative cover

S. No.	Name of Village	Existing area under tree cover (ha)	Area under tree cover proposed
1	IWMP II nd (25 village)	-	88.00

9.5 Livestock

The village has quite a good of livestock population. These include cows, bullocks, buffaloes, goats, sheep and camels. The interventions like provision of good quality cows and buffaloes, the establishment of a fodder bank and other such related activities would spur up the dairy development in the village. It is expected that the post project period would see a substantial increase in livestock population and yield from them.

Table no. 84: Details of livestock in the project areas (for fluids please mention in litres, for solids please mention in kgs. and income in Rs.)

S. no.	Name of MW	Type of animal	Pre Projected			Expected Post Projected			
			No	Yield	Income	No	Yield	Income	
1	IWMP II nd (25 village)	Buffalow	2952	2.33lit/animal	20.00/day	5570	4.00lit/animal	30.00/day	
		Cow	2388	1.84lit/animal	16.00/day	1875	3.004lit/animal	25.00/day	
		Sheep	323	10kg/animal	2000.00/animal	1250	20kg/animal	4000.00/animal	
		Goats	3965	8 kg/animal	1600.00/animal	6780	16 kg/animal	3200.00/animal	
		Pigs	1135	20.0 kg/ha	2000.00/animal	2200	50.0 kg/ha	10000.00/animal	
		Poultry	1890	0.75kg/bird	150.00/bird	-	0.75kg/bird	300.00/bird	
		Fish	-	10.73 q/ha	15000.00/ha	-	50.00 q/ha	75000.00/ha	

9.6 Vegetation/ crop related outcomes:

Table no. 85: Details of karif drop area and yield in the project areas

S.No.	Names of villages	Name of crops	Pre-project						Expected Post-project					
			Area (ha)		Average Yield (Qtl) per ha.		Total Production (Qtl)		Area (ha)		Average Yield (Qtl) per ha.		Total Production (Qtl)	
			Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.
1	2B3C5h2b	Paddy	224	448	18.00	10.00	4032	4480	550	574	30.00	20.00	16500	11440
		Others*	-	1200	-	8.00	-	9600	-	1000	-	15.00	-	15000
2	2B3C5d2a	Paddy	185	409	18.00	10.00	3330	4090	550	593	30.00	20.00	16500	11860
		Others*	-	1000	-	8.00	-	8000	-	600	-	15.00	-	9000
3	2B3C5d1d	Paddy	171	246	18.00	10.00	3078	2460	400	231	30.00	20.00	12000	4620
		Others*	-	600	-	8.00	-	4800	-	500	-	15.00	-	7500
Total			580	3903	54	54	10440	33430	1500	3498	90	105	45000	59420

Irri.- Irrigated

Rf.- Rainfed

Others: Pigeon pea, moong urd, jwar, vegetable etc

Table no. 86 : Details of Rabi drop area and yield in the project areas *

S.No.	Names of villages	Name of crops	Pre-project			Expected Post-project		
			Area (ha)	Average Yield	Total	Area (ha)	Average	Total

					(Qtl) per ha.		Production (Qtl)				Yield (Qtl) per ha.		Production (Qtl)	
			Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.
1	2B3C5h2b	Paddy	224	648	25.00	20.00	5600	12960	550	1074	30.00	25.00	16500	26850
		Others*	-	1000	-	10.00	-	10000	-	500	-	15.00	-	7500
2	2B3C5d2a	Paddy	185	609	25.00	20.00	4625	12180	550	693	30.00	25.00	16500	17325
		Others*	-	800	-	10.00	-	8000	-	500	-	15.00	-	7500
3	2B3C5d1d	Paddy	171	346	25.00	20.00	4275	6920	400	331	30.00	25.00	12000	8275
		Others*	-	500	-	10.00	-	5000	-	400	-	15.00	-	6000
Total			580	3903	75	90	14500	55060	1500	3498	90	120	45000	73450

Irri.- Irrigated

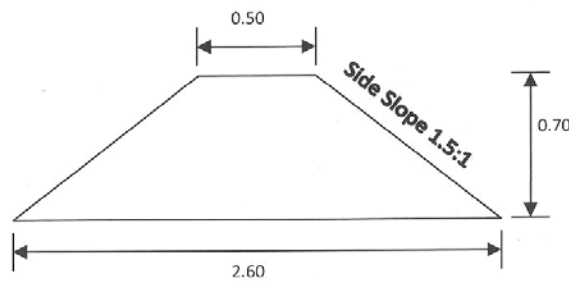
Rf.- Rainfed

* others crop: chick pea, pea, ,mustard, potato etc

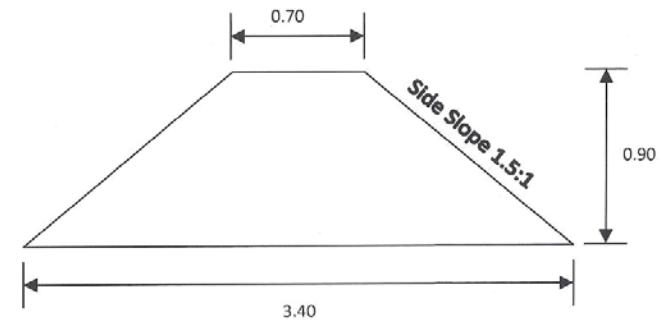
10- DETAILS ESTIMATE OF WATERSHED DEVELOPMENT WORK PHASES (ANNEXURE-1)

DRAWING OF C.B., S.B., P.B., AND M.B.

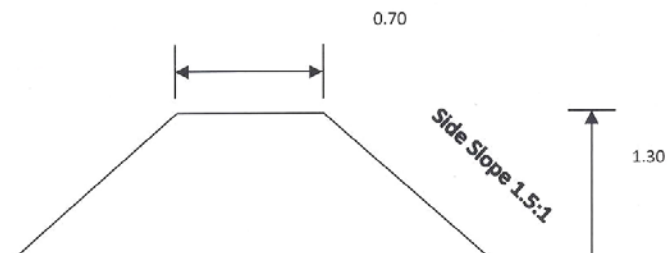
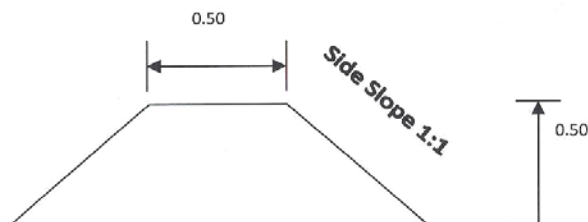
(All dimensions in Metre) (Not to Scale)



(C.B., Cross-Section – 1.085 m²)

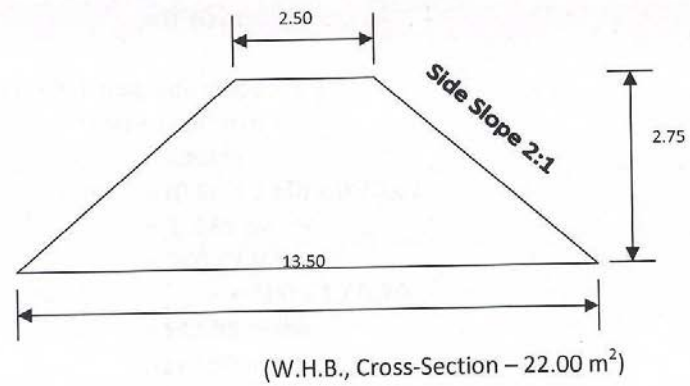
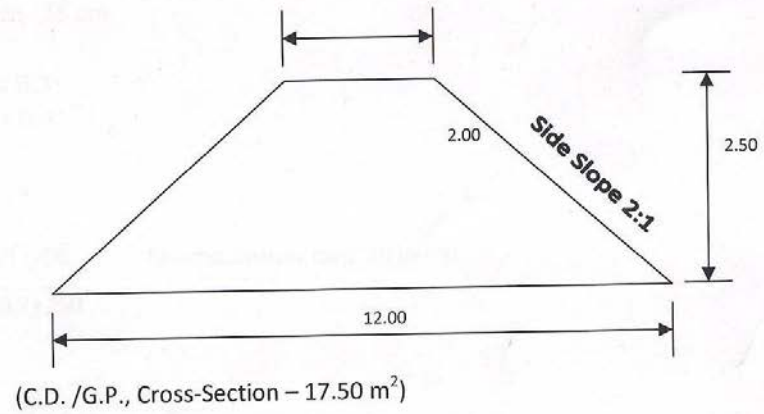
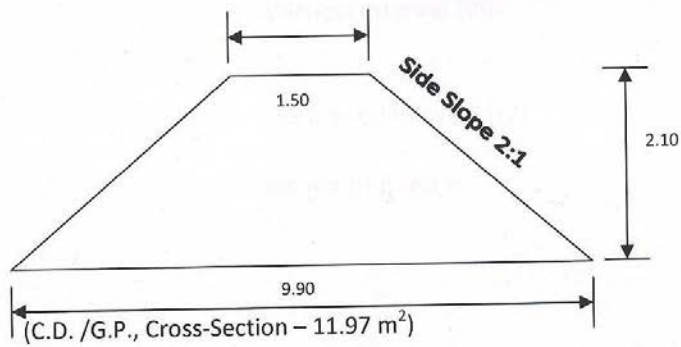


(S.B., Cross-Section – 1.845m²)



DRAWING OF EARTHEN CHEKDAM / GULLY PLUG

(Not to Scale)



(All dimensions in Metre)

DESIGN OF CONTOUR BUND

Type of Soil	- Clay
Rain fall	- 24 hr in cm -25 cm
Fied Stop -1%	
Virtual interval (Vi)	$= [s/3+2]$ $= [1/3+2]$
Horizontal interval (HI)	$= 0.70 \text{ m}$ $= 100 \times V.I/s$
Heidht of Bond h	$= (R \times v_i)/50$ $= (25 \times 0.7) /50$ 0.35 0.59 Say 0.6 m
Ferr bord	= 15% of high mimimum -10 cm
Hight	$= 0.60+0.10$ $= 0.70\text{m}$
Taking top width of bond 0.50 m and side slope 1.5:1	
Then base of bond	$= 0.50+(1.10d) \times 2$ $= 2.60 \text{ m}$
Coress-Section of bond	$= (2.50+ 2.60) \times 0.70/2$ $= 1.085\text{m}^2$
Length of bond	$= 100s/V.I.$ $= 100 \times 1/0.70$ $= \mathbf{142.85 \text{ m/ha}}$

Earth work /ha	Say 120 m/ha = 250x1.085 = 162.75 cum = 162.75 cum
Cort Rs./ ha	=162.7 x39.16=6373.29 Say 6375.00

DESIGN OF SUMBERGENCE BOND

Types soil – Caly	Rainfall intensiy for 24 hrs – 25 cm
Fild slope 3%	V.I. =[s/3+2] x0.30 = 0.909 m
Horizontal Interval =(100xV.I.)/s	= (100x0.909)/3 = 30m
Height of bond h = (Re x V.I.)/50	=(25 x 0.909)/50 =0.45 =0.67m. Say 0.70m
Feree bord 20% of hight minimum 20 cm	=
Total Hight	= 0.90 m
Takingh top wigth of bond 0.70 m and side slope 1.5:1	
Bottom of bund	= 0.70+2x 1.5d = 0.70+2.70 = 3.40
Cross section of Submergence Bond	= (0.70+3.40)x0.90/2 = 1.845 m ²
Lengh of bond	= 100s/V.I. = (100x3) /0.90 = 333 m
Feasible length	= 100+25+25

	= 150m
Earth work/ha	= 150x1.845
	= 276.75
	= 276.75x39.16
Cost per has	= 10,837.53
	Say 10,850=00

TYPICAL SECAION OF FILED BUND

Top widht	= 0.50m
Side slope	=1:1
Height of bound	= 0.50m
Bottom Widht	= 1.50m
Cross section	= (0.580+1.50)x0.50/2=100cum
Length per hectare	= 200 m
Earhwork	= 200x0.50=100cum
Cost 39.16/cum	= Rs.3916.00
Cost per hectare	=Rs. 3916.00

TYPICAL SECTION OF P.B., M.B., S.B0.

Top width	= 0.70m
Side slope	= 1.5: 1
Height	= 1.30 m

Bottom	=4.60 m
Cross section	= $(0.70+4.60) \times 1.30 / 2 = 3.445 \text{m}^2$
Cost/meter	= Rs. 142.00

TYPICAL SECTION OF EARTHEN CHECK DAM / GULLY PLUG

Top width	=1.50 m
Side slope	= 2:1
Height	= 2.10m
Bottom Width	=9.90 m
Cross section	= $(1.50 + 9.90) \times 2.10 / 2$ = 11.97m^2
Cost per meter	= Rs. 551.45

TYPICAL SECTION OF CHEK DAM / GULLY PLUG

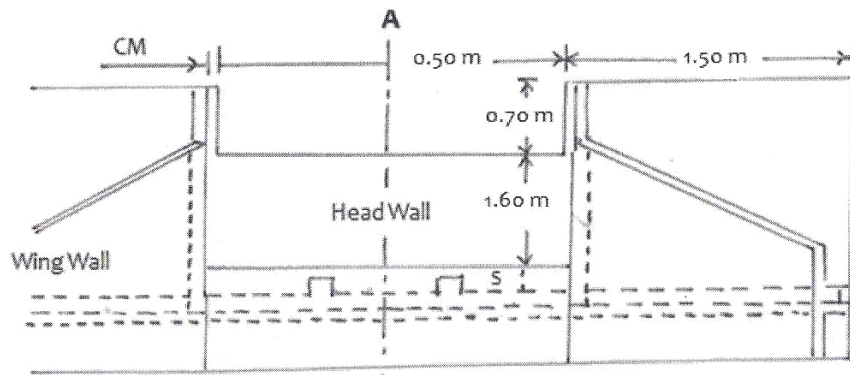
Top Width	= 2.00m
Side slope	=2:1

Height	= 2.50 m
Bottom Width	= 12.00 m
Cross Section	= $(2.00 + 12.00) \times 2.50 / 2$ = 17.50 m ²
Cost/meter	= Rs. 839.12

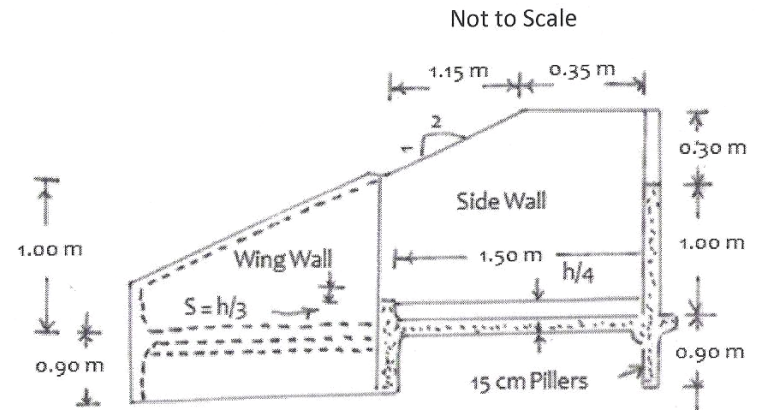
TYPICAL SECTION OF W.H.B

Top width	= 2.50 m
Side slope	= 2:1
Height	= 2.75 m
Bottom Width	= 13.50 m
Cross section	= $(2.50 + 13.50) \times 2.75 / 2$ = 22.00 m ²
Per meter cost	= Rs. 1085.92

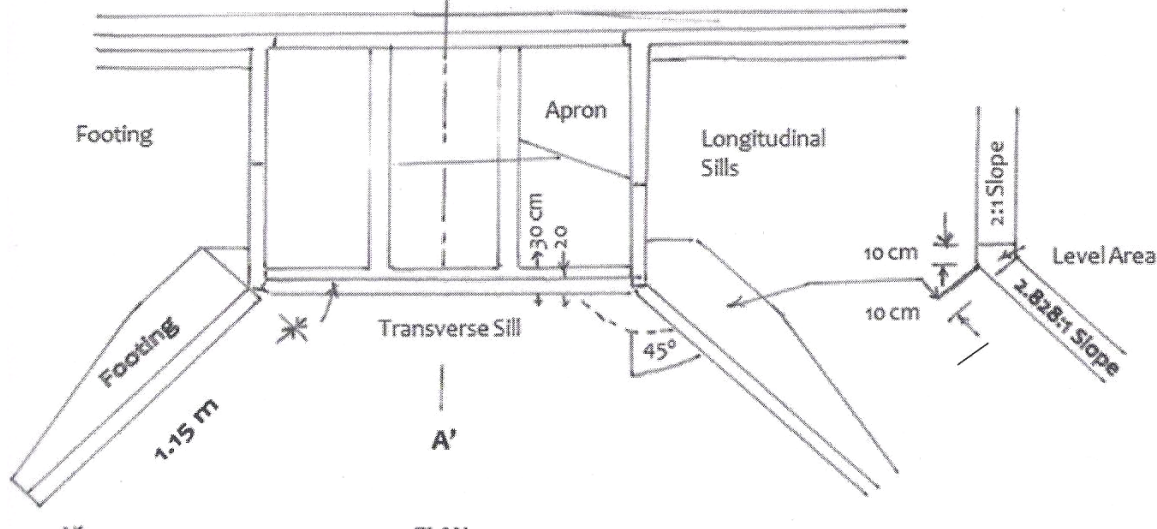
DRAWING OF SPILLWAY OF CREST LENGTH 0.5 m



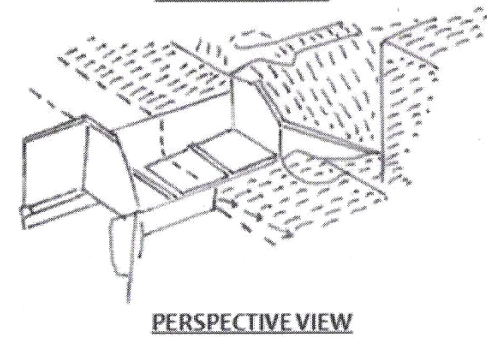
DOWNSTREAM ELEVATION



SECTION ON A-A'



PLAN



PERSPECTIVE VIEW

Design of Drop Spillway to be constructed at a place in a gully having width of 1.0 m and catchment area 1.00 and net drop 0.50 m
 Taking rainfall intensity for duration equal to time of concentration of watershed and design return period of 25 years , as 120 mm/hr .
 The coefficient of runoff for the watershed is 0.3.

1. Hydrologic design – The design peak runoff rate(m^3/s) for the watershed form Rational formula is given as :

$$Q = \frac{C.I.A.}{360} = \frac{0.3 \times 120 \times 1.00}{360} = 36/360 = 0.10 \text{ cum /second}$$

2. Hydraulic design- The maximum discharge capacity of the rectangular weir given by

$$Q = \frac{1.711LH^{3/2}}{(1.1+0.01f)} = \text{o find suitable value of L\&H}$$

Let us assume $L = 0.50$ m (since width of gully is 1.00m)

$$0.10 = \frac{1.711LH^{3/2}}{(1.1+0.01 \times 0.5)} = \frac{1.711L H^{3/2}}{(1.105)}$$

$$L H^{3/2} = \frac{1.105 \times .10}{1.711} = \frac{0.1105}{1.711} = 0.064$$

$$H^{3/2} = \frac{0.064}{0.50} = 0.128$$

$$H = (0.128)^{2/3} = 0.25 \text{m}$$

$$\text{Test } L / h = 0.50 = 2 \geq 2.0 \text{ hence O.K.}; \quad 0.25 \text{ h / f} = \frac{0.25}{0.50} = 0.50 \leq 0.5 \text{ hence O.K.}$$

3. Structural design -

1. Minimum headwall extension , $E = (3h + 0.6)$ or $1.5 f$ whichever is greater $E = 3 \times 0.5 + 0.6$ or 1.5×0.50
 $E = 2.10\text{m}$ or 0.75m = Adopted 2.10m
2. Length of apron basin $L_B = (2.28 h/f + 0.54) = 0.50 (2.20 \times 0.5 + 0.54) - 0.5$
 $= 0.50 \times 2.74 = 1.37 \text{ m}$ says 1.40m
3. Height of end sill, $S = h = 0.50 = 0.16\text{m}$ says 0.20m

4. Height of wing wall and side wall at Junction:

$$J = 2h \text{ or } [f + h + S - (L_B + 0.10)/2] \text{ whichever is greater} = 2 \times 0.20 \text{ or } [0.50 + 0.50 + 0.16 - (1.37 + 0.10/2)]$$

$$= 1.0 \text{ or } [1.16 - 0.735] = 1.0 \text{ or } 0.425 \text{ (adopt } J = 1.00 \text{ m)}$$

$$5. M = 2(f + 1.33 h - J) = 2(0.050 + 1.16 - 0.733 \times 0.25 - 1.00) = 2 \times (-0.167) = -0.335$$

$$6. K = (L_B + 0.1) - M = (1.037 + 0.1) - 0.335 = 1.47 - 0.335 = 1.135 \text{ m}$$

Toe and cut off walls

$$\text{Normal scour depth (N S D)} = 0.473 \times (Q / f)^{1/3} = 0.473 \times (0.1/1)^{1/3} = 0.473 \times 0.464 = 0.219$$

$$\text{Maximum Scour depth (M S D)} = 1.5 \times \text{N S D} = 1.5 \times 0.219 = 0.328\text{m}$$
 Says 0.35 m

$$\text{Depth of cutoff / Toe wall} = 0.35 \text{ m}$$

Apron thickness : For an over fall of 0.5 m .The apron thickness in concrete construction is 0.20m since structure is constructed in masonry ,the Apron thickness will be $0.20 \times 1.50 = 0.30\text{m}$

Wall thickness : The thickness of wall of the structure (masonry construction) is given below . :

Description	Thickness of wall
-------------	-------------------

	T op width	Bottom width
Head wall	0.40	1.00
Side wall	0.30	0.80
Wing all and head wall extension	0.30	0.60

DETAIL ESTIMATE OF DROP SPILLWAY OF CREST LENGTH 0.5 METRE

1. Earth work in cutting in foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	1.50	1.00	1.15	3.45
2	Head wall	1	0.50	1.20	1.15	0.69
3	Head wall extension	2	2.20	0.80	1.15	4.04
4	Wing wall	2	1.15	0.80	1.15	2.11
5	Tow wall	1	0.50	0.80	0.60	0.24
6	Cut off wall	1	4.70	0.80	0.60	2.25
7	Apron	1	0.50	1.50	0.60	0.45
Total						13.23 cum

2 Laying of sand in the bed of foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	1.50	1.00	0.10	0.300
2	Head wall	1	0.50	0.40	0.10	0.020
3	Wing wall	2	1.15	0.80	0.10	0.184
4	Toe wall	2	0.50	0.80	0.10	0.040
5	Cut off wall	1	4.70	0.80	0.10	0.376
6	Apron	1	0.50	1.50	0.10	0.075
Total						0.995 cum

3 C.C.W. 1 :3: 6 in foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
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1	Cut off wall	1	4.70	0.80	0.15	0.564
2	Head wall	1	0.50	0.40	0.15	0.030
3	Side wall	2	1.50	1.00	0.15	0.450
4	Wing wall	2	1.15	0.80	0.15	0.276
5	Toe wall	1	0.50	0.80	0.15	0.060
6	Apron	1	0.50	1.50	0.15	0.112
Total						1.492 cum

4 Brick masonry 1:4

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	4.70	0.80	0.45	1.692
		1	4.70	0.60	0.45	1.269
2	Head wall	1	0.50	1.10	0.45	0.247
		1	0.50	1.00	0.45	0.225
		1	0.50	(0.40+1.00)/2	0.60	0.180
3	Head wall extension	2	2.10	0.80	0.45	1.512
		2	2.10	0.60	0.45	1.134
		2	2.10	0.60	0.60	1.512
		2	2.10	0.40	0.70	1.176
4	Side wall	2	1.50	1.00	0.45	1.350
		2	1.50	0.80	0.45	1.080
		2	1.50	0.80	0.60	1.440
		2	1.50	0.60	0.40	0.720
		2	(0.35+1.50)/2	0.40	0.30	0.222
5	Wing wall	2	1.15	0.80	0.45	0.828
		2	1.15	0.60	0.45	0.621
		2	1.15	0.40	(1.00+0)/2	0.460
6	Tow wall	1	0.50	0.80	0.45	0.180
		1	0.50	0.60	0.45	0.135
		1	0.50	0.40	0.20	0.040
7	Apron	1	0.50	1.50	0.45	0.337
Total						16.360cum

5. C.C.W. 1:2:4 in the wall

S.No.	Description of work	No.	L	B	D/H	Quantity
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1	Head wall	1	0.50	0.40	0.025	0.005
2	Side wall	2	0.35	0.40	0.025	0.007
		2	0.18	0.40	0.025	0.023
3	Head wall extension	2	2.10	0.40	0.025	0.042
4	Wing wall	2	1.52	0.40	0.025	0.030
5	Toe wall	1	0.50	0.40	0.025	0.005
6	Apron	1	0.50	1.50	0.025	0.018
Total						0.130cum

6. Tuck Pointing 1:3

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1	0.50	-	0.60	0.30
		1	0.50		0.84	0.42
2	Side wall	2	1.50	-	1.00	3.00
		2	(0.30+1.50)/2		0.30	0.55
3	Head wall extension	2	2.10	-	1.00	4.20
4	Wing wall	2	1.15		(1.00+0)/2	1.15
Total						9.62m ²

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Coarse Sand (cum)	Brick (No.)	G.S.B. 25-40 mm (cum)	G.S. Grit 10-20 mm (cum)
1	Sand laying	0.995cum	-	0.995	-	-	-
2	C.C.W. 1:3:6	1.492 cum	6.61	0.671	-	1.342	-
3	Brick Masonry	16.360 cum	29.26	5.562	1880	-	-
4	C.C.W. 1:2:4	0.130 cum	0.79	0.045	-	-	0.110
5	Tuck Pointing 1:3	9.62 m ²	0.44	0.045	-	-	
	Total		46.90	7.327	8180	1.342	0.110
	Say	47 Bags					

Cost of Materials

S.No.	Name of Materials	Quantity	Rate	Amount
1	Cement	47 Bags	255.00/bag	11985.00
2	Coarse sand	7.327 cum	910.00/cum	6667.57
3	Brick	8180	4500.00/th	36810.00
4	G.S.B. 25-40 mm	1.342 cum	855.00/cum	1147.41
5	Grit 10-20 mm	0.110 cum	1250.00/cum	137.50
	Total			Rs.56747.48

LABOUR CHARGE

S.No.	Name of Materials	Quantity	Rate	Amount
1	Earth Work	13.23cum	36.66/cum	485.01
2	Sand Laying	0.995cum	33.33/cum	33.16
3	C.C.W. 1:3:6	1.495cum	494/cum	337.04
4	Brick masonry	16.36cum	400/cum	6544.00
5	C.C.W. 1:2:4	0.130cum	494/cum	64.22
6	Tuck Pointing	9.62m ²	51.61/m ²	496.48
7	Curing	16.36cum	25.00/cum	409.00
8	Chowkidar	6 Man days	100.00/Man day	600.00
9	Head Load & local taion cost 10% cost of material	-	-	3670.64
Total				Rs. 13039.55

Total Expenditure	
1. Cost of Materials	56747.48
2 Labour Charges	13039.55
Total	Rs. 69787.03
	Says Rs. 69800.00 only

Design of Drop Spillway to be constructed at a place in a gully having width of 1.0 m and Catchments area 1.00 and net drop 0.50 m Taking rainfall intensity for duration equal to time of concentration of watershed and design return period of 25 years , as 120 mm/hr . The coefficient of runoff for the watershed is 0.3.

1.Hydrologic design – The design peak runoff rate(m^3/s) for the watershed form Rational formula is given as :

$$Q = \frac{C.I.A.}{360} = \frac{0.3 \times 120 \times 5.0}{360} = 0.50 \text{ m}^3/\text{s}$$

2. Hydraulic design- The maximum discharge capacity of the rectangular weir given by

$$Q = \frac{1.711LH^{3/2}}{(1.1+0.01f)} =$$

To find suitable value of L&H

Let us assume $L=1.0$ m(since width of gully is 2.00m)

$$0.50 = \frac{1.711LH^{3/2}}{(1.1+0.01 \times 0.5)} = \frac{1.711L H^{3/2}}{1.105} \quad (1.2)$$

$$L H^{3/2} = \frac{1.120 \times 0.5}{1.711} = 0.350$$

$$H^{3/2} = \frac{0.375}{1.711 \times 4} = 0.35$$

$$H = (0.350)^{2/3} = 0.49 \text{ m says } 0.50\text{m}$$

Test $L/h = \frac{1.00}{0.25} = 2.00 \geq 2.0$ hence O.K.;

$$h / f = \frac{0.50}{1.00} = \leq 0.5 \leq \text{hence O.K.}$$

Hence the designed hydraulic dimensions of the Spillway are :

$$\text{Crest Length (L)} = 1.00 \text{ m}$$

$$\text{Weir depth (h)} = 0.50 \text{ m}$$

3. Structural design -

$$1. \text{ Minimum headwall extension, } E = (3h + 0.6) \text{ or } 1.5 f \text{ whichever is greater ; } 3 \times 0.50 + 0.6 \text{ or } 1.5 \times 1$$

$$E = (1.5 + 0.6) \quad \text{or} \quad 21.50 \text{ m}$$

$$= 2.10 \text{ or } 1.50 \text{ Adopted } = 2.10 \text{ m}$$

$$2. \text{ Length of apron basin } L_B = (2.28 h/f + 0.54) = 1(2.28 \times 0.50 + 0.54) = 1.68 \text{ m}$$

$$3. \text{ Height of end sill, } S = \frac{h}{3} = \frac{0.50}{3} = 0.16 \text{ m}$$

$$3 \quad 3$$

4. Height of wing wall and side wall at Junction:

$$J = 2h \text{ or } [f + h + S - (L_B + 0.10)/2] \text{ whichever is greater} = 2 \times 0.50 \text{ or } [1.0 + 0.50 + 0.16 - (1.68 + 0.10)/2]$$

$$= 1.0 \text{ or } [1.66 - 0.89] = 1.00 \text{ or } 0.77 \text{ (adopt } J = 1.00 \text{ m)}$$

$$5. M = 2(f + 1.33 h - J) = 2(1.0 + 1.33 \times 0.50 - 1.00) = 2(-0.1665 - 1.00) = 1.33 \text{ m}$$

$$6. K = (L_B + 0.1) - M = (1.68 + 0.1) - 1.33 = 0.45 \text{ m}$$

Toe and cut off walls

$$\text{Normal scour depth (N S D)} = 0.473 \times (Q / f)^{1/3} = 0.473 \times (0.5/1.0)^{1/3} \text{ taking } f = 1$$

$$= 0.473 \times (0.5)^{1/3} = 0.473 \times 0.793 = 0.375 \text{ m}$$

$$\text{Maximum Scour depth (M S D)} = 1.5 \times \text{N S D} = 1.5 \times 0.375 = 0.56 \text{ m Says}$$

$$\text{Depth of cutoff / Toe wall } = 0.56 \text{ m say } 0.60 \text{ m}$$

Apron thickness : For an over fall of 1.0 m .The apron thickness in concrete construction is 0.30m since structure is constructed in masonry ,the Apron thickness will be $0.30 \times 1.50 = 0.45\text{m}$

Wall thickness : The thickness of wall of the structure (masonry construction) is given below . :

Description	Thickness of wall	
	Top width	Bottom width
Head wall	0.45	1.00
Side wall	0.30	0.80
Wing all and head wall extension	0.30	0.60

DETAIL ESTIMATE OF DROP SPILLWAY CREST LENGTH

1. Earth work n cutting

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	1.70	1.00	1.15	3.91
2	Head all	1	0.80	1.20	1.15	1.10
3	Head wall extension	2	2.20	0.80	1.15	4.04
4	Toe wall	1	0.80	0.70	0.80	0.45
5	Cut off	1	5.20	0.80	0.70	2.91
6	Apron	1	1.70	0.80	0.60	0.81
7	Wing wall	2	1.30	0.80	1.15	2.39
Total						15.60 cum

2. Laying of sand in the bed & foundation

S. No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	1.70	1.00	0.10	0.340
2	Head all	1	1.00	0.40	0.10	0.040
3	Head wall extension	2	2.10	0.80	0.10	0.336
4	Toe wall	1	1.00	0.80	0.10	0.080
5	Cut off	1	5.20	0.80	0.10	0.416
6	Apron	1	1.60	1.00	0.10	0.160
7	Wing wall	2	1.30	0.80	0.10	0.208

	Total					1.580 cum
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3.C.C.W 1:3:6 in founjdation

S. No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	1.70	1.00	0.15	0.510
2	Head all	1	1.00	0.40	0.15	0.060
3	Head wall extension	2	2.10	0.80	0.15	0.378
4	Toe wall	1	1.00	0.80	0.15	0.120
5	Cut off	1	5.20	0.80	0.15	0.624
6	Apron	1	1.60	1.00	0.10	0.160
7	Wing wall	2	1.30	0.80	0.15	0.312
	Total					2.164cum

4. Brick masonry

S. No.	Description of work	No.	L	B	D/H	Quantity
1	Cut of wall	1	5.20	0.60	0.60	1.8725
2	Head wall	1	1.00	1.00	0.90	0.900
		1	1.00	$(0.40+1.00)/2$	1.00	0.700
3	Side wall	2	1.70	1.00	0.45	1.530
		2	1.70	0.80	0.45	0.918
		2	1.70	0.80	0.60	1.020
		2	1.70	0.60	0.40	0.544
		2	$(1.70+0.45)/2$	0.40	0.50	0.430
4	Head wall extension	2	2.10	0.80	0.65	2.184
		2	2.10	0.60	0.45	1.134
		2	2.10	0.40	1.30	2.184
5	Wing wall	2	1.30	0.80	0.45	0.936
		2	1.30	0.60	0.45	0.702
		2	1.30	0.40	$(1.00+0)/2$	0.520
6	Toe wall	1	1.00	0.80	0.45	0.360
		1	1.00	0.60	0.45	0.270
7	Apron	1	1.70	1.00	0.45	0.765
8	Longitudinal sill	2	1.70	0.20	0.20	0.136
9	Transverse sill	2	1.00	0.20	0.20	0.0440

Total	17.145 cum
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5. C.C.W. 1;2;4 on the wall and Apron

S. No.	Description of work	No.	L	B	D/H	Quantity
1	Hide wall	1	1.00	0.40	0.025	0.010
2	Side wall	2	0.45	0.40	0.025	0.009
		2	1.35	0.40	0.025	0.027
3	Head wall extension	2	2.10	0.40	0.025	0.042
4	Wing wall	2	1.60	0.40	0.025	0.032
5	Longitudinal	2	1.70	0.20	0.025	0.017
6	Transverse sill	1	1.00	0.20	0.025	0.005
7	Apron	3	1.60	02.	0.025	0.024
Total						0.166 cum

6. Tuck Pointing 1:3

S. No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	1	1.00	-	1.00	1.00
		1	1.00	-	1.165	1.16
2	Side wall	2	0.45	-	1.50	1.35
		2	1.25	-	(1.50+1.00)/2	3.12
3.	Wing wall	2	2.30	-	(1.00+0)/2	1.30
4	Head wall	2	2.10	-	1.00	4.20
Total						12.13m²

CONSUMPTION OF MATERIALS

S. No.	Particulars	Quantity	Cement(Bags)	Sand(cum)	Brick (N0)	G.S.Git 25-40mm(cum)	Grit 10-20 mm(cum)

1	Sand laying	1.580cum	-	1.580	-	-	-
2	C.C.W. 1:3:6	2.164 cum	9.95	0.973	-	1.947	-
3	Brick masonry	17.145cum	41.14	5.829	8755	-	-
4	C.C.W 1:2:4	0.166 cum	1.01	0.069	-	-	0.141
5	Tuck Pointing	12.13m ²	0.55	0.057	-	-	-
	Total		25.65	8.508	8755	1.947	0.141
	Say		53 Bags	8.51 cum	8755	1.95cum	0.14 cum

COST OF MATERILS

S.No.	Name of materials	Quantity	Rate	Amount
1	Cement	53 ?Bags	255.00	13515.00
2	Course sand	8.51cum	910.00	7744.10
3	Brick	8755	4500/th	39397.50
4	G.S.B. 25-40 mm	1.95 cum	855.00	1667.25
5	G.S.Grit 10-20	0.14 cum	1250.00	175.00
		Total		Rs.62498.85

LABOUR CHARHGE

S.No.	Particulars	Quantity	Rate	Amount
1	Earth work	15.60 cum	36.66/cum	57189
2	Sand Laying	1.580 cum	33.33/cum	52.66
3	C.C.W 1:3:6:	2.164 cum	494/cum	1.69.0.
4	C.C.W. 1:2:4:	0.166 cum	494/cum	82.00
5	Brick Masonry	17.145 cum	400/cum	6858.00
6	Truck Pointing	12.13m ²	51.61/m ²	626.02
7	Curing	170145cum	25.00/cum	428.62
8	Chowkidar	65Man Days	100.00/Man Day	600.00

9	Head Load & local transportation 10% cost of materials		4068.00
		Total	Rs.14356.20

Total Expenditure	
1. Cost of Materials	62498.85
2. Labour Charges	14356.20
Total	Rs. 76855.05
	Say Rs.76900.00

Design of Drop Spillway to be constructed at a place in a gully having width of 1.0 m and Catchments area 1.00 and net drop 0.50 m Taking rainfall intensity for duration equal to time of concentration of watershed and design return period of 25 years , as 120 mm/hr . The coefficient of runoff for the watershed is 0.3.

1. Hydrologic design – The design peak runoff rate(m^3/s) for the watershed form Rational formula is given as :

$$Q = \frac{C.I.A.}{360} = \frac{0.3 \times 120 \times 20.0}{360} = 2.00 \text{ m}^3/s$$

2. Hydraulic design- The maximum discharge capacity of the rectangular weir given by

$$Q = \frac{1.711LH^{3/2}}{(1.1+0.01F)} =$$

To find suitable value of L&H

Let us assume $L = 2.0 \text{ m}$ (since width of gully is 3.00m)

$$2.00 = \frac{1.711LH^{3/2}}{(1.1+0.01 \times 0.5)} = \frac{1.711LH^{3/2}}{(1.10+1.15)}$$

$$LH^{3/2} = \frac{2.0 \times 1.115}{1.711} = 0.350$$

$$H^{3/2} = \frac{2.23}{1.711 \times 4} = 0.65$$

$$H = (0.65)^{2/3} = 0.75 \text{ m}$$

Test $L/h = \frac{2.00}{0.25} = 2.66 \geq 2.0$ hence O.K.;

$h/f = \frac{0.75}{1.50} = \leq 0.5$ hence O.K.

Hence the designed hydraulic dimensions of the Spillway are :

Crest Length (L) = 2.00 m

Weir depth (h) = 0.81m

3. Structural design -

1. Minimum headwall extension, $E = (3h + 0.6)$ or $1.5 f$ whichever is greater

$E = 3 \times 0.81 + 0.6$ or 1.5×1.50

$E = 3.03$ m or 2.25 m

Adopted = 3.03m

2. Length of apron basin $L_B = (2.28 h/f + 0.54) = 1.5(2.28 \times 0.81 + 0.54)$
 $= 1.50 (1.20 + 0.54) = 2.61$ m

3. Height of end sill, $S = h - 0.50 = 0.16$ m

4. Height of wing wall and side wall at Junction:

$J = 2h$ or $[f + h + S - (L_B + 0.10)/2]$ whichever is greater

$= 2 \times 0.81$ or $[1.50 + 0.81 + 0.27 - (2.61 + 0.10)/2]$

$= 1.62$ or $[1.66 - 0.89] = 1.00$ or 0.77 (adopt $J = 1.00$ m)

adopt $J = 1.62$ m

5. $M = 2(f + 1.33 h - J) = 2(1.50 + 1.33 \times 0.81 - 1.62) = 1.90$ m

6. $K = (L_B + 0.1) - M = (2.61 + 0.1) - 1.90 = 0.81$ m

Toe and cut off walls

Normal scour depth (N S D) $= 0.473 \times (Q/f)^{1/3} = 0.473 \times (2/1)^{1/3} = 0.473 \times 1.259 = 0.595$ m

Maximum Scour depth (M S D) $= 1.5 \times$ N S D $= 1.5 \times 0.595 = 0.89$ m

Depth of cutoff / Toe wall = 0.89 m say 0.60m

Apron thickness : For an over fall of 1.0 m .The apron thickness in concrete construction is 0.30m since structure is constructed in masonry ,the Apron thickness will be $0.30 \times 1.50 = 0.45\text{m}$

Wall thickness : The thickness of wall of the structure (masonry construction) is given below . :

Description	Thickness of wall	
	T op width	Bottom width
Head wall	0.45	1.33
Side wall	0.30	1.10
Wing all and head wall extension	0.30	0.80

DETAIL ESTIMATE OF DROP SPILLWAY OF CREST LENGTH 2.00 METRE

1. Earth work in cutting in foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	2.65	1.30	1.15	7.92
2	Head wall	1	2.00	1.60	1.15	3.68
3	Head wall extension	2	3.05	1.00	1.15	7.01
4	Wing wall	2	1.95	1.00	1.15	4.48
5	Tow wall	1	2.00	1.00	1.15	2.30
6	Cut off wall	1	8.40	1.00	1.15	9.66
7	Apron	1	2.60	2.00	0.75	3.90
Total						38.95 cum

2 Laying of sand in the bed of foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut of wall	2	8.10	0.90	0.10	0.729
2	Side wall	1	2.65	1.20	0.10	0.636
3	Head wall l	2	2.00	0.70	0.10	0.140
4	Head wall extension	2	3.05	0.10	0.10	0.061

5	Wing wall	1	1.95	0.90	0.10	0.351
6	Toe wall	1	2.00	0.90	0.10	0.180
7	Apron	1	2.00	2.65	0.10	0.530
Total						2.627 cum

3 C.C.W. 1 :3: 6 in foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	8.10	0.90	0.15	1.093
2	Side wall	2	2.65	1.20	0.15	0.954
3	Head wall	1	2.00	0.70	0.15	0.210
4	Head wall extension	2	3.05	0.10	0.15	0.091
5	Wing wall	2	1.95	0.90	0.15	0.526
6	Tow wall	1	2.00	0.90	0.15	0.270
7	Apron	1	2.00	2.65	0.15	0.795
Total						3.939 cum

4 Brick masonry 1:4

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	8.10	0.90	0.90	6.561
2	Head wall	1	2.00	1.60	0.45	1.440
		1	2.00	1.50	0.45	1.350
		1	2.00	(0.45+1.40)/2	0.85	0.527
3	Head wall extension	2	3.30	0.90	0.45	2.673
		2	3.30	0.80	0.45	2.376
		2	3.30	0.60	0.60	2.376
		2	3.30	0.50	0.60	1.980
		2	3.30	0.40	1.15	3.036
		2	3.30	0.40	1.15	3.036
4	Side wall	2	2.65	1.10	0.90	5.247
		2	2.65	1.10	0.45	2.623
		2	2.65	1.10	0.65	3.789
		2	2.65	0.80	0.60	2.544
		2	2.65	0.60	0.45	1.431
		2	(0.80+2.65)/2	0.50	0.70	1.260
5	Wing wall	2	1.90	0.90	0.45	1.539
		2	1.90	0.80	0.45	1.368

		2	1.90	0.60	(1.65+0)/2	1.881
6	Tow wall	1	2.00	0.90	0.45	0.810
		1	2.00	0.80	0.45	0.720
		1	2.00	0.40	0.30	0.240
7	Longitudinal sill	2	2.65	0.20	0.30	0.318
8	Apron	2	2.65	2.00	0.45	4.770
Total						51.806 cum

5. C.C.W. 1:2:4 in the wall

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1	2.00	0.45	0.025	0.0225
2	Side wall	2	0.80	0.50	0.025	0.0200
		2	1.32	0.50	0.025	0.330
3	Head wall extension	2	3.02	0.40	0.025	0.610
4	Wing wall	2	2.52	0.60	0.025	0.765
5	Longitudinal sill	2	2.65	0.20	0.025	0.265
6	Apron	1	2.65	1.60/3	0.025	0.353
6	Toe Wall	1	2.00	0.40	0.025	0.200
Total						0.2939cum

6. Tuck Pointing 1:3

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1	2.00	-	0.85	1.70
		1	2.00	-	1.27	2.45
2	Side wall	1	2.65	-	1.65	4.37
		1	(0.80+2.65)/2	-	0.70	
3	Head wall extension	2	3.30	-	1.50	1.20
4	Wing wall	2	1.90	-	(1.665+0)/2	9.90
Total						3.13m ²

CONSUMPTAION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Coarse Sand (cum)	Brick (No.)	G.S.B. 25-40 mm (cum)	G.S. Grit 10-20 mm (cum)
1	Sand laying	2.627 cum	-	2.227	-	-	-
2	C.C.W. 1:3:6	3.939 cum	16.93	1.772	-	3.545	-
3	Brick Masonry	51.806 cum	124.33	17.614	25903	-	-
4	C.C.W. 1:2:4	0.294 cum	1.79	0.123	-	-	0.249
5	Tuck Pointing 1:3	22.84 m ²	1.50	0.107	-	-	-
	Total		144.10	22.243	25903	3.545	0.249
	Say		144 Bags	22.243 cum	25903	3.55 cum	0.250 cum

Cost of Materials

S.No.	Name of Materials	Quantity	Rate	Amount
1	Cement	144 Bags	255.00/bag	36720.00
2	Coarse sand	22.243 cum	910.00/cum	20241.13
3	Brick	25903	4500.00/th	115663.50
4	G.S.B. 25-40 mm	3.55 cum	855.00/cum	3035.25
5	G.S. Grit 10-20 mm	0.250 cum	1250.00/cum	312.50
	Total			Rs.176872.38

LABOUR CHARGE

S.No.	Particulars	Quantity	Rate	Amount
1	Earth Work	38.95cum	36.66/cum	1427.90
2	Sand Laying	2.627 cum	33.33/cum	87.55
3	C.C.W. 1:3:6	3.939 cum	494/cum	1945.86

4	C.C.W. 1:2:4	0.2939 cum	400/cum	145.18
5	Brick masonry	51.806 cum	494/cum	20722.40
6	Tuck Pointing	22.84 m ²	51.61/m ²	1178.77
7	Curing	51.806 cum	25.00/cum	1295.15
8	Chowkidar	13 Man days	100.00/Man day	1300.00
9	Head Load & local taion cost 10% cost of material	-	-	11340.03
Total				Rs. 39442.84
Total Expenditure				
1. Cost of Materials			176872.38	
2 Labour Charges			39442.84	
Total			Rs. 216315.22	
Says Rs. 216315.00 only				

Design of Drop Spillway to be constructed at a place in a gully having width of 1.0 m and Catchments area 1.00 and net drop 0.50 m Taking rainfall intensity for duration equal to time of concentration of watershed and design return period of 25 years , as 120 mm/hr . The coefficient of runoff for the watershed is 0.3.

1. Hydrologic design – The design peak runoff rate(m³/s) for the watershed form Rational formula is given as :

$$Q = \frac{C.I.A.}{360} = \frac{0.3 \times 120 \times 20.0}{360} = 2.00 \text{ m}^3/\text{s}$$

2. Hydraulic design- The maximum discharge capacity of the rectangular weir given by

$$Q = \frac{1.711LH^{3/2}}{(1.1+0.01F)} =$$

To find suitable value of L&H

Let us assume L = 2.0 m (since width of gully is 3.00m)

$$2.00 = \frac{1.711LH^{3/2}}{(1.1+0.01 \times 0.5)} = \frac{1.711LH^{3/2}}{(1.10+1.15)}$$

$$LH^{3/2} = \frac{2.0 \times 1.115}{1.711} = 0.350$$

$$H^{3/2} = \frac{2.23}{1.711 \times 4} = 0.65$$

$$H = (0.65)^{2/3} = 0.75 \text{ m}$$

Test $L/h = \frac{2.00}{0.25} = 2.66 \geq 2.0$ hence O.K.;

$$h/f = \frac{0.75}{1.50} = \leq 0.5 \text{ hence O.K.}$$

Hence the designed hydraulic dimensions of the Spillway are :

Crest Length (L) = 2.00 m

Weir depth (h) = 0.81 m

3. Structural design -

1. Minimum headwall extension , $E = (3h + 0.6)$ or $1.5 f$ whichever is greater

$$E = 3 \times 0.81 + 0.6 \text{ or } 1.5 \times 1.50$$

$$E = 3.03 \text{ m or } 2.25 \text{ m}$$

$$\text{Adopted} = 3.03 \text{ m}$$

2. Length of apron basin $L_B = (2.28 h/f + 0.54) = 1.5(2.28 \times 0.08 + 0.54)$

$$= 1.50 (1.20 + 0.54) = 2.61 \text{ m}$$

3. Height of end sill, $S = h - 0.50 = 0.16 \text{ m}$

4. Height of wing wall and side wall at Junction:

$$J = 2h \text{ or } [f + h + S - (L_B + 0.10)/2] \text{ whichever is greater}$$

$$= 2 \times 0.80 \text{ or } [1.50 + 0.81 + 0.27 - (2.61 + 0.10)/2]$$

$$= 1.0 \text{ or } [1.66 - 0.89] = 1.00 \text{ or } 0.77 (\text{adopt } J = 1.00 \text{ m})$$

$$\text{adopt } J = 1.62 \text{ m}$$

5. $M = 2(f + 1.33 h - J) = 2(1.50 + 1.33 \times 0.81 - 1.62) = 1.90 \text{ m}$

6. $K = (L_B + 0.1) - M = (2.61 + 0.1) - 1.90 = 0.81 \text{ m}$

Toe and cut off walls

Normal scour depth (N S D) = $0.473 \times (Q / f)^{1/3} = 0.473 \times (2/1)^{1/3} = 0.473 \times 1.259 = 0.595 \text{ m}$

Maximum Scour depth (M S D) = $1.5 \times \text{N S D} = 1.5 \times 0.595 = 0.89\text{m}$

Depth of cutoff / Toe wall 0.89 m say 0.60m

Apron thickness : For an over fall of 1.0 m .The apron thickness in concrete construction is 0.30m since structure is constructed in masonry ,the Apron thickness will be $0.30 \times 1.50 = 0.45\text{m}$

Wall thickness : The thickness of wall of the structure (masonry construction) is given below . :

Description	Thickness of wall	
	T op width	Bottom width
Head wall	0.45	1.33
Side wall	0.30	1.10
Wing all and head wall extension	0.30	0.80

DETAIL ESTIMATE OF DROP SPILLWAY OF CREST LENGTH 2.00 METRE

2. Earth work in cutting in foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	3.40	1.30	1.15	9.38
2	Head wall	1	3.00	1.60	1.15	5.52
3	Head wall extension	2	3.00	1.00	1.15	6.90
4	Wing wall	2	1.80	1.00	1.15	4.96
5	Tow wall	1	3.00	1.00	1.15	3.45
6	Cut off wall	1	9.00	1.00	1.15	10.35
7	Apron	1	3.00	2.00	0.75	5.56
Total						46.12 cum

2 Laying of sand in the bed of foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut of wall	2	3.40	0.90	0.10	0.680

2	Head wall l	2	3.00	0.70	0.10	0.180
3	Head wall extension	2	1.80	0.10	0.10	3.60
4	Wing wall	1	3.00	0.90	0.10	2.40
5	Toe wall	1	9.00	0.90	0.10	0.900
6	Apron	1	3.00	2.65	0.10	0.795
Total						3.155 cum

3 C.C.W. 1 :3: 6 in foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	9.00	0.90	0.15	1.35
2	Head wall	1	3.00	0.70	0.15	0.27
3	Head wall extension	2	3.40	0.10	0.15	1.02
4	Wing wall	2	1.80	0.90	0.15	0.54
5	Tow wall	1	3.00	0.90	0.15	0.36
6	Apron	1	3.00	2.65	0.15	1.192
Total						4732 cum

4. Brick masonry

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	9.00	1.00	0.90	8.100
2	Head wall	1	3.00	1.50	0.90	4.050
		1	3.00	(1.50+0.50)/2	1.50	4.500
3	Head wall extension	2	3.00	0.80	0.45	2.160
		2	3.00	0.60	0.45	1.620
		2	3.00	0.60	0.60	2.160
		2	3.00	0.50	0.60	1.800
		2	3.00	0.40	1.30	2.120
		2	3.00	0.40	1.30	2.120
4	Side wall	2	3.40	1.00	0.45	3.060
		2	3.60	0.80	0.45	2.592
		2	3.80	0.60	0.60	2.736
		2	3.90	0.50	1.00	3.900
		2	(4.00+1.40)/2	0.40	1.50	3.240
5	Wing wall	2	1.80	1.00	0.45	1.620
		2	1.80	0.80	0.45	1.296
		2	1.80	0.50	(1.60+0)/2	1.440

6	Toe wall	1	3.00	0.80	0.45	1.080
		1	3.00	0.60	0.45	0.810
		1	3.00	0.40	0.30	0.360
7	Apron	1	3.00	2.65	0.45	0.577
8	Longitudinal sill	2	2.60	2.20	0.45	0.486
Total						53.689 cum

5. C.C.W. 1:2:4 in the wall

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1	3.00	0.50	0.025	0.037
2	Side wall	2	1.40	0.40	0.025	0.028
		2	3.00	0.40	0.025	0.060
3	Head wall extension	2	3.00	0.40	0.025	0.060
4	Wing wall	2	2.40	0.50	0.025	0.060
5	Longitudinal sill	2	2.65	0.20	0.025	0.026
6	Apron	3	2.65	0.86	0.025	0.170
Total						0.441cum

6. Tuck Pointing 1:3

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1	3.00	-	1.00	4.56
		1	3.00	-	1.18	5.40
2	Side wall	2	3.40	-	1.60	10.88
		2	$(1.40+3.40)/2$	-	1.50	7.20
3	Head wall extension	2	3.00	-	1.50	9.00
4	Wing wall	2	1.80	-	$(1.60+0)/2$	2.88
Total						39.86m²

CONSUMPTAION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Coarse Sand (cum)	Brick (No.)	G.S.B. 25-40 mm (cum)	G.S. Grit 10-20 mm (cum)
1	Sand laying	3.155 cum	-	3.155	-	-	-
2	C.C.W. 1:3:6	4.732 cum	2.34	2.129	-	4.258	-
3	C.C.W. 1:2:4	0.441 cum	2.69	0.185	26845	-	-
4	B/W 1:4	53.689 cum	128.85	18.254	-	-	0.374
5	Raised Pointing	39.86 m ²	1.83	0.187	-	-	-
	Total		153.71	23.910	26845	4.258	0.374
	Say		154	23.910	26845	4.26	0.374

Cost of Materials

S.No.	Name of Materials	Quantity	Rate	Amount
1	Cement	154 Bags	255.00/bag	39270.00
2	Coarse sand	23.91 cum	910.00/cum	21758.10
3	Brick	26845	4500.00/th	129802.00
4	G.S.B. 25-40 mm	4.26 cum	855.00/cum	3633.75
5	G.S. Grit 10-20 mm	0.374 cum	1250.00/cum	467.50
	Total			Rs.192931.35

LABOUR CHARGE

S.No.	Particulars	Quantity	Rate	Amount
1	Earth Work	46.12 cum	36.66/cum	1690.75
2	Sand Laying	3.155 cum	33.33/cum	105.15
3	C.C.W. 1:3:6	4.732 cum	494/cum	2337.60

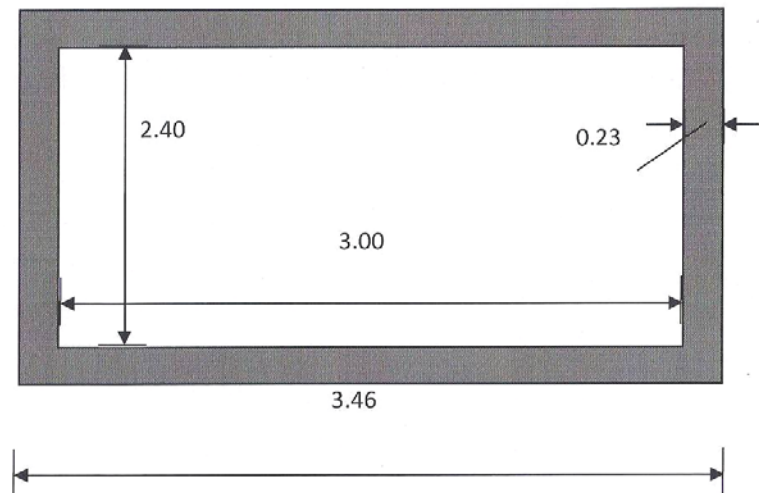
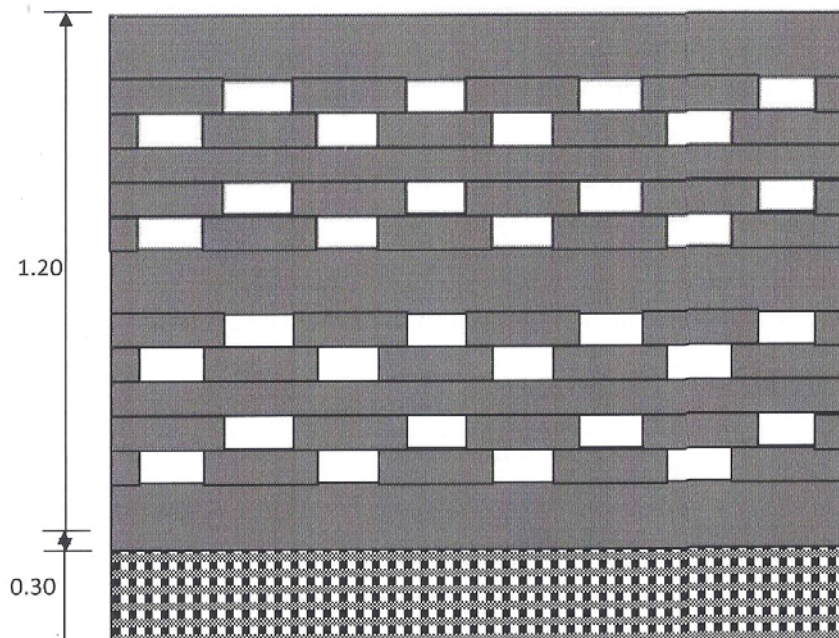
4	C.C.W. 1:2:4	1.441 cum	494/cum	217.85
5	B/W 1:4	53.689 cum	400/cum	21475.60
6	Tuck Pointing	39.86 m ²	51.61/m ²	2057.17
7	Curing	53.689 cum	25.00/cum	1342.22
8	Chowkidar	13 Man days	100.00/Man day	1300.00
9	Head Load & local taion cost 10% cost of material	-	-	12015.12
Total				Rs. 425441.34

Total Expenditure	
1-Cost of Materials	192931.35
2 Labour Charges	42541.34
Total	Rs. 235472.69
Says Rs. 235500.00 only	

11- DRAWING AND DETAILS ESTIMATE OF THE LIVELIHOOD PROGRAMME

(ANNEXURE-2)

DRAWING OF NADEF COMPOST STRUCTURE



DESCRIPTION.

PLAN

1. Brick work = 1:4.

PERPARATION OF COMPOST BY NANDEF METHD

NADEP is the name of the method. in this method glazed pit of brick masonry above Ground level is made as shown in the drying. in this method by using a little quantity of cow during, and crop residue, leaf of trees, straw and other organic materials. The method of filling up the pit is – first of all best soil of pond or field is spread in the bottom of pit as least 3” thickness and then one layer of 6” thickness and other agriculture waste is made then best soil is spread on in and on this layer the liquid made of cow dung is spread to wet the crop residue, straw etc. this method is repeated unit the pit is net completely filled up. On the top layer of this material a bulk is made and then pit is closed by earthen gara. water is spread on the top of bulk and from glazed side weekly. This process is repeated to moist the filling material always. The decomposition in filling material started and within six month filled material become compost khad.

S.No.	Description of work	No.	L.	B.	D./H.	Quantity
1.	Earth work					
	Long Wall	2	3.60	0.30	0.30	0.648
	Short Wall	2	2.33	0.30	0.30	0.419

	Total					1.067 cum
2.	Brick work 1:4					
	Long wall solid	2	3.46	0.23	0.90	1.432
	Short Wall Solid	2	2.40	0.23	0.90	0.993
	Total					2.425 cum
3.	Plastering Work					
	Long Wall	2	3.46	-	0.60	4.152
	Short Wall	2	2.40	-	0.60	2.880
	Top of Long Wall	2	3.46	0.23	-	1.591
	Top of Short Wall	2	2.40	0.23	-	1.104
	Total					9.727 m ²

ABSTRACT OF WORK

S.N.	Particulars	Quantity
1.	Earth Work	1.06 com
2.	Brick Work 1:4 2.425 + 1.616/2	3.233 cum
3.	Plastering 1:4	9.727 m ²

CONSUMPTION OF MATERIALS

S.NO.	Particulars	Quantity	Cement (Bags)	Coarse Sand (cum)	Brick (nos.)
1.	Brick work 1:4	3.233 cum	5.82	0.873	1487

2.	Plastering 1:4	9.727 m ²	1.07	0.146	-
	Total		6.89	1.019	1487
	Say		7 Bags	1.02 cum	1500 nos.

COST OF MATERIALS

S.NO.	Particulars	Quantity	Rate	Amount
1.	Cement	7 Bags	255.00/Bag	1785.00
2.	Coarse Sand	1.02 cum	910.00/cum	928.20
3.	1 st Class Brick work 1:4	1500 nos.	4050.00/ Thousand	6075.00
	Total			Rs. 8,788.20

LABOUR CHARGES

S.NO.	Particulars	Quantity	Rate	Amount
1.	Earth Work	1.06 cum	36.66/cum	30.85
2.	Brick	3.233 cum	370.00/cum	1196.21
3.	Plastering	9.727 m ²	40.00/m ²	389.08
	Total			Rs. 1616.14

Total Expenditure	
1. Cost of Materials	8788.20
2. Labour Charges	1616.14
Total	Rs.10,404.34
Say Rs. 10,400.00 only	

DAIRY WORK

In income generating activities through Self Help Group, landless and marginal farmers are advised to use three or four cows of SANKER breed or two or three buffalos of MURRA breed, for their good life.

Establishment of Goat Unit for S.H.G.'s formed in I.W.M.P. IInd Hardoi

Project

District Hardoi II is situated in eastern part of state, where the number of goat/sheep is very less and they are small in nature, Goat Population is appreciable and is fact, it is the major source of livelihood for poor people of the district. in the state , on an average, 16 kg of meat is obtained from a goat, if they are dewormmed twice, shall be increment of 4 kg in meat on an average, benefiting the farmers of the state.

Deworming and vitamins, mineral- supplement to the goats shall enhance their productivity and also improve anti-body response and protection level through vaccination, i.e., importance in efficiency of vaccination. More Productivity and assured health and low mortality shall

result into adoption of more framers to goat farming with the formation of more S.H.G. 's and in turn availability of goats for processing unit. Goat excreta shall be of immense help in enrichment of soil fertility.

Establishment of Goat Units for S.H.G.'s

Eastern region, due to the geo-climate conditions and land pattern is favorable for goat husbandry. Goats thrive Well in dry and semi-dry climate with bushes and thorny vegetation. Presently in this area, farmers rear goats for their livelihood. If goat husbandry would be transformed to intensive husbandry, there shall be more economic stability of farmers, more profit sharing and availability of running capital for future expansion. Kepping in view above fact, goat unit shall be formed in the area in intensive way.

16 Goat Unit are Proposed in I.W.M.P. IInd Project for S.H.G. one unit constituting 10 goats and 1 buck will be distributed to one S.H.G.

A register Of S.H.G. will be maintained by Secretary Of S.H.G. in the supervision of W.D.T. member . The details of beneficiaries Of S.H.G. including the breed of goat reared, breeding and feeding status, deworming status, deaths, post mortem conducted claim settlement and working status of unit will be maintained in the register.

Preferences shall be given in consecutive years in purchasing the goats and bucks for new unit, from old units for which database maintained shall be of use and it should be assured by buy back arrangement

Financial Component

S.No.	Component	Amount
1.	Cost Of 10 goat of improved breed (Not less than 6 months of age) @Rs. 3000.00 each	30000.00
2	Cost of 1 back of improved breed @ Rs.5000.00	5000.00
3	Cost of insurance @ 11.63/unit	4070.00
4	Feed cost for 3 months @ 250gm/day for goats @Rs.11.84/250gm	2930.00
5	Provision of deworming, mineral and vitamin supplement, treatment, vaccination @ Rs/160/animal	1760.00
6	The expense including monitoring expenses, register and record @Rs.170.00/unit	170.00
	Total	Rs. 43,930.40
		Say Rs. 43,950.00

Estimate of Livestock Development Activities

Total number of female animals:	Buffalo	-	3665
	Cow	-	5006
	Total	-	86,71

1. Artificial Insemination (A.I.): 33% of total animals per year, i.e., 2894

Amount required for A.I. by BAIF @ 100.00/ animal.

Total Amount - Rs. 2,89,400.00

2. Vaccination: Total number of animals in I.W.M.P. IInd - 10372 nos.

1. H.S. + B.Q. @ 5.50 57046.00

2. F.M.D. @10.50 217812.00

(Twice in a year)

Total Amount - Rs. 274858.00

3. Deworming: Adult animals - 9335

Child animals - 1037

Albendazole for 9335 animals @ 40.56 3,78,627.60

1037 child animals @20.28 21,036.36

Total Amount - Rs. 3,99,663.96

4. Mineral Mixture: Agrimine Forte Chelated for 7015 animals @ 115.00 Rs. 8,06,725.00

GRAND TOTAL - Rs. 17,70,646.96

Say - Rs. 17,70,600.00

12- DRWAING AND DETAILS ESTIMATE OF PRODUCTION SYSTEM AND MICRO-ENTERPRISES

(ANNEXURE-3)

DEMOSTRATION OF WHEAT

1. Variety recommended for District

Irrigated - W.H.- 542

Unirrigated – K 8027 , K – 5351 (Mandakini)

Kathia – Raj 1555

2- Seed rate – 100 -125 Kg/ hectare

3- Requirement of fertilizers / ha N- 125 Kg , P- 70 -75 Kg, K-70-75 Kg

ESTIMATE OF DEMONSTRATION OF WHEAT IN EATERSHED (PER HA)

S.No.	Particulars	Quantity	Rate	Amount	Remarks
1	Tillage operation or preparation of field for sowing	100.00 kg	1000.0/ha	1000.00	Since the project is to be operated in a participatory Mode, contribution in form of the tillage ,sowing, irrigation and harvesting done by farmer is not included in the estimates
2	Cost of seed	1.00ha	18.00/kg	1800.00	
3	Sowing by seed drill	160 Kg	1000.00/ha	1000.00	
4	D.A.P. 18:46	210 Kg	573.00/50 kg	1833.60	
5	Urea	150 Kg	270.00/50 kg	1134.00	
6	Potash (M.O.P.)	1.0 0ha	300.00/50 kg	900.00	
7	Irrigation (three irrigation)	1.00ha	650.00/ha	650.00	
8	Harvesting		2000.00/ha	2000.00	
Total				5657.60	
Say				5700.00	

Hence demonstration cost of wheat /ha is Rss 5700.00

DEMONSTRATION OF GRAM IN WATERSHED AREA (per ha)

- 1 Variety Irrigated - vdai , KWR – 108 ,
Rainfed - J.G. – 315 , Avrdhi
- 2- Seed rate /ha – 50 -55 Kg
- 3- Fertilizers requirement / ha N- 25.0 Kg , P- 80Kg, K- 30 Kg

ESTIMATE OF DEMONSTRATION OF GRAM (PER HA)

S.No.	Particulars	Quantity	Rate	Amount	Remarks
1	Tillage operation or preparation of field for sowing	1.0 ha (twice)	1000.0/ha	2000.00	Since the project is

2	Cost of seed	55 kg	90/kg	4950.00	to be operated in a participatory Mode, contribution by the former in the form of tillage ,sowing, operation , sowing and and harvesting is not included in the estimates
3	D.A.P.	175 Kg	573.00/50 kg	2005.50	
4	M.O.P	65 Kg	300.00/50 kg	390.00	
5	Medicine	1.00 ha	Lump sum	1250.00	
6	Harvesting	1.00 ha	700.00/ ha	700.00	
Total				8595.50	
Say				8600.00	

Hence per hectare of demonstration Rs 8600.00

DEMONSTRATION OF ARAHAR IN WATERSHED AREA (per ha)

- 1 Variety - Malviya -13 narendra -1 Amar I
2- Seed rate /ha - 30 Kg
3- Fertilizers requirement / ha N- 20.0 Kg , P- 50Kg, K- 40 Kg

ESTIMATE OF DEMONSTRATION OF ARAHAR (PER ha)

S.No.	Particulars	Quantity	Rate	Amount	Remarks
1	Tillage operation in preparation of field for sowing	1.0 ha	1000.0/ha	2000.00	Since the project is to be operated in a participatory Mode,
2	Cost of seed	30.0 kg	120.00/kg	3600.00	
3	Nitrogen N.P.K.	190.0 Kg	470.00/50 kg	1786.50	

	12:21:16				contribution by the former in the form of tillage operation, sowing and and harvesting provided by participating farmers ,hence this cost is not included in the estimates
4	Urea	-	-	-	
5	M.O.P	-	-	-	
6	Harvesting	1.00 ha	650.00	650.00	
7	Medicine	1.00 ha	Lump sum	1000.00	
Total				6386.00	
Say				6400.00	

Hence per hectare of demonstration Rs 6400.00

DEMONSTRATION OF HYBRID IN WATERSHED AREA (per ha)

1 Requirement of Seed /ha - 10 kg I

2- Requirement of fertilizers / ha N- 60.0 Kg , P- 40.00Kg, K- 40.00 Kg

ESTIMATE OF DEMONSTRATION OF BAJRA (PER ha) RAINFED

S.No.	Particulars	Quantity	Rate	Amount	Remarks
1	Tillage operation in preparation of field for sowing	1.0 ha	1000.0/ha	2000.00	Since the project is to be operated in a participatory Mode, contribution by the former in the form of tillage operation,
2	Cost of seed	10.0 kg	130.00/kg	1300.00	
3	Nitrogen N.P.K. 12:21:16	125.0 Kg	470.00/50 kg	1175.00	
4	Urea	90 kg	270.00/50 kg	486.00	

5	M.O.P	40kg	300.00/50 kg	240.00	sowing and and harvesting provided by participating farmers ,hence this cost is not included in the estimates
6	Harvesting	1.00 ha	650.00 /ha	600.00	
Total				3201.00	
Say				3200.00	

Hence per hectare of demonstration of Bajra Rs 3200.00

DEMONSTRATION OF AGRO-HORTICULTURE USING PLASTIC DRUM OF 200 LITRES CAPACITY

District Hardoi is situated in Eastern U.P. region where there is scarcity of water and in summer temperature rises up to 45°C causing upper layer of fields dry and therefore mortality rate of plants is very high. Farmers usually like to grow grain crops only. They are not interested in horticulture because of less holding. The production of crops decreases below the tree. Therefore to promote horticulture with crops a demonstration model using plastic drums for horticulture is made. Mainly crops roots go in to the soil up to “4-5” in cereal crops and “6-9” in pulses. Using plastic drums the plants will be planted 50-60 cm below the ground level which is below the root zone of crops. Therefore trees will not be able to take nutrients from upper layer of fields and there will be no effect of plants on crops.

In summer season up to 1 to 1.50m depth of soil becomes dry causes more mortality rate of plants, using drums plants are planted below 50-60 from Ground level and in rainy and winter season up to February roots of plants go below 2.10m below where moisture will be available and plants will be safe in summer also. Using barbed wire fencing the plants will be protected. Therefore, it is hoped that farmers will adapt this procedure for Agro-forestry and will become prosperous.

DETAIL ESTIMATE OF DEMONSTRATION OF HORTICULTURE AND MIXED CROPPING

S.No.	Description of Works	No.	L.	B.	D./H.	Quantity
1	Earth work in cutting	156	3.14 x 1.20	-	1.35	793.54
	Trench	156	1.50	0.75	0.75	131.62
	Fencing Poll	133	0.20	0.20	0.20	1.064
Total						926.22 cum
	Farm yard manure	156x 10		-		1560 kg
	Filling of earth work with farm yard	156	3.14 x 1.00	-	1.20	587.80 cum

	manure					
	C.C.W. 1:2:4 for fencing poll	133	0.20	0.20	0.20	1.064 cum
	Angle iron of poll	133	1.80	-	-	239.40 m
	Barbed wire	3	400	-	-	1200.00 m
	Plants	156	-	-	-	156 nos
	Plastic drum (200 litre)	156	-	-	-	156 nos

CONSUMPTION OF MATERIAL

S.N.	Description of Work	Quantity	Farmyard Manure (Kg>	Cement Bags (nos)	Coarse Sand (cum)	G.S. Grit 10-20 mm	Angle Iron (m)	Barbed Wire (Kg)	Planting Drum (nos)
1	C.C.W. 1:2:4	1.064 cum	-	6.49	-	-	-	-	-
2	Angle Iron	239.4 m	-	-	-	-	-	-	-
3	Barbed wire	1200.0m	-	-	-	-	-	-	-
4	Farmyard manure	1560.0 kg	1560 kg	-	-	-	-	-	-
5	Plastic drum	156 nos	-	-	-	-	-	-	-
Total			1560.0 kg	6.49	0.446	0.883	239.40	1200.00	156
Say			1560.0 kg	6.50 bags	0.450 bags	0.900 cum	239.40	1200.0 m	156

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Fram yard manure	1560.0kg	10,00 kg	15600.00
2.	Barbed wire	1200.0m/120.0kg	60.50/kg	7260.00
3.	Angle Iron	239.40m/785kg	40.50/kg	31792.50
4.	plastick drum	156 nos	690.50each	107640.00
5.	Cement	6.50bags	255.00/bag	1657.50
6.	Coarse Sand	0.450 cum	910.00/cum	409.50

7.	G.S.Grit 10-20mm	0.900 cum	1250.00/cum	1125.00
8.	Plants	156 nos	18.00each	2808.00
		Total		Rs.1,68,292,50

LBOUR CHARGES

S.NO.	Particulars	Quantity	Rate	Amount
1.	Earth work	1514.02cum	36.66/cum	55503.97
2.	C.C.W 1:2:3:	1.064 cum	492.00 cum	523.88
3.	Fixing of angle iron	10 man days	100/Man Day	1000.00
4.	Fixing of barbed wire	15 man days	100/Man Day	1500.00
Total				Rs, 58,527.85

Total Expenditure	
1. Cost of materials	1,68,292.50
2. Labour Charges	58,527.85
Total	Rs.2,26,819.50.00
say	Rs.2,26,820.00 only

5- Lack of infrastructure including marketing.

(B) Soil constraints

- 1- Poor nutrient status of the soil
- 2- Physical impediment
- 3- Moisture stress / water logging / inadequate drainage.

(C) Plant related constraints

- 1- Problem of plant establishment
- 2- Physiological disorders

3- Fruit drop and poor productivity

4- Incidence of insects-pests.

However, apart from the above mentioned constraints, the measure bottleneck in horticulture development are poor technological advancements, high initial establishment cost, high input demand , timely operation and seasonal shortage of labours, etc.

CONCEPTS AND ADVANTAGES OF CONSERVATION HORTICULTURE

Conservation horticulture or horticulture land use based on soil and water conservation principle is a suitable alternative for utilization and management of land under rainfed conditions. Thus horticulture development in watershed management appears to be the most appropriate technique for sustained productivity as well as for restoration of degraded lands. In fact, horticulture system meet all the basic needs-food, fruits, fodder, fuel and timber besides, providing employment and sustaining a number of products for industries.

The fruit trees grown with crops can provide. fuel from pruned-shoots and dried- bra leaf--fodder for animals and leaf litter that can be utilized as mulch material and organic matter the leaf litter of deciduous fruit trees not only protects the top soil from the impact of raindrops but also improve soil structure, reduces évapotranspiration, increases infiltration and add to the nutrient status of soil. Therefore conservation based horticulture land use system assumes great significance as fruit trees on degraded lands provide higher returns and offer alternative opportunity in non-arable areas where cropping may not be possible.

CONSERVATION HORTICULTURE PRACTICES

Some of the important practices are given below

1- Selection of Suitable Fruits Types: For the success of conservation horticulture, selection of hardy varieties resistant to diseases and pests and use of local or other hardy root stocks for raising fruit-trees is of great importance. The major part of the reproductive cycle i.e. Period from flowering to fruiting must also fall during maximum water availability period and the root ripening must be completed before the onset of dry summer (April-May).

Ber, Guava, Karonda, Be), Amla, Lemon, and Phalsa etc. are the plants which fulfill this requirement and all these fruit plants are most suitable for Bunde region.

2- Planting Techniques: For degraded lands, pits should be dug of 1m x 1m x 1m size, the excavated soil is mixed with Farmyard Manure (FYM) @ 5-10kg/pit with doses of potash and phosphorous and some insecticide / pesticide (numicide / aldrex) for prevention of white ant. Planting of the fruits plants should be done with the onset of monsoon.

3- Use of Root Stokes: Budding and grafting on the wild root stock gives benefit of the establishment root and in turn provides better quality fruits with high field potential. For example, *Ziziphun mauritiana*, a wild ber can be successful budded with scion of improved cultivars, This practice is only successful where sizable patch of wild root stock is available. The budded/grafted stock needs intensive management as it is required to be protected from the wild animals, birds,

insects, pests etc. The wild root stock develops efficient top root to provide moisture and nutrients to the scion. Amla. Bel is other examples of raising the improved cultivation the wild root stock.

4- In Situ Water Harvesting: Since on slopy lands, runoff water is considerably higher, therefore, it should be harvested and used. The run off can be utilized for growing fruit plants in such a way that each tree in the established plants is at the time of fruit setting and fruiting. Moisture available at this critical period improves the fruit yield.

Runoff water will be harvested and stored in tanks during the rains. The stored water will be utilized at the time when the fruit trees show moisture stress during dry months. Counter trenches will dug between the rows of fruit trees because this is effective in conserving moisture and providing soil erosion.

5-Mulching: Mulching is practiced to conserve moisture. It prevents the loss of moisture by evaporation and improve water intake by the soils. Various organic (Straw, hay, manure, tree leaves, dry wads) Mulches are used for mulching. Use of plastic mulch has been taken in rainfed and dryfarming conditions to increase the productivity by minimizing evapotranspiration losses.

6-Drip Irrigation: Drip irrigation saves water by 40 to 70 percent and two to three times more area can be irrigated with the same amount of available water. It has the advantages that it ensures uniform distribution of water, provides perfect control over water application and minimizing the losses during convergence and seepage.

Estimate of Orchard Development in the Watersheds Per Hectare (Without Fencing)

S.No.	Particulars	Quantity	Rate	Amount	Remarks
A, Horticulture					
1.	Soil Working 1m x 1m size pits (270nos.) including cost of refilling	270.00 cum	36.66/cum	9898.20	Since, the project is to be operated in a participatory mode, contribution in the form of labour input for pit digging, FYM and its applications, weeding and hoeing are to be provided by the participating farmers, hence the costs are not included in the estimates,
2.	Application of Farmyard manure including cast		L.S.	450.00	
3.	Cost of NPK mixture. neemicide @ 250 gm/plants		L.S.	400.00	
4.	Cost of plants (including 15% etc. for mortality) including transportation and planting	310 nos.	15.00/Plant	4650.00	

5.	Casualty replacement @ 10% of item no. 4&5			465.00	
6.	Cost of 2 weeding and hoeing		1.00/Plant	540	
7.	Contingency and unforeseen (3%)			492.00	
	Total			Rs.6,007.00	
	Say			Rs. 6,000.00	
	Maintenance cost 2 nd Year onwards – 15% of 1 st year cost			900.00	
	For next 5 years i.e.,Rs. 900x5			4500.00	
	Total Cost			Rs. 10,500.00	
	Say			Rs.10,500.00	
B. Agro-Horticulture (Cost per ha)					
1	Cost of raising 270 plants UP to 5 year @ Rs. 10,000.00			10500.00	The remarks mentioned under Horticulture are also applicable for agro Horticulture.
2	Cost of raising agricultural Crops @ Rs. 5,000 per hectare per year			5000.00	
	Total			Rs.15,500.00	

Estimate of Orchard Development in the Watersheds Per Hectare (Without Fencing)

S.No.	Particulars	Quantity	Rate	Amount	Remarks
A, Horticulture					
1.	Soil Working 1m x 1m size pits (270nos.) including cost of refilling	270.00 cum	36.66/cum	9898.20	Since, the project is to be operated in a participatory mode, contribution in the form of labour input for pit digging, FYM and its applications, weeding and hoeing are to be provided by the participating farmers, hence the costs are not included in the estimates,
2.	Application of Farmyard manure including cast		L.S.	450.00	
3.	Cost of NPK mixture. neemicide @ 250 gm/plants		L.S.	400.00	
4.	Cost of plants (including 15% etc. for mortality) including transportation and	310 nos.	15.00/Plant	4650.00	

	planting				
5.	Casualty replacement @ 10% of item no. 4&5			465.00	
6.	Cost of 2 weeding and hoeing		1.00/Plant	540	
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	Total			Rs.6,007.00	
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1	Cost of raising 270 plants UP to 5 year @ Rs. 10,000.00			10500.00	The remarks mentioned under Horticulture are also applicable for agro Horticulture.
2	Cost of rasing agricultural Crops @ Rs. 5,000 per hectare per year			5000.00	
3.	Fencing			45300.00	
	Total			Rs.60,800.00	

COST IN PLANTING ONE PLANT WITH DIGGING, FILLING MIXED WITH FYM AND COST OF PLANT

S. n	Particular	No.	L	B	D/H	Quantity	Rate	Amount
1	Earth work in digging	1	1.0	1.0	1.00	1.00	36.66	36.66
2	Cost of FYM,in kg/pit	1	-	-	-	10kg	8.00	8.00
3	Filling of pits mixed with FYM and soil	1	1.0	1.0	1.0	1.00	36.66	36.66
4	Cost of plants	1	-	-	-	1	18.00	18.00
Total								171.32

ESTMATE FOR SILVI-PASTROAL SYSTEM (RS.ha⁻¹) PLANTATIONS (800 PLANTS ha¹)

S. N	Particulars of work	Rate (Rs.)	Cost (Rs.)	Remarks
1-	Clear felling or bush clearance of area Infected with Lantana etc,including cost of burning	LS	550.00	The area is to be procted through biofencing
2-	Soil working – earth work ,digging of Pits / holes 60 cm deep, 30cm dia -800 Nos.Including cost of refilling and trenching.(400trenches/ha)	LS	6085.00	•
3-	Cost of seedlings for 900 nos and grass /legumes seeds and planing.sowing	-	2050.00	Rs.2.00 per seeding
4-	Weeding and hoeing(2 Nos.)	LS	300.00	
Total			8985	
Maintenance				
2nd Years 15% of the 1st year Xpenditure including being up 1st year failure				
Grand total			10.335.00	
say			10.335.00	

DEMONSTRATION OF GREEN MANURING

Green Manuring is very useful but due to sowing of Kharif season crop, lack of suitable type of seeds, and limitation of moisture, it is not widely practiced. Green Manuring brings immediate advantage because of its quick decomposition where as FYM and compost improves the soil physical condition in the long-run. Benefits of Green Manuring accrue from substitution of chemical fertilizers, enhance soil biological activities and erosion control due to vegetative cover. Sesbania Species (Dhaincha) and Crotonaria Juneea (Sunhemper Sanai) are most common green manure crops. They accumulate about 100 kg N/ha in their biomass and 64-88% of this is derived from atmosphere. Apart from direct benefit of green Manuring as a source of nutrients and organic matter, it has the capacity to mobilize soil phosphorus and other nutrients. It also helps in reclamation of problem of soil, e.g., Sesbania helps in removing exchangeable sodium and reclamation of salt affected soils.

In District Hardoi more fields are kept fallow and only single crop in Rabi is grown. Therefore, this area is suitable for Green Manuring. Therefore, in I.W.M.P.IInd HardoiProject, efforts will be made to oblige the farmers for Green Manuring.

4 typical estimate is made for Green Manuring is given below:

ESTIMATE FOR GREEN MANURING IN THE WATERSHED (PER ha)

S.No.	Parcticulurs	Rate	Cost	Remark
1	Seed of Sesbania (Dhanicha) 25 Kg /ha	25.00 /kg	625	Since the prokect to be operated in a participatory mode contribution in the form of tillage will be done by farmers in not included in the estimate
2	Tillage operation before sowing and to plough the plants of dhaincha after 40 – 45 days of sowing for Green Manuring	1000/ ha Before and after saring	2000.00	
	Total		Rs . 625.00	

Therefore cost per hectare of Green Manuring is Rs. 625.00/ha

PASTURE MANAGEMENT

Introduction: The sound animal industry in any country centers around good quality feed and fodders. The livestock population in India is nearly 15%of the total livestock population of the world, tough we have only 2% of the world’s geographical area. The project on for green and dry fodder requirement in India has been estimated at 1061 and 590 million tons by 2010 A-D, while the present feed and fodder resources in the country can meet only 4% of the requirement. The grazing intensity is very high i.e., 26 adult cattle unit (ACU)/ha as against 0.8 ACU in the developing countries. The importance of grasses for protection and production, the two aspects of

soil and water conservation is well known. Grass is unique in that it is the only resource utilized in situ by grazing. A “grassland” or more appropriately, a “range” is defined as “the areas which are predominantly covered with grasses or grass like plants and are primarily utilized as for age for grazing animals or used as hay.” The grasslands are the major sources of food to the animals.

Pasture Management: All grazing areas are referred to as pastures, but ore specifically the term is applied to cultivated grassland used for grazing. Thus pastures are artificial grasslands with or without non-grass vegetation (such as legumes) that are created with selected high forage-yielding grass and legume species and with inputs like fertilizers and irrigation and carefully managed to exclude all other vegetation. Pastures are usually fenced and used either for grazing, for gay and silage making or for both.

Intensive Fodder Production: In areas where. the. major enterprise of the farmers centers around the milk production. Continuous supply of green fodder round the year is the basis for success of such as industry. Under the aegis of ICAR’s all India coordinated Research Project on Forage Crops, several highly productive fodder cropping system have been tested and recommendations made for their general use. For central region important intensive crop rotations are presented as given below:

Zone wise crop rotations	Green fodder yield(t / ha)
Central region	
1- Hybrid napier +Cowpea-Berseem+Japanrape	286.3
2- Maize+Cowper-Jowar-Berseem+Japanrape	197.2
3- iawar+Cowper-Berseem+Japanrape-Jawer+Cowpea	168.6

Conservation on of Forages: In order to sustain animal production, it is essential that the optimum feeding should be maintained round the year. In India, we have two seasons, rainy season and winter season, when surplus quantities of green fodder is available- country to this there are 2 to 3 months of lean periods(October-November and April to July) when the fodder availability to animals is at its low. In the summer months, it is difficult even to meet the maintenance

requirements of the animals. Stage of maturity to feed the animals adequately during the lean period. The conservation of forages could be done in the form of silage from cultivated fodders (legumes and cereals) and also pasture grasses.

Forages could also be conserved in the form of hay when dried to its nutrients. This feed stuff is quantitatively important from both maintenance and nutritional point of view.

Agro-forestry system for fodder production: A number of fodder trees play an important role in human food security through their function as animal food sources, especially as drought services. Agro-forestry systems consisting of such trees and animals and/or pasture are called Silvo-Pastoral system. Silvi-Pasture (or Silvo-Pastoral system) is the most promising alternate land use system which integrates multipurpose trees, shrubs, legumes and grasses mostly on non arable, degraded and marginal lands for optimizing land productivity. It helps in conservation of vegetation, soil and nutrients and provides forage, timber and fuel wood on a sustainable basis. Potentials of Semi-arid region for different **forage production systems.**

Region Forage Production Systems

Semi arid Integration of Agro-Silvi-Pasture, dry land agriculture on cultivated lands. Forage-cum- Copping forming on the marginal and sub marginal lands with intercropping dry lands cereals and legumes

ROLE OF GRASSLAND IN SOIL CONSERVATION

The grass plant itself protects the soil from the forces of water erosion including the impact of rain drops and surface flow. Grass acts a spring cushion intercepting and broking up the falling rain drops in their way down. Conducting the water down the blades and stems of the plants and finally allowing it to reach the ground as fine sprays without disturbing the surface. Clamps of grass plants, in a mechanical way, obstruct-flowing water and reduce its rate of flow. In fact to control soil erosion whatever technique is adopted, there are four approaches to deal with the problem:

- 1- To condition the soil to make it resistant to detergent and transportation and create more absorptive surface layer.
- 2- To cover the soil so that it is protected from the impact of wind and rain drops.
- 3- To decrease the velocity of wind or runoff water.
- 4- To provide safe disposal outlet for surplus run off.

Grass in the nature highly efficient device to protect the soil from destructive forces like rain , wind etc. Grass and legumes increase the aggregation of soil particles; improve soil structure and water holding capacity of the soil. Grasses gives quicker protection to eroded lands. To establish gully sides, water ways, gully head and check dams. Grass is perhaps the most effective and economical tool. It can put to various uses in soil conservation:

- 1- Strip cropping, rotational cropping or lay farming.
- 2- Stabilization of bunds and terraces.
- 3- Stabilization of gullies, diversion or drainage channels.
- 4- Stabilization of sand dunes.
- 5- Meadows and pasture on steep slopes.
- 6- Fertility builder for eroded soil.

Expected/Estimated Outcomes (IWMP-2nd)-Hardoi

S. No.	Name of the District	Item	Unit of measurement	Pre-project Status	Expected Post-project Status	Remarks
1	HARDOI	Status of water table	Meters	6.40	5.90	
2		Ground water structures repaired/ rejuvenated	No.	-	-	
3		Quality of drinking water	Quality	Smelly	Pure	
4		Availability of drinking water	Days	10 months	12 Months	
5		Increase in irrigation potential	%			
6		Change in cropping/ land use pattern	Cropping pattern	Sugarcane, Paddy, Single	Double Cropping	
7		Area under agricultural crop	Ha	7658	3250	
8		i	Area under single crop	3829	4229	2425.00

9		ii	Area under double crop	1914	2014	300.00	
10		iii	Area under multiple crop	1915	2015	200.00	
11			Net increase in crop production area	Ha	-	600	
12			Increase in area under vegetation	Ha	275	300	
13			Increase in area under horticulture	Ha	280	300	
14			Increase in area under fuel & fodder	Ha	3.50	9.0	
15			Increase in milk production	Av.lit/day/ cattle	20 Lit./Village	30 Lit./ Village	
16			No. of SHGs	No.			
17			Increase in no. of livelihoods	No.			
18			Increase in income	Rs.			
19			Migration	%	750	450	
20			SHG Federations formed	No.	-	3	
21			Credit linkage with banks	No.	8	32	
22			Resource use agreements	%	Agreed	100% as per required	
23			WDF collection & management	%	5-10	100% collection during project period	
			Summary of lessons learnt				

Date;

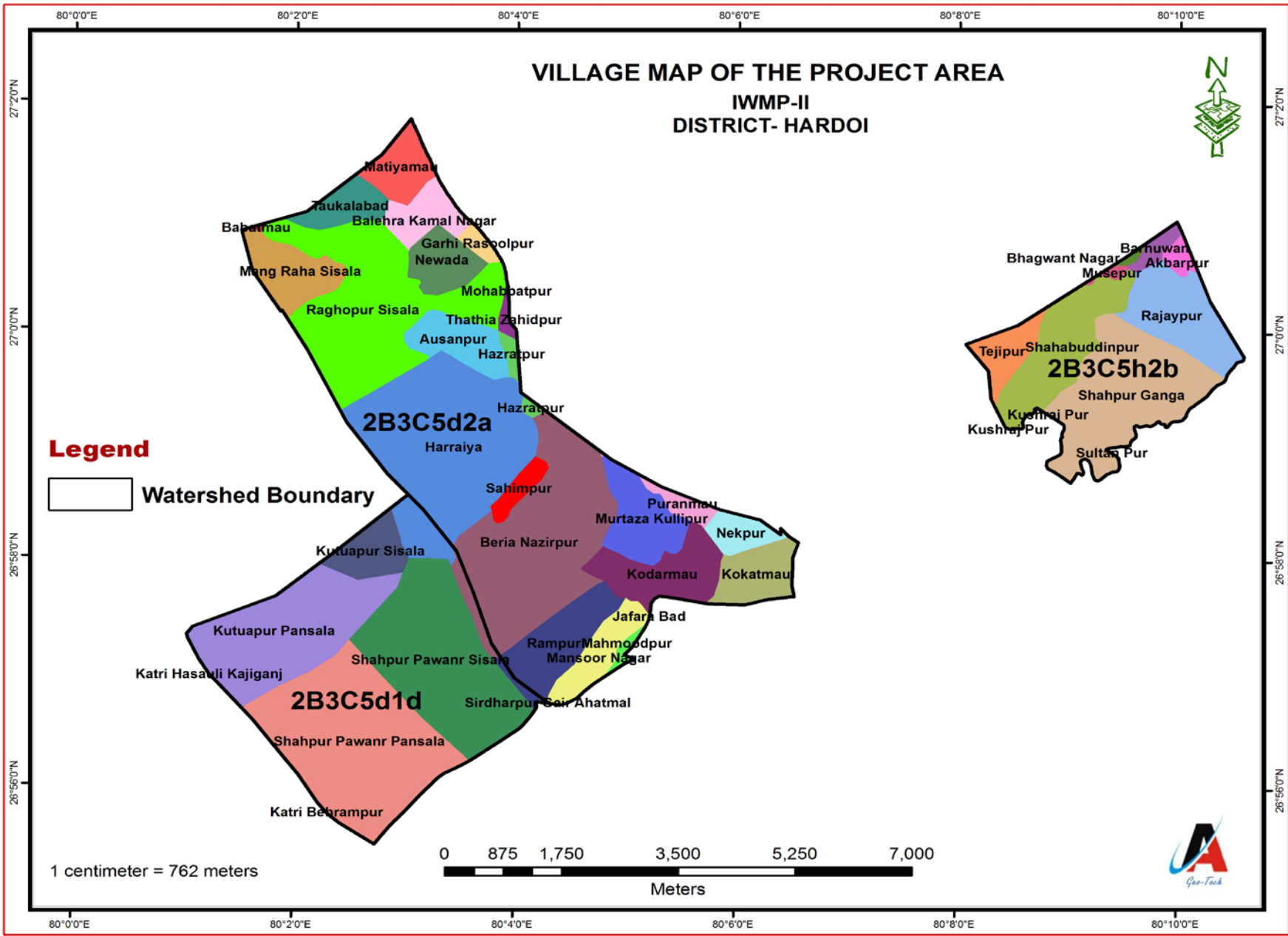
Signature of officers authorized
by State Govt. with name and Designation

Staff at PIA level

S. No.	Name	Designation	Age	Sex	Qualification	Experience (Year)
1	Mr. Kunwar Bahadur Singh	Bhoomi Sanrakshan Adhikari	55	M	Civil engineer	30
2	Mr. R.M. Mishra	Jr. Engineer	55	M	Civil engineer	30
3	Mr. S.N. Ram	Jr. Engineer	51	M	Civil engineer	30
4	Mr. S.K. Nigam	Accountant	51	M	M.com	29
5	Mr. R.K. Rastogi	Accountant	52	M	M.com	29
6	Mr. K.D. Marwaha	Draughts Man	51	M	Intermediate,ITI	29
7	Mr. B.P. Singh	S.Clerk	54	M	B.A	29
8	Mr. R.S. Mishra	J.Clerk	50	M	B.A	29
9	Mr. S.P.Bajpai	J.Clerk	52	M	B.A	29
10	Mr. R.K.Seth	J.Clerk	53	M	B.A	29
11	Mr.A.K.Srivatava	Trasser	52	M	Intermediate	29
12	Mrs.Devpari	Trasser	42	F	High school	15
13	Mrs. R.S. Rawat	Trasser	35	F	M.a	7
14	Mr.R.Dayal	Jiledar	54	M	Graduate	29
15	Mr.R.P. Bajpai	Work Supervisor	52	M	Graduate	30
16	Mr.A.K.Panday	Work Supervisor	54	M	Graduate	29
17	Mr.K.D.Panday	Work Supervisor	51	M	Graduate	29
18	Mr.Akhil Singh	Work Supervisor	50	M	Graduate	29
19	Mr.M.Salim	Work Supervisor	52	M	Graduate	29
20	Mr.R.C.Sharma	Work Supervisor	51	M	Graduate	29
21	Mr.Roop Kishor	Work Supervisor	25	M	Graduate	3
22	Mr.V.D.Yadav	Work Supervisor	52	M	Graduate	29
23	Mr.Om Prakash	Work Supervisor	35	M	Graduate	7
24	Mr.R.P.Katiyar	Fourth Class	51	M	Intermediate	-
25	Mr.Duli Chand	Fourth Class	52	M	8 th Class	-
26	Mr. Hem Singh	Fourth Class	28	M	B.A	-
29	Mr.Pankaj Kumar	Fourth Class	30	M	B.A	-
30	Mr.S.Prakash	Fourth Class	32	M	Intermediate	-

Chapter-13

Mapping



BASE MAP OF THE PROJECT AREA

IWMP-II

DISTRICT- HARDOI










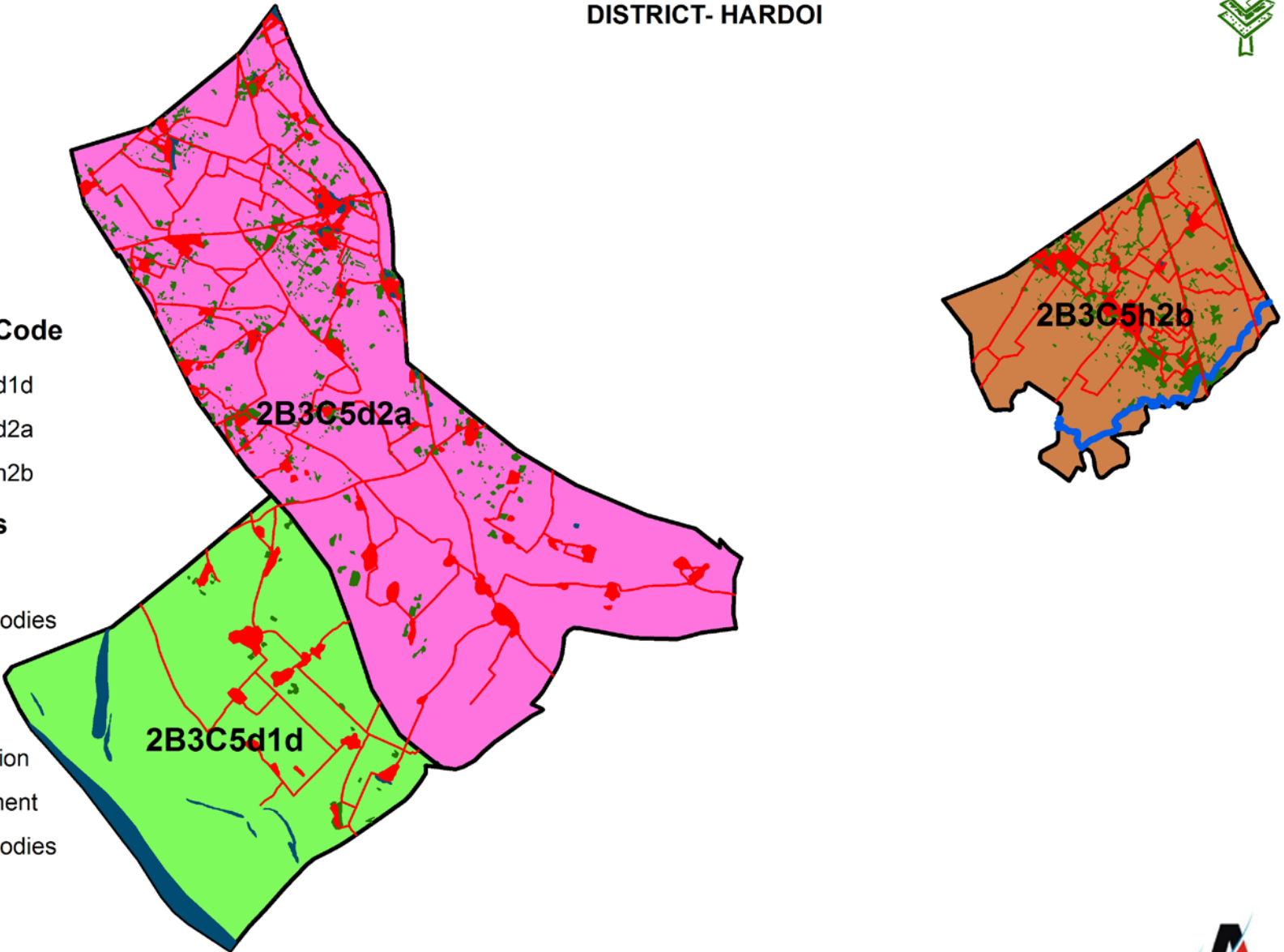
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Watershed Code

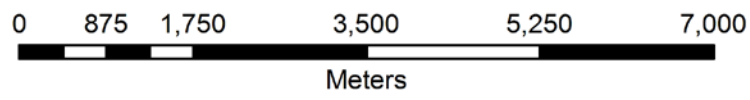
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-  2B3C5d2a
-  2B3C5h2b

Base Layers

-  Road
-  Waterbodies
-  River
-  Drain
-  Plantation
-  Settlement
-  Waterbodies



1 centimeter = 762 meters

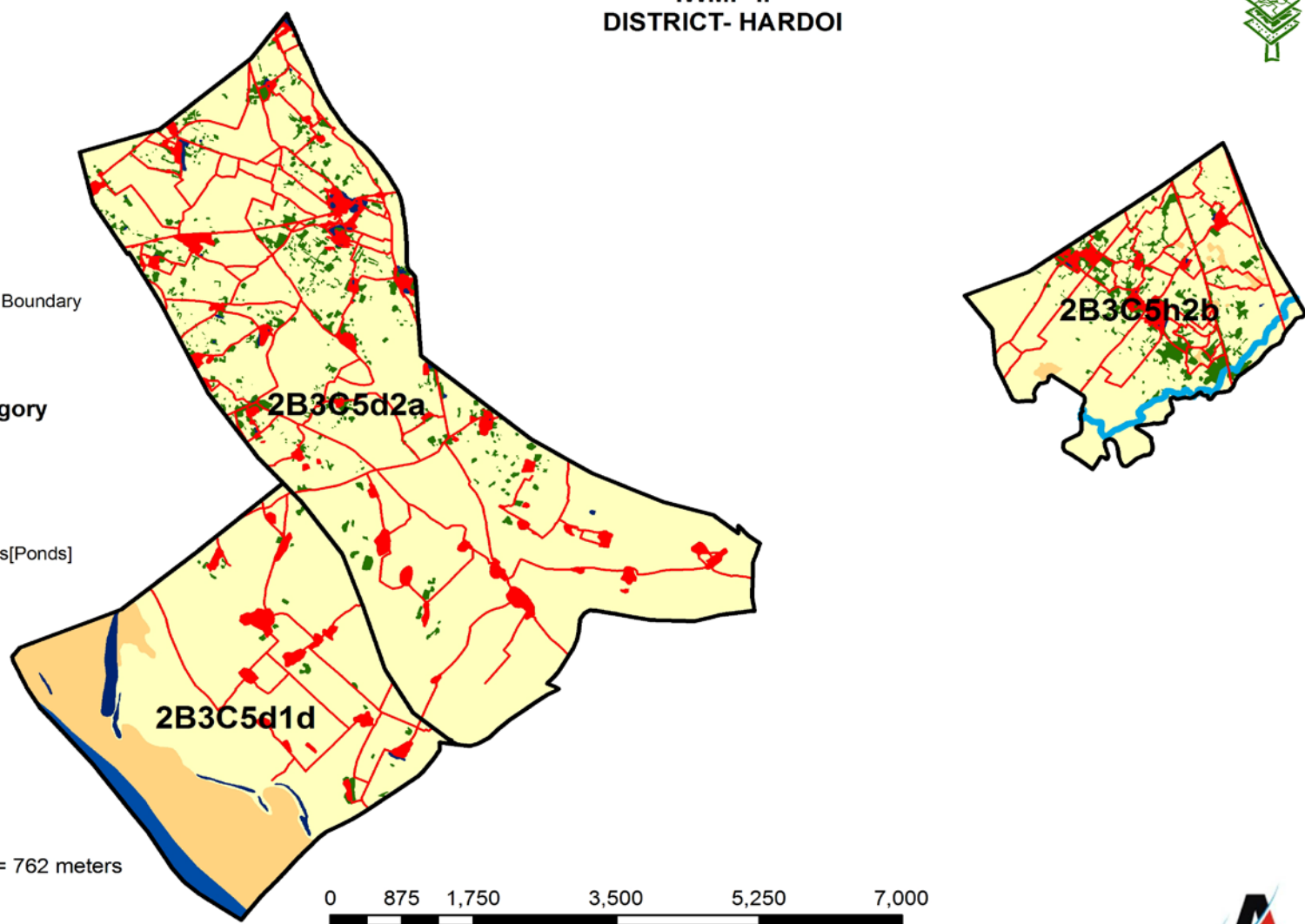


LANDUSE/ LANDCOVER MAP OF THE PROJECT AREA IWMP-II DISTRICT- HARDOI

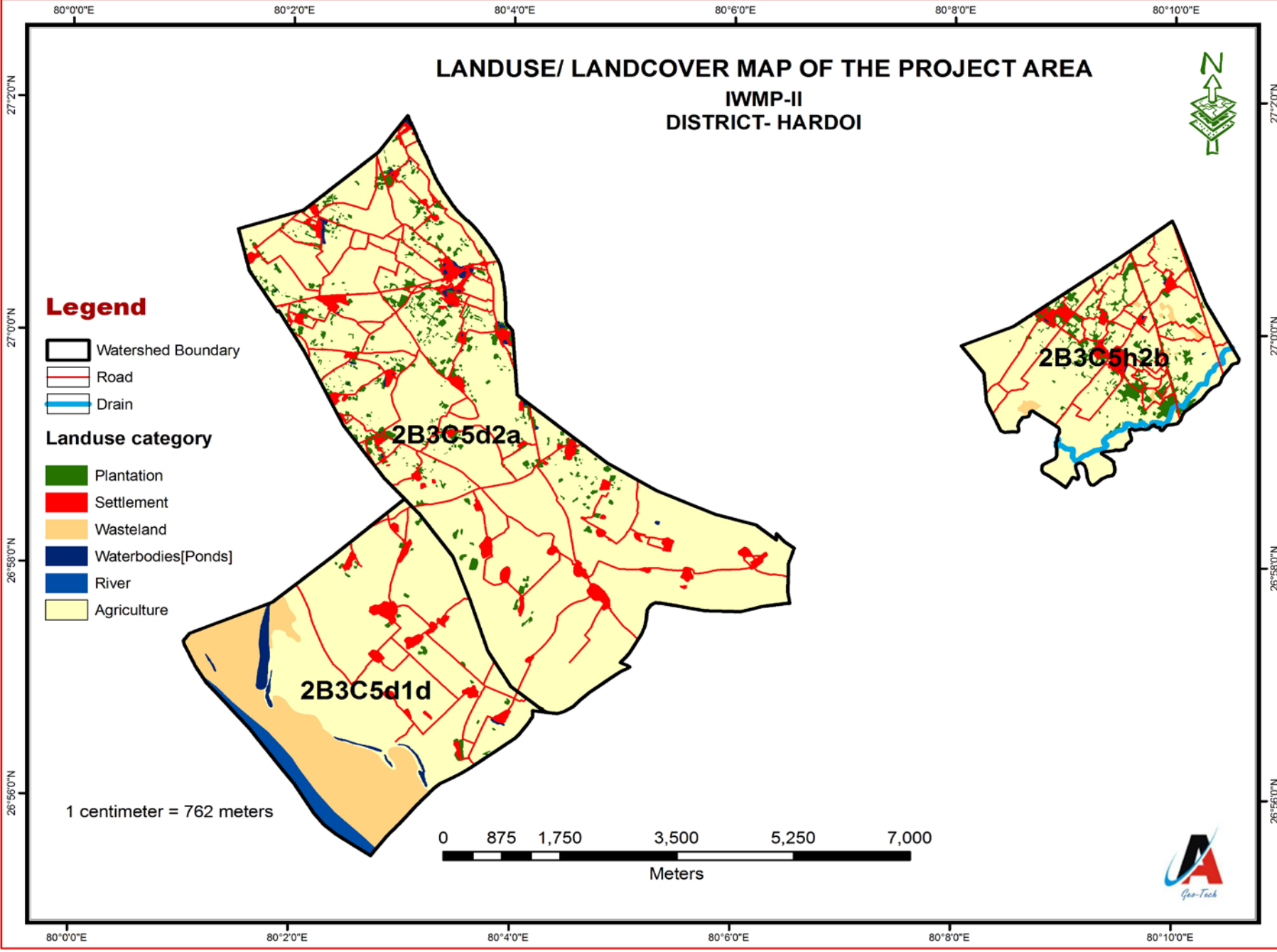
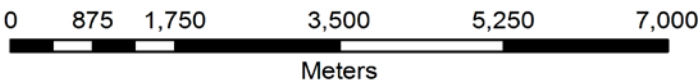


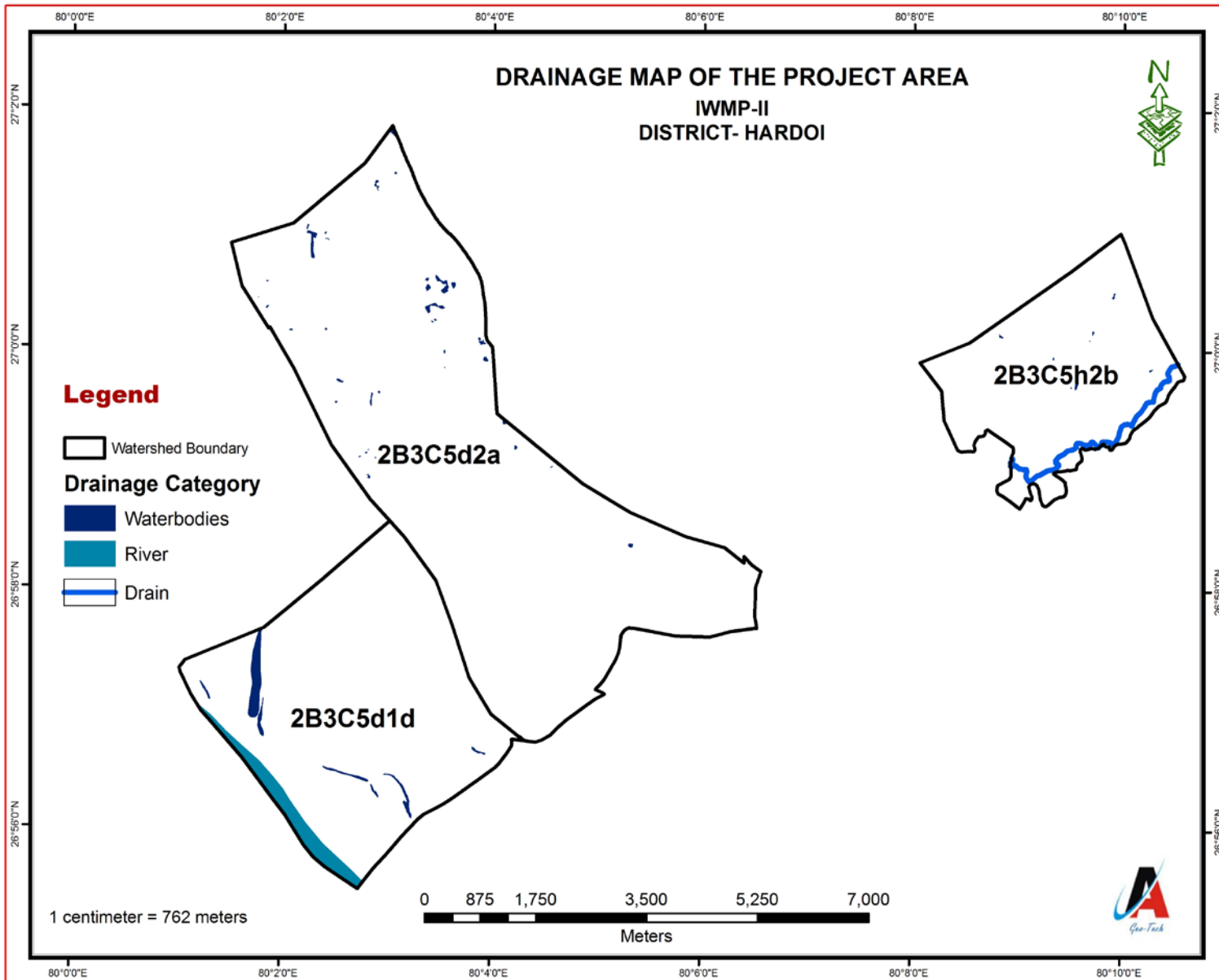
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- Watershed Boundary
- Road
- Drain
- Landuse category**
- Plantation
- Settlement
- Wasteland
- Waterbodies[Ponds]
- River
- Agriculture



1 centimeter = 762 meters







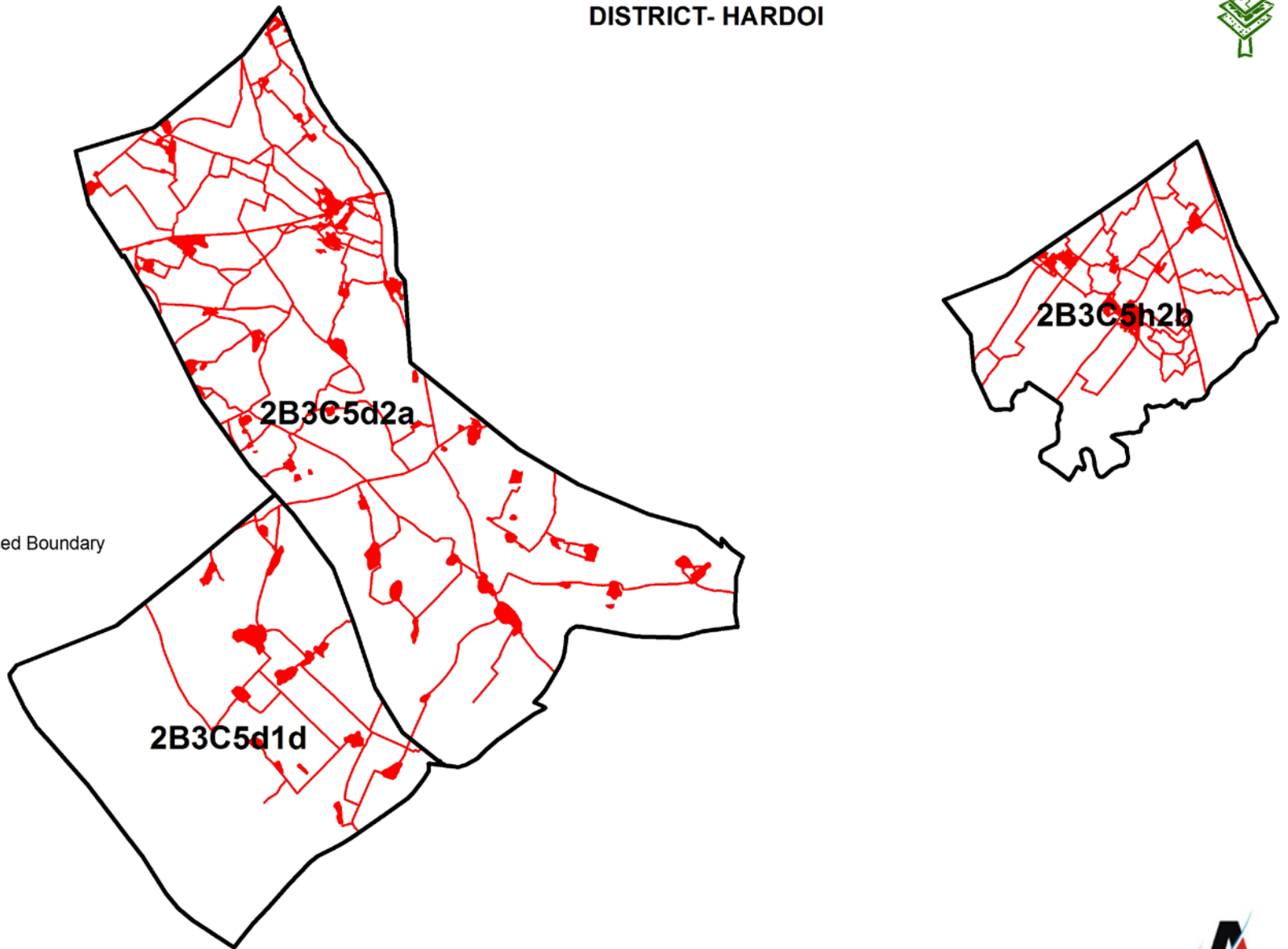
TRANSPORT NETWORK MAP OF THE PROJECT AREA

IWMP-II DISTRICT- HARDOI

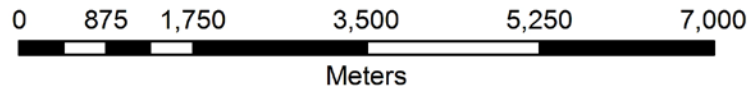


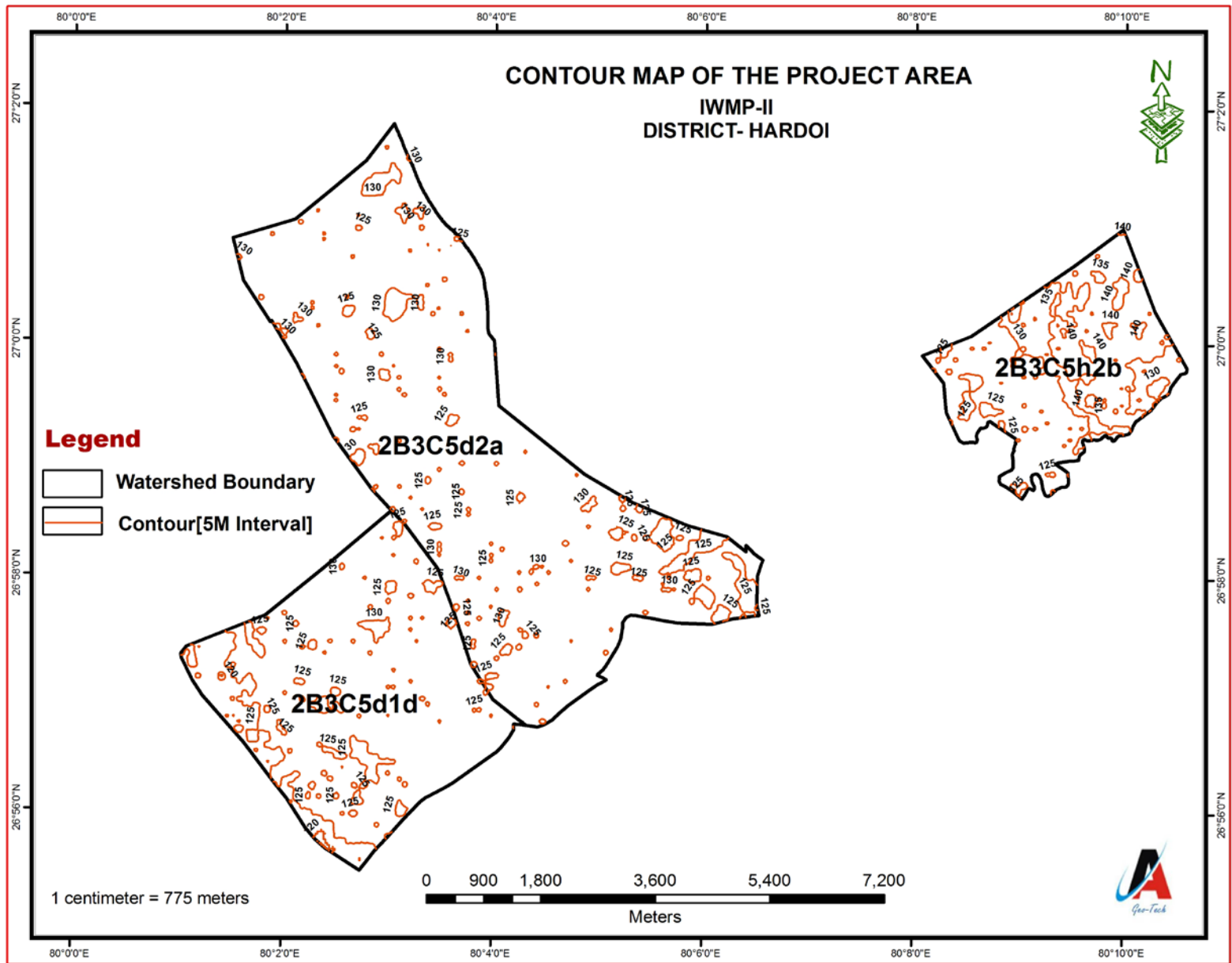
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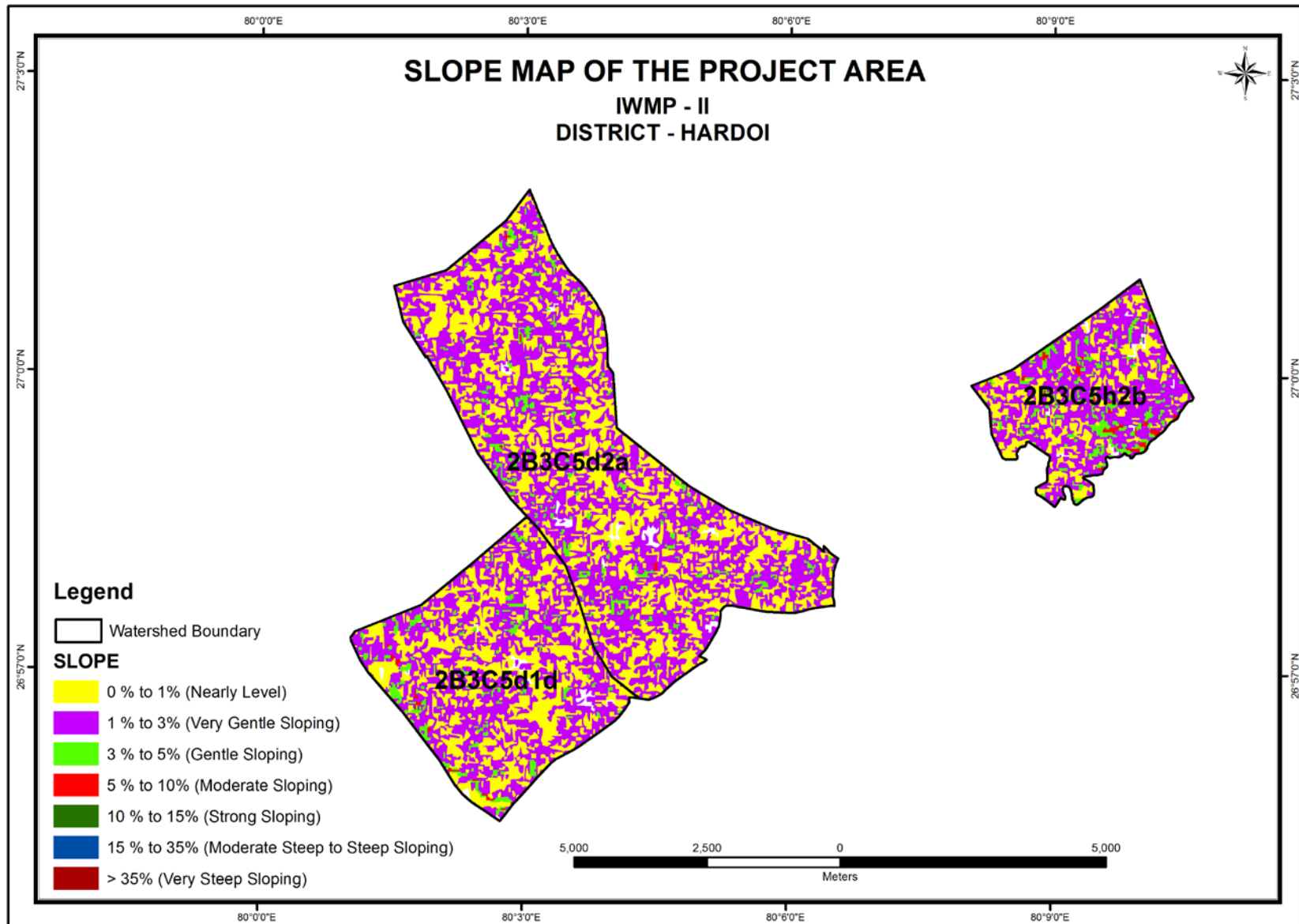
-  Watershed Boundary
-  Road



1 centimeter = 762 meters







PERPARTION OF DPR

Detail Project Report Of Integrated Watershed Management Programme IWMP IInd had been prepared through base line/bench Mark survey for Physiographic climate, soil land use, vegetation, hydrology and socio economic data analysis PRA have been exercised to collect primary data secondary data have been collected from Revenue Statistics department Statistical Magazine of the district, Hardoi. Toposheet (1:50000) survey of india Dehradun and technical & specific input and health with preparation and drafting of detail project report.

S.No.	Name	Designation
1.	Dr. N. K. Singh	Scientist, Advanced Geo-Tech Solutions, 7,Vrindavan Vihar Bahadurpur, Lucknow-226021
2.	Dr. Rakesh Singh	Scientist, Advanced Geo-Tech Solutions, 7,Vrindavan Vihar Bahadurpur, Lucknow-226021
3.	Dr. Vijendra Kumar Pandey	Scientist, Advanced Geo-Tech Solutions, 7,Vrindavan Vihar Bahadurpur, Lucknow-226021
4.	Mr. C.L. Paul	Scientist, Advanced Geo-Tech Solutions, 7,Vrindavan Vihar Bahadurpur, Lucknow-226021
5.	Mr. Yudhishther Singh	Scientist, Advanced Geo-Tech Solutions, 7,Vrindavan Vihar Bahadurpur, Lucknow-226021
6.	Mr. Sushil Kumar	GIS Engineer, Advanced Geo-Tech Solutions, 7,Vrindavan Vihar Bahadurpur, Lucknow-226021
7.	Mr. Arun Kumar	GIS Engineer, Advanced Geo-Tech Solutions, 7,Vrindavan Vihar Bahadurpur, Lucknow-226021
8.	Mr. Rohinish Karan	Architect, Advanced Geo-Tech Solutions, 7,Vrindavan Vihar Bahadurpur, Lucknow-226021
9.	Mr. Kunwar Bahadur Singh	Bhoomi Sanrakshan Adhikari
10.	Mr. R.M. Mishra	Jr. Engineer
11..	Mr. S.N. Ram	Jr. Engineer
12.	Mr. K. D. Marwaha	Draftman
13.	Mr. S.K. Nigam	Accountant
14.	Mr. R.K. Rastogi	Accountant
15.	Mr. R.K.Seth	J.Clerk
16.	Mr.A.K.Srivatava	Trasser
17.	Mrs.Devpari	Trasser
18.	Mrs. R.S. Rawat	Trasser
19.	Mr.R.Dayal	Jiledar
20.	Mr.R.P. Bajpai	Work Supervisor
21.	Mr.A.K.Panday	Work Supervisor
22.	Mr.K.D.Panday	Work Supervisor
23.	Mr.Akhil Singh	Work Supervisor
24.	Mr.M.Salim	Work Supervisor
25.	Mr.R.C.Sharma	Work Supervisor
26.	Mr.Roop Kishor	Work Supervisor
27.	Mr.V.D.Yadav	Work Supervisor
28.	Mr.Om Prakash	Work Supervisor
29.	Mr.R.P.Katiyar	Fourth Class
30.	Mr.Duli Chand	Fourth Class

DPR PLAN ABSTRACT

The collection of all the relevant data of watershed area and the possible option and solution are described with the help of feedback of focused discussion and detailed perspective plan for the watershed area with year wise and activity wise summarized for the DPR plan abstract for 5 year (2010-11 to 2014-15) .

The summary of the above document is verified by the following persons:

Prepared By:

Bhoomi Sanrakshan Adhikari
Dept. Of Land Development & Water Resources
District-Hardoi

Technically Approved By:

Deputy Director
Dept. Of Land Development & Water Resources
Region-Hardoi

Physically & Financially Approved:

Project Director
District Rural Development Authority

Chief Development Officer
District- Hardoi