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C.D.O. MIRZAPUR (U.P.)
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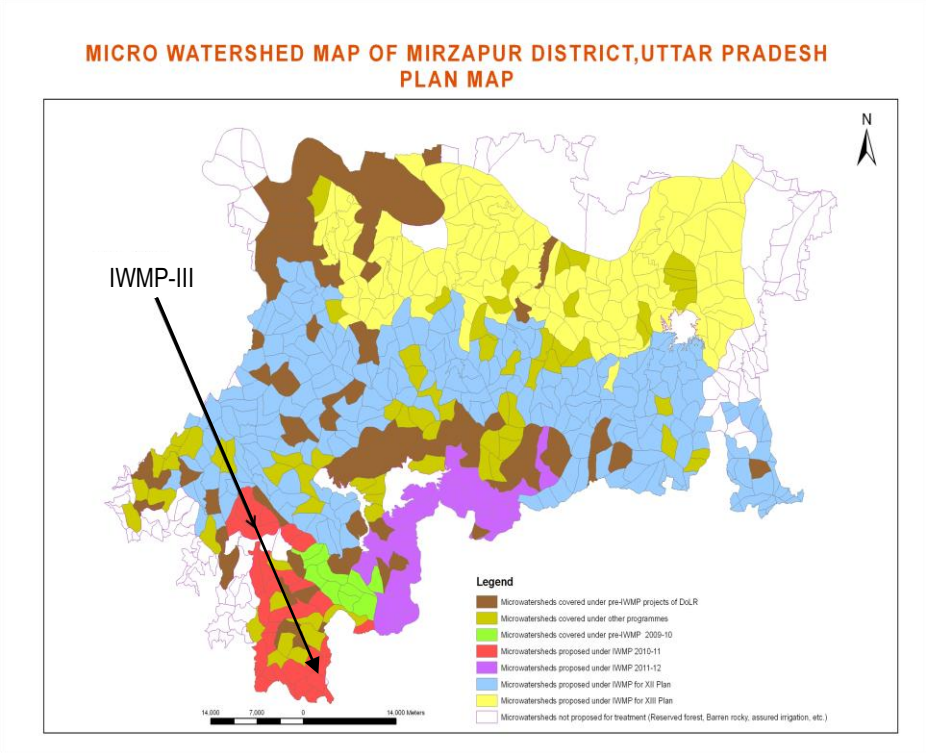
Date:

(B.RAM)
Chief Development officer/
Chief Executive officer (I.W.M.P)
Mirzapur

IWMP-III (2010-11) DISTRICT – MIRZAPUR

Name of the project	Weightage	No.of MWS	Geographial Area (ha)	Rainfed Area (ha)	Treatable area (ha)
I.W.M.P.III	81.0	18	6826	4678	4573



PROJECT AT A GLANCE

1.	Name of Block	**HALLIA**
2.	No. of Gram Panchayats	10
3.	Four reasons for selection of Watershed	i. Major % of SC ii. Actual wages are significantly lower than minimum wages. iii. More than 80% small and marginal farmers. iv. Above 5 micro watersheds in cluster
4.	Date of approval of watershed Development Plan by DRDA/DPC	
5.	Area proposed to be treated (ha.)	4573.00
6.	Date of sanction of PPR & Date of release of Ist Instalment	10-03-2010 & 15-06-2010
7.	Project duration	2010-2011 to 2014-2015
8.	Project Cost (in lac.)	**548.76**
9.	Proposed mandays	**220000**

Table-1: PROJECT AT A GLANCE

1.	Name of Project	**IWMP – III**
2.	Name of Block	HALLIA
3.	Name of District	MIRZAPUR
4.	Name of State	UTTAR PRADESH
5.	Name of Micro Watershed	Gajaria, Manigarha I, Manigarha II, Manigarha III, Manigarha VI, Manigarha V, Badoha, Mahokhar, Parsia Khurda, Gaurwa, Banjari Khurd I, Banjari Khurd II, Surajgarh I, Surajgarh II, Karaundia, Pindaria I, Pindaria II, Pindaria III .
6.	Name of Village under Micro Watershed	Mudpeli, Gajaria, Manigarha, Dewari, Baroha, Parisa Mudpeli, Tita, Patpara, Jharha, Mahokhar, Vyoguna, Gaurva, Parisa khurd, Karaoundia, Jhagraha, Paudi Rampur, Banzari Khurd, Surajgarh, Harbara, Baraya, Pidaria, Fhuliyari, Chaura, Khajurahat.
7.	Micro Watershed Code Selected	1. Gajaria-2A7D7i2a, 2. Manigarha-I-2A7D7e1a, 3. Manigarha-II-2A7D7e1b, 4. Manigarha-III-2A7D7i3b, 5. Manigarha-VI-2A7D7e1f, 6. Manigarha-V-2A7D7o1d, 7. Badoha-2A7D7i3a, 8. Mahokhar-2A7D7i2c, 9. Parsia Khurda-2A7D7i3d, 10. Gaurwa-2A7D7g2b, 11. Banjari Khurd-I-2A7D7g2d, 12. Banjari Khurd-II-2A7D7g2c, 13. Surajgarh-I-2A7D7g2e, 14. Surajgarh-II-2A7D7g1c, 15. Karaundia-2A7D7g2a, 16. Pindaria-I-2A7D7i1d, 17. Pindaria-II-2A7D7g1a, 18. Pindaria-III-2A7D7m2b
8.	Total Area of the Project	6826.00 ha
9.	Proposed Area for Treatment	4573.00 ha
10.	Cost per Hectare	Rs. 12,000.00 per ha
11.	Project Period	2010 – 11 to 2014 – 15
12.	Total Cost of Project	Rs. 548.76 Lakhs

EXECUTIVE SUMMARY

1. Breif about area

Integrated watershed management ProgrammeIIIrd is located in Hallia block of Mirzapur District, Uttar Pradesh.Its geographical area of 6826.00 ha. Out of which 4573.00 ha.area of the watershed have been proposed to be treated. The watershed lies in the southern part of the district which is about 76 km away from the district headquarter; 22 km from block headquarter main market Hallia and 46 km from the National Highway 7 (Mirzapur- Rewa Road). The aforesaid progarmme is in a mountainous terrain of Vindhyan Hills precipitous slopes and drains into river Ganga thorough main river Belan near a place known as Meza of Allahabad District. Average annual rainfall of the watershed is about 822 mm. and the proposed watershed area is comes under Agro climatic zone 9 (North – East Plain Zone) owing to undulated topography whole area under watershed is highly prone to erosion hazards in the absence of proper conservation measured. The three fourth of the total cultivated area is rain fed i.e. farmers of the watershed have to dependent of rain water for their crop production. The total cultivated area is 4937.05 ha. out of which about 259.00 ha. area is under regular cultivation i.e. cultivated both in Rabi and Kharif crop seasons. There is lack of complete and assured irrigation in the watershed although partial or life shaving irrigation is available on about 100.0 ha. of land during rabi season which is completely dependent upon the availability of water stored in water bodies. Thus the moisture conservation as well as water harvesting has always been on the top priority of the farmers in the watershed. In these circumstances total grain production and the productivity of the watershed lies far below than the rest part of the district, further, scarcity of irrigation water for fodder production throughout the year causes huge shortages of fodder that ultimately leads to the poor health of cattle population coupled with low milk yield and sterility. Integrated watershed Management programme 3rd (IWMP 3rd) Mirzapur is a cluster of watershed comprised of 18 micro watersheds namely 1. Gajaria-Code No. 2A7D7i2a, 2. Manigarha-I- Code No. 2A7D7e1a, 3. Manigarha-II- Code No. 2A7D7e1b, 4. Manigarha-III- Code No. 2A7D7i3b, 5. Manigarha-VI- Code No.

2A7D7e1f, 6. Manigarha-V- Code No. 2A7D7o1d, 7. Badoha- Code No. 2A7D7i3a, 8. Mahokhar- Code No. 2A7D7i2c, 9. Parsia Khurda Code No. 2A7D7i3d, 10. Gaurwa- Code No. 2A7D7g2b, 11. Banjari Khurd-I- Code No. 2A7D7g2d, 12. Banjari Khurd-II- Code No. 2A7D7g2c, 13. Surajgarh-I- Code No. 2A7D7g2e, 14. Surajgarh-II- Code No. 2A7D7g1c, 15. Karaundia- Code No. 2A7D7g2a, 16. Pindaria-I- Code No. 2A7D7i1d, 17. Pindaria-II- Code No. 2A7D7g1a, 18. Pindaria-III- Code No. 2A7D7m2b in Hallia block of the district Mirzapur, Uttar Pradesh. These Micro watershed have been recognized by Remote sensing Application centre, Uttar Pradesh that area oriented between longitude 82^0 18′ to 82^0 26′ E and latitude 24^0 35′ to 24^0 39′ N with on altitude from 295 m to 192 m above the mean sea level (MSL)

Altogether twenty four villages namely Mudpeli, Gajaria, Manigarha, Dewari, Baroha, Parisa Mudpeli, Tita, Patpara, Jharha, Mahokhar, Vyoguna, Gaurva, Parisa khurd, Karaoundia, Jhagraha, Paudi Rampur, Banzari Khurd, Surajgarh, Harbara, Baraya, Pidaria, Fhuliyari, Chaura, Khajurahat are located in the watershed.

The climate of the region is characterized as semi-arid with an average annual rainfall of 822 mm. and average 45 raining days. Out of which more than 90 present of rain is received during the monsoon season from July to September the area receives barely rainfall during the winter, temperature ranges from as high as 48^0C in the May-June to as low as 4^0C during December- January. The trend of rainfall in highly erratic and maximum water goes through run off.

The topmost portion of the watershed is hilly terrain with occasional depressions of flat land interlocked between the hillocks. The soils are derived from the solid rocky terrain. The soils of the watersheds are latertic to sandy- loam with occasional those layers of silt in small patches. Successful planning of land use according to their capacity in the watershed is most crucial in the development of the watershed. Six land capability classes have been identified e.g. Class II, Class II, Class IV, Class V, Class VI and Class VII over the total area of 4678 ha of the IWMP IIIrd. The most part of the land in the watershed is coming under class IV and V the lands from these class is no more profitable for agricultural production because cultivation can cause erosion in the lack of proper management, it is being advised that agro-forestry should be practiced on these lands. Lands under class V are sloppy that make it unsuitable for crop production, these lands should be used for pasture or

forestry but grazing should be regulated to prevent cover from being destroyed. Class VI and VII lands are shallow soils on extreme slopes; rocky hill tops, gullies that are highly prone to soil erosion, therefore, should be kept under perennial grasses and vegetation, land under class II are productive, these land should be cultivated regularly by following crop rotation, water harvesting and special tillage practices to control erosion, further, the productivity of these lands could be enhanced by adoption of simple soil and water conservation measures like contour bunding, in-situ moisture conservation techniques etc. In class III submergence bund, marginal and peripheral bund have been planned and in class IV, gully plugging structures, earthen check dams and water harvesting bund have been proposed with permanent pucca drop spillway structures and pucca check dams. Hence the proposed IWMP 3rd is aimed at environmental security, food and nutritional sufficiency, local human resource development, employment generation, sustainable agricultural development, socio-economic well-being of the people under watershed.

Since the major part of cultivated land of the watershed is rainfed, therefore, high yielding and early maturing short duration varieties that can escape the drought spells at the maturity stage have been proposed to be introduced. Greater emphasis with be given on mulching and tillage practices for soil and moisture conservation. Under irrigated conditions optimized water use would be ensured with appropriate cropping systems and scheduling of irrigation synchronized with most suitable crop growth stages, introduction of improved high yielding verities recommended for north east plain zone (NEPZ) and Vindhayan zone have been proposed. Conservation agronomical practices suitable for hilly watershed like intercropping, strip cropping management have been recommended.

Watershed area had almost devoid of horticulture crops due to harsh climatic conditions which includes excessive heat and low humidity that hamper the successful cultivation of fruits and vegetable crops. Although there is a scope for the cultivation of drought hardy horticultural crop species, e.g. Bael, Anola, Karonda, Ber, Sharifa, Nibu, etc. Therefore it is propped to increase the area under fruit plantation from 20 to 72 ha. under horticulture to improve the nutritional status as well as the income of dwellers of the watershed. Natural vegetation of the watershed is medium to poor. The forest vegetation is predominating with palas, followed by

Bamboo, Tendu Patta, Mahua etc. There area occasional occurrence of Neem plants throughout the watershed. There is no grass land in the watershed but bushy shrubs can be seen throughout the watershed.

The treatments proposed in these lands are Jatropha plantation of Sagaoun, Mahua, Neem and mechanical measures. Besides, for meeting daily requirements of fuel, fodder and small timber agro forestry trees subabool have been proposed to be planted on farm boundaries of agricultural land. It is expected that the implementation of watershed development activities will bring down the runoff and soil loss by 70 and 80 of their present level, respectively. It has been proposed to increase water and land utilization index through adoption bio-engineering measures. The proposed plan will improve the crop diversification index, productivity of existing crops and thereby will leads to self-sufficiency in food with nutritional security.

2. Institutional arrangement

This watershed has been identified by the state department under NWDPRA scheme by proper prioritization of different parameters for watershed selection criteria

The area of watersheds is proposed to be taken by Bhoomi Sanrakshan Adhikari, Department of land development & water resources Mirzapur district of Uttar Pradesh for integrated watershed management programme (IWMP) starting from the year 2010-11. The project will be completed by 2014-15.

3. Salient project activities

The area is prone to soil degradation due to environmental impact and over exploitation of natural resources therefore it is an urgent need to restore the ecological balance for the sustainability. Fodder shortage, lack of inputs and market facility are some of the major constraints being experienced by the farmers.

It is proposed that the soil conservation and check in run-off water is required urgently. Therefore the certaine measures like contour bund, marginal bunds, and peripheral bunds are urgently required. On the other

hand to control the run-off water the water management practices like drainage treatment check dams and other practices have been propsed according to general geology of the project area.

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

Table 2: Watershed Development works including proposed engineering structures

Component	***Total (Lakhs) Amount***	***% of the bugdet***
A. Soil & moisture conservation i. Construction of Bunds (graded, contour and field Bund)	69.990	50%
ii. Marginal & Peripheral Bundh	24.150	
iii. Gully Plug	-	
B. Water Resources Development i. Water Harvesting Bundhi	158.64	
ii. Pucca Check Dams	-	
iii. Farm Pond	-	
C. Agro forestry & Horticulture	-	
i. Agro forestry	10.80	
ii. Horticulture	10.80	
Sub Total	**274.380**	**50%**

Livelihood Activities (community Based)

Component	Total (Lakhs) Amount	% of the bugdet
(a) Poultry Farming	54.876	10%
(b)Dairy Work		
(c) Goating Keeping		
(d) Bee Keeping		
(e) Tailoring etc.		
Total	**54.876**	**10%**

4. Physical target and financial outlays

Table – 3: YEAR WISE PHASING (PHYSICAL & FINANCIAL) OF I.W.M.P. - III, MIRZAPUR DISTRICT (U.P.)

Area-Ha & Rs. In Lakh

S. No.	Item	1st Year (2009-10)		IInd Year (2010-11)		IIIrd Year (2011-12)		1Vth Year (2012-13)		Vth Year (2013-14		Total	
		Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.
1	Administrative 10%	-	-	10.975	-	14.817	-	14.816	-	14.268	-	54.876	-
2	Monitoring 1%	-	-	1.098	-	1.097	-	1.098	-	2.195	-	5.488	-
3	Evaluation 1%	-	-	1.646	-	1.097	-	0.823	-	1.921	-	5.487	-
4	Entry Point Activity 4%	21.950	-	-	-	-	-	-	-	-	-	21.950	-
5	Institutional and Capacity building 5%	5.488	-	10.975	-	4.116	-	4.115	-	2.744	-	27.438	-
6	D.P.R Preparation 1%	5.488		-	-	-	-	-	-	-	-	5.488	-
7	Watershed Dev. Works 50%	-	-	**41.157**	**686.00**	**72.162**	**1203.00**	**72.436**	**1207.00**	**88.625**	**1477.00**	**274.380**	**4573.00**
8	Livelihood & Income Generating 10%	-	-	5.488	-	21.950	-	16.463	-	10.975	-	54.876	-
9	Production System development 13%	-	-	5.488	-	21.951	-	27.437	-	16.463	-	71.339	-
10	Consolidation Phase 5%	-		-	-	-	-	-	-	27.438	-	27.438	-
	Total	**32.926**	**-**	**76.826**	**686.00**	**137.190**	**1203.00**	**137.190**	**1207.00**	**164.628**	**1477.00**	**548.76**	**4573.00**

RESOURCE CONSERVATION AND WATER MANAGEMENT, BLOCK – HALLIA, DISTRICT MIRZAPUR (U.P.)

Budget for the various components is given below (I.W.M.P.- III, MIRZAPUR)

S.N.	Budget Component	Total (Rs. In Lakhs)
1.	Management Cost	
	a) Administration Cost	54.876
	b) Monitoring	5.488
	c) Evaluation	5.487
	Sub Total	**65.851**
2.	Preparatory Phase	
	a) Entry point activities	21.950
	b) Capacity building	27.438
	c) Preparation of DPR	5.488
	Sub total	**54.876**
3.	Watershed Works	
	a) Soil and moisture conservation	94.134
	b) Water resources development	158.646
	c) Agro-forestry and horticulture	21.600
	Sub total	**274.38**
4.	Livelihood Activities	54.876
5.	Production System and Micro enterprises	71.339
6.	Consolidation Phase	27.438
	Grant Total	**548.760**

5. Treatment area and details

The above project area the problem of land degration is caused not only by soil erosion, but also by water logging and excessive salinity. Following are the main problem in the selected watershed.

(a) Lack of awareness amongst the villagers about the deteriorating environmental condition of the area.

(b) 75% of the run off water makes it away to way towards rivers carrying fertile soil with has nutrients and this decreases soil fertility, there is a decline in the productivity of cereals,pulses and vegetable crops.

(c) Due to over grazing, vegetative cover is declining on community land. There is no grasses and even shrub. Vegtation is vanishing, River carry a huge silt every year

(d) Due to continuous cutting of trees, overgrazing bushes and shrubs ecological balance of the area has been hardly distrubed.

(e) Due to increasing populasion pressure of man and animal there is camptition for collection of food, fodder and fuel resources.

(f) The ground water of the watershed area is deteriorating environmental condition. Therfore it is an urgent need, that rainwater should be harvested for crops and re-charged to improve the quality of the water.

Table – 4 : Treatment of Micro Watershed

S. No.	Watershed Reaches	Proposed Work	Treatable Area (ha.)	Proposed Cost (Rs.lakh)
1	**Upper Reaches**	a) Contour bund	2187.00	69.984
2	**Middle Reaches**	a) Marginal bund, Peripheral bund, Submergence bund, Earthen check dams	525.00	24.150
		b) Agro-forestry/Horticulture	216.00	21.600
3	**Lower Reaches/Drainage Line Treatment**	a) Water harvesting bundhi with Drop spill way/Drop inlet spill way and pucca check dam	1645.00	158.646
		Total	**4573.00**	**274.38**

6. Fact sheet about benchmark indicators

Gradually increasing soil erosion, poor harvesting management,single cropping pattern,non treated land and water resources have been required to take immediate action for conservation of soil and moistures various type earthen bunds in the watershed field, necessity has been observed, Stabilize Disturbed Areas immediately. Permanentstructures, temporary or permanent vegetation, and mulch, or a combination of these measures, should be employed as quickly as possible after the land is disturbed. Retain or Accommodate Runoff. Runoff from the development should be safely conveyed to a stable outlet using storm drains.

Table -5: Area under Various LCC Classes

LCC class	Area ha
I	550.00
II	3858.00
III	2418.00
Total	**6826.00**

7. Action plan at a glance

The preparation of detailed project report has been carried out by applying different steps for its compilation. A brief detail has been given below:-

Secondory or co-lateral data collection – During the field visit programme all available data spatial and non- spatial has been collected through village lavel from gram panchayat office and community block lavel office.

Paticipatry rural appraisal (PRA) has been conducted for detail survey of the village resource information.

Formation of User'group and self help group and different committees for the social awareness among the people of the study area have been formed.

Conducted watershed committee meetings at gram panchyat lavel, for the discussion of different problems and their appropriate solution according to need in the project area.

After gathering all required information compiled thoroughly discussed and finalized the expected out-comes and benefits specialy in the respect of livelihood for different segments.These are the target and and performers, indicators for the project area,

The draft of the detailed project report has been prepared for the approvel of the project.

CHAPTER-1

INTRODUCTION & BACKGROUND

1. PROJECT BACKGROUND:

The broad objective was the promotion of the overall economic development and improvement of the socio-economic conditions of the resource poor sections of people inhabiting the programme areas. A comprehensive programme named Integrated Watershed Management Programme (I.W.M.P.) has been implemented under Common Guidelines on Watershed Development in 2008.

The main objectives of the IWMP are to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover and water. The outcomes are prevention of soil run-off, regeneration of natural vegetation, rain water harvesting and recharging of the ground water table. This enables multi-cropping and the introduction of diverse agro-based activities, which help to provide sustainable livelihoods to the people residing in the watershed area. In addition, there is a Scheme of Technology Development, Extension and Training (TDET) is also being implemented to promote development of cost effective and proven technologies to support watershed management.

Integrated Watershed Management Programme IIIrd, Mirzapur having Project area 6826.00 ha located in southern part of Mirzapur district of Uttar Pradesh has been taken up by Deptt. of Land Development and Water Resources, Mirzapur (UP) for development under Integrated Watershed Management Programme funded jointly by Deptt. of Land Resources, Ministry of Rural Development, Government of India (Share 90%) and the Government of Uttar Pradesh(Share 10%). The IWMP IIIrd Mirzapur has been also taken up program implementation comprising of development and management plan during next five years (2010-11 to 14-15).

The study area is a cluster of 18 (Eighteen) micro- watershed, with code No. 2A7D7i2a, 2A7D7e1a, 2A7D7e1b, 2A7D7i3b, 2A7D7e1f, 2A7D7o1d, 2A7D7i3a, 2A7D7i2c, 2A7D7i3d, 2A7D7g2b, 2A7D7g2d, 2A7D7g2c, 2A7D7g2e, 2A7D7g1c, 2A7D7g2a, 2A7D7i1d, 2A7D7g1a, 2A7D7m2. *Its altitude ranges from* 247 m to 192 m above the mean sea level (MSL)*. The total area of watershed is 10311.12 Ha.Out of which 6828.00 ha have been taken for the treatment.*

Table -1.1 :Basic Project Information

S. No.	Name of the Project	Villages	Block	District	Total area of the Project	Area proposed to be treated	Total Project cost (Rs. in Lacs)	PIA
1.	I.W.M.P.-III	Mudpeli, Gajaria, Manigarha, Dewari, Baroha, Parisa Mudpeli, Tita, Patpara, Jharha, Mahokhar, Vyoguna, Gaurva, Parisa khurd, Karaoundia, Jhagraha, Paudi Rampur, Banzari Khurd, Surajgarh, Harbara, Baraya, Pidaria, Fhuliyari, Chaura, Khajurahat	Hallia	Mirzapur	6826.00	4573.00	548.76	Bhoomi Sanrakshan Adhikari Department of Land Development and Water Resource Mirzapur

2. NEED AND SCOPE FOR WATERSHED DEVELOPMENT

The main objectives are

a) Restoration of health of watershed through reducing the volume and velocity of run-off water so that soil erosion can be checked

b) To increase per capita availability of drinking water through incresed ground water level by inset conservation measures, water harvesting structure and planting work in watershed ground water recharge through *in-situ* conservation measures, water harvesting structures and plantations in watershed.

c) Conservation, development and sustainable management of natural resources including their uses.

d) To ensure foods security through increased agricultural production and productivity by popularizing improved varieties, INM, IPM and improved agricultural implements.

e) Restoration of ecological balance in the degraded and fragile ecosystem through forestation.

f) To discourage migration of villagers/rural community by creating sustainable employment opportunities for livelihood security in the watershed villages.

Main problem in watershed Area

The main problem in a watershed is the soil erosin by rainfall. The run off water transport the sediments which may block the channel head, dam, reservoir and storage structures are the major problems faced in the project area and attempts made so far to over come them.

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 flat topography hence highly prone to soil erosion. Lack of irrigation water is the greatest problem experienced by the people followed by low function of field crops, lack of fodder availability and low animal productivity.

3. Table- 1.2 : Weightage of the project

Project name	Project Type	Weightage												
IWMP IIIrd MIRZAPUR	IWMP	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv
		5	5	5	5	2	3	5	5	10	10	5	10	10	80

4. Table- 1.3 : Criteria and weightage for selection of watershed

Criteria	Maximum Score	Ranges & Scores			
Poverty index (% of poor to population)	10	Above 80 % (10)	80 to 50 % (7.5)	50 to 20 % (5)	Below 20 % (2.5)
% of SC/ ST population	10	More than 40 % (10)	20 to 40 % (5)	Less than 20 % (3)	
Actual wages	10	Actual wages are significantly lower than minimum wages (5)	Actual wages are equal to or higher than minimum wages (0)		
% of small and marginal farmers	10	More than 80 % (10)	50 to 80 % (5)	Less than 50 % (3)	
Ground water status	5	Over exploited (5)	Critical (3)	Sub critical (2)	Safe (0)

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	
Area under rain-fed agriculture	15	More than 90 % (15)	80 to 90 % (10)	70 to 80% (5)	Above 70 % (Reject)
Drinking water	10	No source (10)	Problematic village (7.5)	Partially covered (5)	Fully covered (0)
Degraded land	15	High – above 20 % (15)	Medium – 10 to 20 % (10)	Low- less than 10 % of TGA (5)	
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)	
Contiguity to another watershed that has already been developed/ treated	10	Contiguous to previously treated watershed & contiguity within the micro watersheds in the project (10)	Contiguity within the micro watersheds in the project but non contiguous to previously treated watershed (5)	Neither contiguous to previously treated watershed nor contiguity within the micro watersheds in the project	

				(0)	
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 micro watersheds in cluster (10)	2 to 4 micro watersheds in cluster (5)	
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 micro watersheds in cluster (10)	2 to 3 micro watersheds in cluster (5)	
	150	150	90	41	2.5

Problems identified and prioritized during the transact walk and PRA exercises in all villages of the project area were pooled and a list of nine problems representing the whole watershed was prepared. Problems were ranked as per their total weightage in these villages.

PROBLEM IDENTIFICATION AND PRIORITIZATION FOR WATERSHED

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

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

SWOT analysis of the watershed

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

5. Table -1.4: WATERSHED INFORMATION

Name Of the Project	No. of water sheds to be treated	Watershed Code	Watershed regime/type/order
IWMP-III, Mirzapur	18	2A7D7i2a, 2A7D7e1a, 2A7D7e1b, 2A7D7i3b, 2A7D7e1f, 2A7D7o1d, 2A7D7i3a, 2A7D7i2c, 2A7D7i3d, 2A7D7g2b, 2A7D7g2d, 2A7D7g2c, 2A7D7g2e, 2A7D7g1c, 2A7D7g2a, 2A7D7i1d, 2A7D7g1a, 2A7D7m2	MicroWatershed

The watershed falls under the semi arid region of Tropical climate. The average annual rain fall is 988 mm. Most of the rainfall (about 90 %) is received during July to September. The intensity of Rainfall is moderate to high. The Temperature ranges from as high as 46.6°c in the month of May – June to as low as 3.3°c in December - January.

6. OTHER DEVELOPMENTAL PROJECTS/SCHEMES RUNNING IN THE VILLAGES:

These villages of the project area being very backward therefore have been on top priority for a number of developmental projects. These programmes are Swarnajayanti Gram Swarojgar Yojana (SGSY) and Indira Awas Yojana (IAY). Integrated Watershed Management Programme in other areas of the district is under operation in the department of Agriculture DPAP Programme is also running in the project area.

DETAILS ABOUT ONGOING DEVELOPMENT PROGRAMME

Sr. No.	Name of Programme	Impleme-nting agency	Objectives of the programme	Year of Commencement	Villages covered	Project Cost
1	Swarnajayanti Gram Swarojgar Yojana (SGSY)	DRDA	Farmulation of groups for weaker section of the BC/SC	On going	All the villages of the project area	-
2	Indira Awas Yojana (IAY)	DRDA	Provide low cast houses to the weaker section SC/ST	On going	All the villages of the project area	-
3	Drought Prone Area Programme (DPAP)	B.S.A DOLR	To improvement of environmental condition of the watershed	1995 onwords	-	-

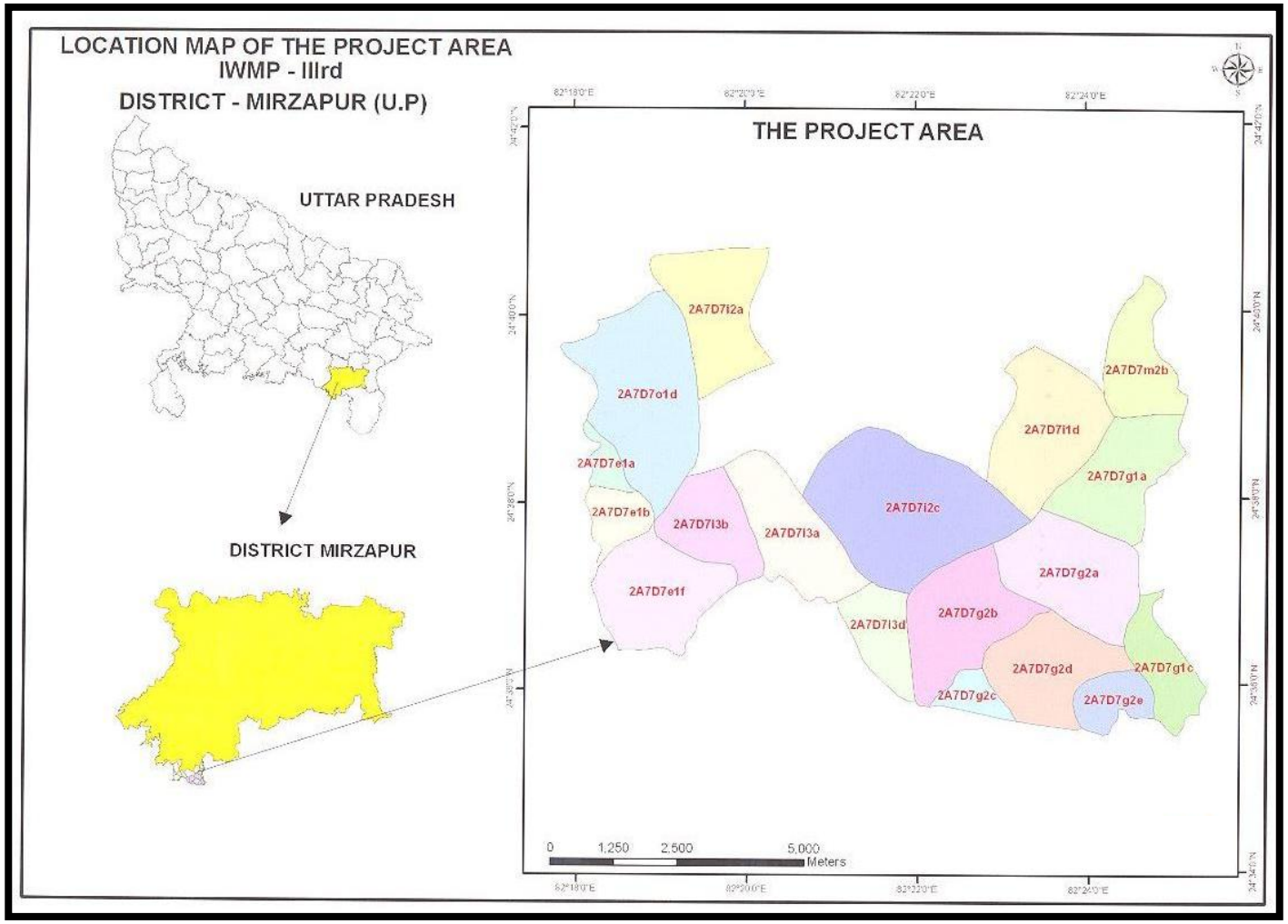
CHAPTER – 2

GENERAL DESCRIPTION OF PROJECT AREA

1. LOCATION

The IWMP 3rd Mirzapur in Hallia block of Mirzapur district (U.P.) is 46 Km away from NH-7 (Mirzapur-Rewa Road) and about 76 km from Mirzapur. The watershed IWMP IIIrd lies between $82^0$18’ to $82^0$26’ E longitude and $24^0$35’ to $24^0$41’N latitude.

LOCATION MAP OF THE PROJECT AREA



2. AREA

The project is a cluster of Eighteen (18) micro- watersheds with code No. 2A7D7i2a, 2A7D7e1a, 2A7D7e1b, 2A7D7i3b, 2A7D7e1f, 2A7D7o1d, 2A7D7i3a, 2A7D7i2c, 2A7D7i3d, 2A7D7g2b, 2A7D7g2d, 2A7D7g2c, 2A7D7g2e, 2A7D7g1c, 2A7D7g2a, 2A7D7i1d, 2A7D7g1a, 2A7D7m2, having an area of 6518.00 ha out of which 4573.00 ha, has been undertaken to be treated under Integrated Watershed Management Programme (IWMP) starting year 2010-2011. Elevation ranges from 192 to 295 m above the mean sea level

Altogether twenty four villages namely Mudpeli, Gajaria, Manigarha, Dewari, Baroha, Parisa Mudpeli, Tita, Patpara, Jharha, Mahokhar, Vyoguna, Gaurva, Parisa khurd, Karaoundia, Jhagraha, Paudi Rampur, Banzari Khurd, Surajgarh, Harbara, Baraya, Pidaria, Fhuliyari, Chaura, Khajurahat are located in the watershed.

Table – 2.1: LANDUSE PATTERN OF THE PROJECT AREA

S. No	Name of District	No. of Micro-watershed	No. of Villages	Geographical Area (ha)	Rainfed Area (ha)	Wasteland	Land under agricultural use (ha)	Plantation (ha)
1	Mirzapur	18	24	6826.00	4678.00	1437.46	4911.59	7.68

3. AGRO-CLIMATE CONDITIONS

The Agro-Climate Condition of the project area including the Agro-Climate Zone of Vindhyan. The soil type, rainfall, major crops etc., of Mirzapur district is briefly described below:

Table – 2.2 : DETAILS OF AGRO-CLIMATE CONDITIONS

S. No.	Name of Project	Name of Agro-climate Zone covered	Area (Ha)	No. of the Villages	Major Soil Type (Ha)		Topography	Average Rainfall (mm)	Major crops	
					Type	Area (ha)			Name	Area (ha)

1	IWMP -III	Vindhyan	4678.00	24	Laterite, Alluvial Soil	3975.00	Undulating with	820 mm	Barley, Wheat, Gram, Maize, Jowar, Arhar	3651.00

4. PHYSIOGRAPHY

The watershed is located in the mid of Vindhyan mountainous terrain having precipitous slopes and drains into the river Ganga through main Belan, Adwa, Adh Nadi, Kehnjua, Samarmara & Hath Bandha Nala (Hath Bandha> Kehnjua> Adwa > Belan Nadi> Ganga), (Samarmara >Adh> Adwa>Belan> Ganga), (Ghugua Nala > Kehanjua Nadi> Adwa Nadi> Belan> Ganga) & (Samarmara Nala>Adh nadi>Adwa> Belan> Ganga). The top of the watershed exhibits extremely precipitous and manifesting moderate to severe erosion class. The lower portion of the watershed has moderate slopes. At the outlet of the watershed small gullies are noticed, covered with sparse vegetation. Total 147 (1st order -119 numbers, 2nd order- 22, 3rd order-3 & 4th Order 3) numbers of streams of different orders are found in the watershed, with total stream length of 127 Km. Stream characteristics of the watershed are presented as below.

STREAMS OF THE IWMP-IIIrd MIRZAPUR

Stream Order	Number of Stream	Stream Length(Km)
Steam Order No. 1	119	86.00
Steam Order No. 2	22	26.50
Steam Order No. 3	3	6.00
Steam Order No. 4	3	8.50

Table - 2.3: ELEVATION RANGE, LONGITUDE LATITUDE, RELIEF HEIGHT DIFFERENCE ETC,

Location of Watershed						Elevation in the Watershed: From MSL (Meter)		
District	Mandal	Gram Panchayat (s)	Habitations	Longitude	Latitude	Highest	Lowest	Relief Height Difference
Mirzapur	Vindhyachal	Gajariya, Manigarha **MWS Code No.** - 2A7D7i2a	Mudpeli, Gajariya, Devari, Manigarha	$82^0$18'52.58" to $82^0$20'20.272" E	$24^0$39'5.396" to $24^0$40'42.543" N	238	192	46 M
		Manigarha **MWS Code No.** - 2A7D7e1a	Magraha, Manigarha	$82^0$18'5.688" to $82^0$18'44.511" E	$24^0$38'6.453" to $24^0$38'52.886" N	288	210	78 M
		Manigarha **MWS Code No.** - 2A7D7e1b	Magraha, Manigarha	$82^0$18'6.957" to $82^0$18'55.919" E	$24^0$37'18.28" to $24^0$38'10.268" N	290	217	73 M
		Manigarha, Badauha **MWS Code No.** - 2A7D7i3b	Manigarha, Badauha	$82^0$18'55.946" to $82^0$20'12.74" E	$24^0$37'5.556" to $24^0$38'22.83" N	280	225	55 M
		Manigarha **MWS Code No.** - 2A7D7e1f	Magraha, Manigarha	$82^0$18'10.566" to $82^0$19'54.171" E	$24^0$36'20.501" to $24^0$37'47.756" N	290	216	74 M
		Gajariya, Manigarha **MWS Code No.** - 2A7D7o1d	Mudpeli, Manigarha	$82^0$17'49.981" to $82^0$19'27.236" E	$24^0$37'48.377" to $24^0$40'15.191" N	295	203	92 M
		Manigarha, Badauha, Mahokhar **MWS Code No.** - 2A7D7i3a	Manigarha, Badauha, Parsiya Mudpeli	$82^0$19'44.325" to $82^0$21'28.312" E	$24^0$36'53.366" to $24^0$38'33.214" N	269	222	47 M
		Pholiyari, Badauha, Mahokhar, Baraiya, Gaurwa **MWS Code No.** -	Teeta, Patpara, Badauha, Jharna, Parsiya Mudpeli, Mahokhar, Byoguna, Gaurwa, Parsiya	$82^0$20'39.766" to $82^0$23'20.567" E	$24^0$27'0.087" to $24^0$38'47.994" N	276	212	64 M

		2A7D7i2c	Khurd					
		Mahokhar, Gaurwa **MWS Code No. -** 2A7D7i3d	Parsiya Mudpeli, Gaurwa, Parsiya Khurd	$82^0$21'3.872" to $82^0$21'54.381" E	$24^0$35'50.534" to $24^0$37'7.742" N	286	244	42 M
		Mahokhar, Gaurwa, Baraiyam **MWS Code No. -** 2A7D7g2b	Mahokhar, Gaurwa, Karundiya, Jhagraha, Parsiya Khurd, Paudi Rampur, Banjari Khurd	$82^0$21'52.628" to $82^0$23'34.245" E	$24^0$35'47.349" to $24^0$37'31.75" N	286	251	33 M
		Baraiya, Gaurwa **MWS Code No. -** 2A7D7g2d	Karundiya, Suraj Garh, Paudi Rampur, Banjari Khurd	$82^0$22'45.568" to $82^0$24'33.783" E	$24^0$35'31.83" to $24^0$36'49.838" N	281	248	33 M
		Gaurwa **MWS Code No. -** 2A7D7g2c	Gaurwa, Paudi Rampur, Banjari Khurd	$82^0$22'7.819" to $82^0$23'9.761" E	$24^0$35'37.65" to $24^0$36'11.951" N	285	286	19 M
		Gaurwa **MWS Code No. -** 2A7D7g2e	Suraj Garh, Banjari Khurd	$82^0$23'49.246" to $82^0$24'45.85" E	$24^0$35'28.401" to $24^0$36'11.164" N	285	254	31 M
		Gaurwa, Baraiya **MWS Code No. -** 2A7D7g1c	Suraj Garh, Harbara	$82^0$24'25.468" to $82^0$25'23.059" E	$24^0$35'27.736" to $24^0$37'1.786" N	298	242	56 M
		Mahokhar, Baraiya, Gaurwa **MWS Code No. -** 2A7D7g2a	Mahokhar, Byoguna, Baraiya, Karaundiya, Jhagraha, Suraj Garh	$82^0$22'53.294" to $82^0$24'36.011" E	$24^0$36'25.387" to $24^0$37'54.218" N	269	245	24 M
		Pholiyari, Gaurwa, Baraiya **MWS Code No. -** 2A7D7i1d	Pholiyari, Chaura, Patpara, Pidariya, Khajurahat, Byoguna	$82^0$22'49.224" to $82^0$24'19.505" E	$24^0$37'46.539" to $24^0$39'38.557" N	263	226	37 M
		Baraiya, Gaurwa **MWS Code No. -** 2A7D7g1a	Harbara, Pindariya, Byoguna, Baraiya	$82^0$23'27.151" to $82^0$25'9.226" E	$24^0$37'29.877" to $24^0$38'55.101" N	265	206	59 M
		Gaurwa **MWS Code No. -** 2A7D7m2b	Chaura, Pindariya	$82^0$24'12.839" to $82^0$25'10.497" E	$24^0$38'52.28" to $24^0$40'23.792" N	257	195	62 M

5. SLOPE ANALYSIS

The Project area has an uneven terrain with higher elevations on the south to South-West side of the watershed. Since slope is the most important terrain characteristic and plays a vital role in geomorphological and runoff processes, soil erosion and land use planning, it is very important to have an understanding of the spatial distribution for the development and management of both land and water resources. The general slope of the watershed is towards south - East. In the present study Seven (7) Slope classes were identified through the analysis of Aster Digital Elevation Model. One such map of Slope of the watershed is shown in Annexure Map.

6. CLIMATE

The watershed comes under the semi-arid region having temperate climate. The average annual rainfall is 822 mm. Most of the annual rainfall (about 90%) is received during the rainy season (July to September) accompanied with high intensity storm. The temperature in the area rarely goes up to 48^{o} C in the May-June to as low as 4^{0}C during December-January.

Climatic condition of last five year

Sr. No.	Year	Average Rainfall (mm)	Highest Rainfall intensity in a day/mm)	Temperature (C)		Relative humidity %
			Max.	Min.	Max.	Min.
1	2007 - 2008	1393.1	-	3.5	42.4	96
2	2008 -2009	1291	-	4.2	43.3	90
3	2009-2010	1172.5	-	3.8	42.6	94
4	2010-2011	1200	-	3.7	41.2	89

7. WATERSHED CHARACTERISTICS

SHAPE AND SIZE

The shape of the watershed (IWMP IIIrd, Mirzapur) is elongated type. Maximum length and width of the watershed is 11750 m and 9000 m respectively with the length: width ratio of 1.30:1

SHAPE AND SIZE OF IWMP IIIrd, MIRZAPUR

S.No.	Micro Watershed Code No.	Micro Watershed Name	Micro Watershed Area (ha.)	Shape of Micro Watershed	Approx size in Meter		Ratio Length : Width
					Length	Width	
1.	2A7D7i2a	Gajaria	421.35	Quadrilateral	2625	2375	1.10 : 1
2.	2A7D7e1a	Manigarha-I	64.65	Triangular	1250	750	1.67 : 1
3.	2A7D7e1b	Manigarha-II	127.27	Quadrilateral	1250	1000	1.25 : 1
4.	2A7D7i3b	Manigarha-III	286.64	Elongated	2000	1150	1.74 : 1
5.	2A7D7e1f	Manigarha-VI	450.56	Elongated	2000	1900	1.05 : 1
6.	2A7D7o1d	Manigarha-V	709.62	Elongated	4250	1275	2.26 : 1
7.	2A7D7i3a	Badoha	406.08	Quadrilateral	2850	1150	2.48 : 1
8.	2A7D7i2c	Mahokhar	854.44	Quadrilateral	3250	2750	1.18 : 1
9.	2A7D7i3d	Parsia Khurda	212.88	Triangular	1750	1000	1.75 : 1
10.	2A7D7g2b	Gaurwa	464.35	Quadrilateral	2500	1800	1.39 : 1

11.	2A7D7g2d	Banjari Khurd-I	400.17	Elongated	2000	1750	1.14 : 1
12.	2A7D7g2c	Banjari Khurd-II	87.48	Triangular	1125	750	1.15 : 1
13.	2A7D7g2e	Surajgarh-I	143.70	Elongated	1250	1000	1.25 : 1
14.	2A7D7g1c	Surajgarh-II	216.64	Elongated	2500	900	2.78 : 1
15.	2A7D7g2a	Karaundia	491.18	Quadrilateral	2300	1800	1.28 : 1
16.	2A7D7i1d	Pindaria-I	509.45	Quadrilateral	2875	1500	1.92 : 1
17.	2A7D7g1a	Pindaria-II	391.20	Quadrilateral	2250	1550	1.45 : 1
18.	2A7D7m2b	Pindaria-III	280.34	Triangular	2625	1000	2.62 : 1
	Total :		**6826.00**	-	-	-	-

8. GEOMORPHOLOGY AND SOILS

Geomorphology:

The watershed represents the typical Vindhyan terrain which consists of characteristic lithology mainly composed of plutonic rocks with sand stone etc. showing faults and fissures and various stages of weathering in the upper and middle reaches. This makes the area highly prone to soil erosion.

Soils:

In the watershed four kind of soils namely, Sigwa or red sandy-loam (50%) Dader (black clay soil 20%), Gurmuta or Lateritic silt (10%) and Lateric (Lalmitti 20%) are found. Main crops are oilseeds and pulses which

are grown in soils having poor fertility. The soils of the watershed having low content of organic matter, poor in fertility due to low content of nitrogen, phosphorous, potash as well as micronutrients.

Table - 2.5 : DETAILS OF SOIL EROSION IN THE PROJECT AREA

1	2	3	4	5
Cause	Type of erosion	Area affected (ha)	Run off (mm/ year)	Average soil loss (Tonnes/ ha/ year)
Water erosion				
a	Sheet	950.00	630	16.00-20.00
b	Rill	1750.00		
c	Gully	1978.00		
Sub-Total		4678.00	630	16.00-20.00
Wind erosion		NA	-	-

9. HUMIDITY

During the monsoon and the post monsoon seasons the relative humidity are high ranging between 70 and 85 per cent. In the winter months humidity decreases and in summer the air is comparatively drier.

10. VEGETATION

(a) Natural Vegetation:

Natural vegetation of the watershed is medium to poor. The forest vegetation is predominant with palas, followed by Bamboo, tendu patta, mahua etc. There are occasional occurrence of neem plants (*Azadirachta indica*) and Shisham (*Dalbergia sissoo*) with no grass land in the watershed but bushy shrubs can be seen throughout watershed.

(b) Horticulture:

Though no organized orchards are present in the watershed, homestead planting of fruit trees of mango, guava, bael, sharifa, karonda etc. has been practiced by farmers.

(c) Agro-forestry:

The agriculture fields of the villages do not have any kind of forest or horticultural plantation. At some places isolated trees of Mahua, subabool etc. can be seen, whose frequency is one tree per running length of 200 mtr.

CHAPTER-3

BASELINE SURVEY

A DETAILED BASELINE SURVEY OF THE PROJECT AREA WAS CONDUCTED TO THE STUDY MAJOR SOCIO-ECONOMIC AND BIOPHYSICAL CONSTRAINTS TO SUSTAINABLE CROP PRODUCTION. THE FOLLOWING INFORMATION WAS COLLECTED

1. SOCIO-ECONOMIC ANALYSIS OF THE PROJECT

In the proposed watershed management plan of proper blending of bio- engineering measures will be applied. Based 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 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.

2. ECONOMIC ANALYSIS

Economic analysis of the project is carried out by taking direct benefits and costs, considering 30 year project life at 10% discount rate. For the purpose of economic analysis, whole watershed development plan is divided into four sectors namely agriculture (rainfed and irrigated), pure horticulture, agro-horticulture and silvi pastoral (Silvi-Pastoral + sericulture). Net present value (NPV), Benefit Cost Ratio (BCR) , Payback Period (PBR) and internal rate of return (IRR) criteria is employed to judge the economic efficiency of each enterprise, sector and project as a whole.

3. DEMOGRAPHIC INFORMATION

The total population of Twenty Four villages of the watershed is 18896 with average family size of 5-6 persons. Total SC population is 9370 with total SC male 4887 and female 4483.

Table- 3.1: HUMAN POPULATION OF THE PROJECT AREA IWMP-III MIRZAPUR, U.P.

S. No.	Name of Village	Total No. of House Hold	Total Population	Male	Female	Total SC Population	SC Male	SC Female	% of SC/ST
1.	Mudpeli	337	1851	995	856	952	494	458	50.34
2.	Gajariya	180	952	510	442	456	244	212	47.9
3.	Dewari	175	915	465	450	255	129	126	27.87
4.	Manigarha	716	3584	1892	1692	1379	699	680	38.48
5.	Baroha	290	1450	762	688	764	394	370	52.69
6.	Parsiya Mudpeli	289	1446	745	701	665	333	332	45.99
7.	Teeta	115	553	285	268	205	105	100	37.07
8.	Patpara	164	819	450	369	428	226	202	52.26
9.	Jharna	30	142	82	60	91	47	44	64.08
10.	Mahokhar	37	183	103	80	177	96	81	96.72
11.	Vouguna	90	450	249	201	205	106	99	45.56
12.	Gaurwa	129	643	344	299	217	116	101	33.75
13.	Parsiya Khurd	106	529	314	215	140	75	65	26.47
14.	Karoundiya	74	369	225	144	99	51	48	26.83
15.	Jhagraha	51	231	137	94	194	102	92	83.98
16.	Paudi Rampur	58	285	170	115	102	55	47	35.79

17.	Banjari Khurd	10	52	31	21	18	10	18	34.62
18.	Suraj Garh	103	519	3069	210	382	202	180	73.60
19.	Harbara	65	327	194	133	232	122	110	70.95
20.	Baraya	156	774	425	349	530	270	260	68.48
21.	Pindariya	142	705	397	308	430	229	201	60.99
22.	Phuliyari	359	1799	1000	799	1300	698	602	72.26
23.	Chaura	61	303	168	135	149	84	65	49.17
24.	Khajurahat	4	15	9	6	0	-	-	0%
	Total :	**3737**	**18896**	**10261**	**8635**	**9370**	**4887**	**4483**	

4. MIGRATION STATUS

The detail of migration status in the project area is given below.

Table - 3.2 : Migration Status

No. of Villages	No. of Persons migrating	No. of days per year of migration	Reason for migration	Expected reduction in no of persons migrating
24	279	165	Poverty & better employment	75%

CONCLUSION

The land capability classification of the watershed provides reasonable good information with regard to capability of soil that could be used for agriculture, agri-horticulture, and silvi-culture and pasture development. The majority of land form is coming under class V, which give an insight of less agriculture production potential of these watersheds. The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like contour bunding *in-situ* moisture conservation practices. In class V & VI submergence bund, marginal and peripheral bund are planned and in class IV, gully plugging structures, earthen check dam and water harvesting bunds are proposed with permanent Pucca Drop Spill Way structures.

5. SOIL AND LAND CAPABILITY CLASSIFICATION:

Soil Morphology: The selected area is situated in the southern part of District-Mirzapur. The entire watershed is topographically divided into four major land forms. Accordingly, the soils of watershed have been grouped in the four major categories.

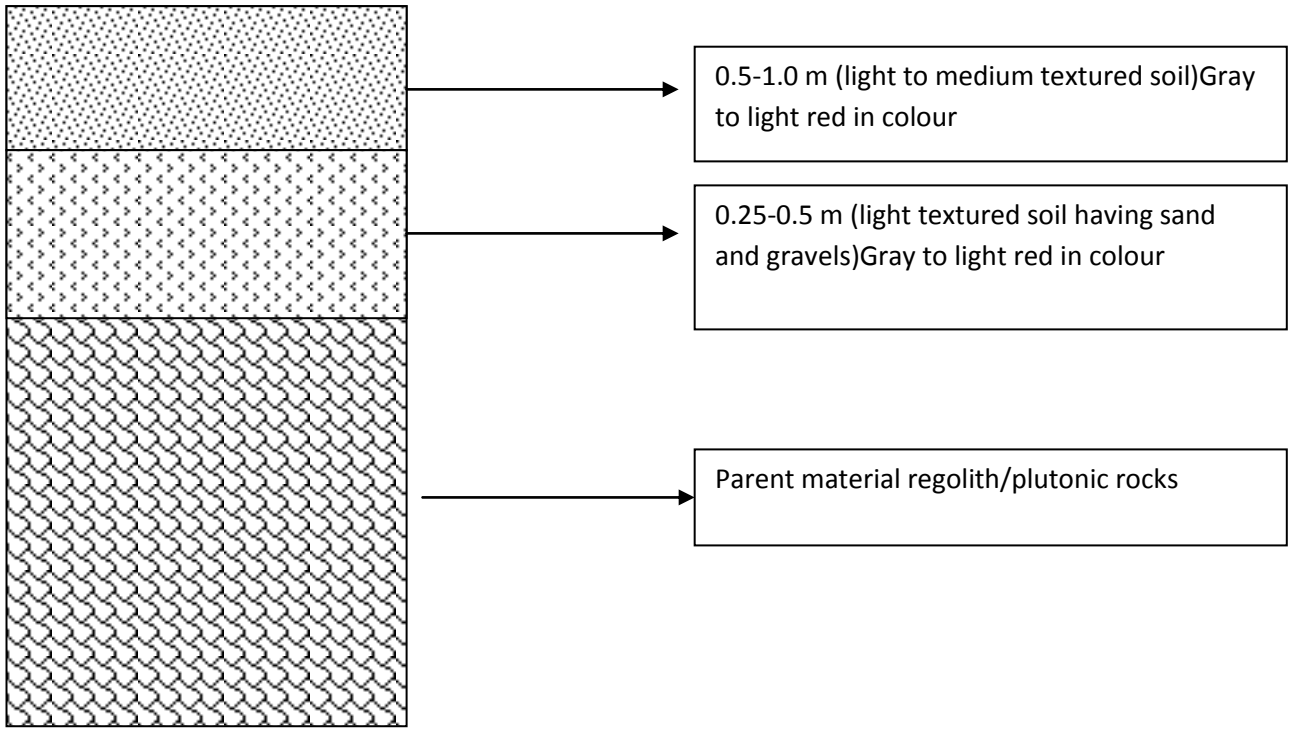
a) Moderate sloppy land

b) Steep sloppy land

c) Ravinous land.

d) Rocky soil

Soil profile- A representative soil profile



SOIL CHARACTERISTICS AND FERTILITY STATUS:

Fertility status of four kind of soil mentioned above in ranges between medium to poor. There is scarcity of essential nutrients and micronutrients due to continuous soil erosion. Demonstration of pulses and oilseeds crops in Kharif and Rabi seasons and application of organic manures have been proposed under agriculture production activity so that organic matter content and fertility status of soil can be enhanced.

6. LAND CAPABILITY CLASSIFICATION (LCC)

Land capability classification is an interpretative grouping of lands made to show their relative suitabilities for various crops, pasture, forestry and wildlife and recreation. The inherent characteristics, limitations and risk of damage to the soils and also their response to manage-ment are taken into consideration for classifying them under various land capability classes.

Land capability class is the broadest category in the land capability classification system. Class codes I, II, III, IV, V, VI, VII, and VIII are used to represent arable and non-arable land as defined below.

Class I lands have slight limitations that restrict their use.

Class II lands have moderate limitations that reduce the choice of plants or require Land capability classification is an interpretative grouping of lands made to show their relative suitabilities for various crops, pasture, forestry and wildlife and recreation. The inherent characteristics, limitations and risk of damage to the soils and also their response to management are taken into consideration for classifying them under various land capability classes.

Land capability class is the broadest category in the land capability classification system. Class codes I, II, III, IV, V, VI, VII, and VIII are used to represent arable and non-arable land as defined below.

Class I lands have slight limitations that restrict their use.

Class II lands have moderate limitations that reduce the choice of plants or require moderate conservation practices

Class III lands have severe limitations that reduce the choice of plants or require special conservation practices, or both.

Class IV lands have very severe limitations that restrict the choice of plants or require very careful management, or both.

Classes V to VII cover lands that are unsuitable for agriculture but suitable for pasture.

Class VIII lands are suitable neither for agriculture nor for forestry and are best left for wildlife and recreation.

Land capability classes are divided into land capability subclasses, groupings of soils that have the same kind of limitations for agricultural use. Subclass codes used are e, w, s and c.

'e' represents susceptibility to erosion by water or wind,

'w' represents drainage difficulties including wetness or overflow,

's' represents soil limitations for plant growth and

'c' represents climatic limitations.

Land capability subclasses are subdivided into land capability units that are groupings of one or more individual soil map units having similar limitations or hazards. They are denoted by appending a numeral from 0 to 9 to the land capability subclass to specify the kind of limitation. The specific limitations are

– Stony or rocky (0),

– Erosion hazard/slope (1),

– Coarse texture (2),

– Fine texture (3),

– Slowly permeable subsoil (4),

Land capability classification(LCC) is crucial for appropriate land use planting consisting of practiced like choice of vegetation /crops, tillage practices, use of scientific method of cultivation and desirous conservation practices, Detailed LCC Survey carried out in the watershed brought out the prevailing LCC classes as I,II,III,IV

7. PRESENT LAND USE IN THE WATERSHED

Spatial information on land use/land cover is a necessary prerequisite in planning, utilizing and management of natural resources. In the current days context of development planning, information on land use/land cover and the changes over a period of time attain prominence because of its primary requirement in all the planning activities. The present watershed have varied land/use land cover categories as shown in table below. One such map of land use/ land cover of the watershed is shown in Annexure Map. The details of the Landuse/Landcover catagories in the project area is given below.

Table 3.3 : MICRO WATERSHED WISE PRESENT LAND USE DETAIL

SL. No.	M.W.S. Code	Agri. Land	Waste Land	Plantation	River	Settlement	Water bodies	Pond	Reservoir	Total
1	2A7D7i2a	331.81	125.00	0.00	12.15	6.39	0.00	0.00	0.00	475.35
2	2A7D7e1a	54.49	14.00	0.00	0.00	0.16	0.00	0.00	0.00	68.44
3	2A7D7e1b	100.10	27.00	0.00	0.00	0.17	0.00	0.00	0.00	127.27
4	2A7D7i3b	232.29	80.00	0.00	0.00	0.96	0.00	0.00	3.39	316.64
5	2A7D7e1f	349.70	100.00	0.00	0.00	0.86	0.00	0.00	0.00	450.56
6	2A7D7o1d	550.00	150.72	0.00	0.00	6.40	2.50	0.00	0.00	709.62
7	2A7D7i3a	350.67	150.00	1.21	0.95	4.80	0.45	0.00	0.00	508.08
8	2A7D7i2c	628.85	190.00	0.00	3.52	9.54	6.77	0.00	15.76	854.44
9	2A7D7i3d	107.85	90.00	0.00	0.00	9.17	0.29	0.00	5.57	212.88
10	2A7D7g2b	348.85	121.00	3.05	0.00	6.18	6.27	0.00	0.00	485.35
11	2A7D7g2d	270.12	105.00	0.00	0.00	2.75	0.00	0.00	23.30	401.17
12	2A7D7g2c	70.48	17.00	0.00	0.00	0.00	0.00	0.00	0.00	87.48

13	2A7D7g2e	100.15	43.00	0.00	0.00	0.16	0.40	0.00	0.00	143.71
14	2A7D7g1c	131.00	80.61	0.00	4.47	0.02	0.54	0.00	0.00	216.64
15	2A7D7g2a	384.00	90.29	1.20	0.00	11.74	3.95	0.00	0.00	491.18
16	2A7D7i1d	450.85	102.00	2.22	0.00	2.41	1.20	0.00	0.77	559.45
17	2A7D7g1a	300.38	89.02	0.00	0.00	1.60	0.21	0.00	0.00	391.40
18	2A7D7m2b	250.00	62.84	0.00	13.50	0.00	0.00	0.00	0.00	326.34
	Total :	**5011.59**	**1487.46**	**7.68**	**34.59**	**63.31**	**22.58**	**0.00**	**48.79**	**6826.00**

Present Landuse/Landcover of the project area

S.N	Landuse	Area (ha)	%
1	Built-up land	63.31	0.92
2	Agricultural Land	5011.59	73.44
3	Water Bodies/River/Ponds etc.	105.96	1.55
4	Plantation	7.68	0.11
5	Waste Land	1637.46	23.98
Total		**6826.00**	**100**

Description

The present LU/LC map has been depicted through the satellite data of January, 2010 (Google). A total no. of 5 major categories of LU/LC has been mapped.

BUILT-UP LAND

All the major settlement areas have been mapped under this category and the total area under category is 63.31 1Hectare which is 0.92 % of the total mapped area. Under this category road network and other built-up area has also been included.

WASTE LAND

Land which is deteriorating for lack of appropriate water and soil on account of natural causes comes under this category. The total area under this category comes about 1637.46 Hectare which is 23.98 % of the total mapped area. The sub categories are like Salt affected land, Gullied/Ravenous Land, Scrub Land etc.

WATER BODIES

This category comprises area with surface water either impounder in the form of ponds, lake & reservoirs. The total area under this category comes about 105.96 Hectare which is 1.55 % of the total mapped area.

AGRICULTRAL LAND

These are the lands primarily used for farming and for production of food; it includes land under the (irrigated and un-irrigated). Areas with standing crop as on the date of satellite overpass. Cropped areas are in varying shape and size in a contiguous and non contiguous pattern. They are widely distributed in different terrains; prominently appear in the irrigated areas irrespective of the source of irrigation. The study area is predominantly paddy producing area being its flatness in 2007-08 maximum production of paddy recorded in this region under the double crop area, sugarcane belt capture 561 Hectare total agriculture land. It is important to know that the project area has maximum **two crop areas** i.e. **Kharif and Rabi**. The average size of the agricultural field is less than 0.5 Hectare. The total area under this category comes about 5011.59 Hectare which is 73.44 % of the total mapped area.

PLANTATION

These areas are separable from crop land especially with the data acquired during rabi/zaid season. Plantations appear with different size and regular and sharp edges indication the presence of a fence around it. Depending on the location, they exhibit a disbursed or contiguous pattern. The total area under this category comes about 7.68 Hectare which is 0.11 % of the total mapped area.

8. AGRICULTURE : CROPS, YIELDS, HORTICULTURE ETC.

Various agriculture land uses in the watershed are extended to diversified land capabilities starting from marginal to good class II^{nd} lands. The watershed distinctly has three types of land i.e. leveled, sloping and degraded and undulating. The water (both for irrigation 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 farmers for watershed.

The agricultural soils in the watershed have diversified texture i.e. clay, silty clay, sand mixed with gravel and loam which are located in patches throughout the watershed. Four types of sandy, loam, Clay, clay loam are the main soil of district-Mirzapur . The heavy soils are almost kept fallow during rainy season. The irrigation water is conveyed in earthen channels and surface irrigation methods following mainly border method of free flooding method of irrigation by farmers in the watershed. The factors substantially reduce the water use efficiency of limited available and valuable irrigation water in the watershed. To test the quality of irrigation water samples of water of each selected village has sent to laboratory for testing.

Rehabitation of waste lands with appropriate drought hardy species like Prosopis ju liflora, introduction of suitable multipurpose tree, promoting agro foresting on agricultural lands with appropriate fruit and forest species, suitable vegetative barriers on sloping lands can of high future value in meeting out not only fire wood and fodder demands in the watershed but also for soil and water conservation, Rehabitation of wasteland and substantial income generation for socio-economic uplift of farmers in the watershed.

One Year Crop Rotation

Single Cropping: Sugarcane Fallow, Paddy

Double Cropping: Sugarcane, wheat, Maize, Potato

Irrigated Agriculture

One Year Crop Rotation: Sugarcane-fallow, Urad/Moong-Vegetables, Paddy-Gram, Paddy-Lentil, Maize-Potato.

9. CROP PRODUCTIVITY

Food crop production is a major land based activity in the watershed. Traditional cultivation practices, coupled with poor quality seeds and long duration crops varieties result in low crop yields. Crops are taken under rainfed as well as irrigated conditions. The yield levels of rainfed crops are particularly very poor. Large variation has been noticed in productivity of wheat (19-25Qu./ha) and rice (12-16 Qu/ha.) under rainfed and irrigation, condition respectively. At present level of rainfed farming. The total produce from Rabi and Kharif crops obtained by a medium size of holding owning family can meet food requirements for upto 6 to 7 months only.

The farmers also do not have suitable cropping systems to deal aberrant weather. Weeds impose considerable constrant in producing of both Kharif and rabi crops under irrigation as well as rain-fed production system. Use of weedicide is rare in the watershed.

The mixed cropping is in practice in limited area with Kharif crops like Sugarcane, Maize+Arhar but it is not only irrational but also unscientific and beset with low productivity. Subsequent rabi crops in general are raised on residual soil moisture under rain-fed production system during past monsoon season. Imbalanced use of fertilizers is common in not only Rabi and Kharif crops but also in rain fed and irrigated production system.

The recommended deep ploughing for enhanced in situ residual soil moisture conservation and higher production is also not followed in the watershed. The shallow ploughing tractors drawn tillage 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 specially with legumes, use of FYM/compost, vermi-compost , biofertilizers , soil and water conservation measures, use of brought up or in situ 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 the watershed.The cropping intensity in the project area is about
135%.

AREA PRODUCTION & PRODUCTIVITY OF KHARIF/RABI SUMMER SEASON CROPS

S. N.	Names of the crop	Current status		Expected Post-Project Status	
		Area (ha)	Productivity (kg/ha)	Area(ha)	Productivity(kg/ ha)
1	Kharif				
	Paddy	2640.00	1150.00	3391.00	1550.00
	Arhar	2161.00	550.00	2701.00	785.00
	Other	1305.00	450.00	1632.00	650.00
	Total	**6106.00**	**-**	**7724.00**	**-**
2	Rabi				
	Wheat	2951.00	950.00	3746.00	1650.00
	Gram	1713.00	650.00	2141.00	850.00
	Other	1332.00	750.00	1667.00	810.00
	Total	**5996.00**	**-**	**7554.00**	**-**
3	Zaid/Other season	-	-	-	-

10. INDIGENOUS TECHNOLOGICAL KNOWLEDGE: (I.T.K.)

Agriculture is an old age occupation which farmers have practiced and improved in their own manner to earn livelihood under the condition of area. The villagers have their traditional village ponds, practice of field bunding, production of Arhar crop on the bunds in paddy area which typically constitute agriculture related ITKs in the watershed. The indigenous farming technology in the watershed is observed to cover a vast spectrum of activities involving tillage, implement crop selection, storage of produce and value condition. Seed drill, seed comfort drills are used with tractor and Nai/chonga with indigenous plough. These ITKs are eco-friendly, cost effective and involve use of local materials with farmers own wisdom. These techniques equip farmers with skills and strength to adopt to the prevailing adverse conditions.

11. HORTICULTURE

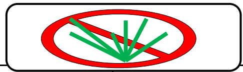
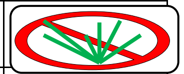
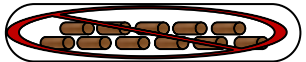
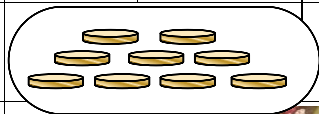
Though no organized orchards are present in the watershed, homestead planting of fruit trees of mango, papaya, banana and guava etc. has been practiced by farmers.

12. AGRO-FORESTRY

The agriculture fields of the village do not have any forest or horticultural plantation. At some places isolated trees of Mahua, Babool, Ber, can be seen, whose frequency is less than one tree per running length of 100 m.

SEASONAL ANALYSIS

Seasonal analysis has done with the help of farmers about rainfall patterns, cultivated crops, employment, income, availability of fuel, fodder, migration, transport and health hazards, etc. with respect to seasonal variation in a year which is shown as below:

Month Item	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Festivals			Holi	Baisakhi			Rakshabandhan			Dashara	Diwali	Guru Parv
Sowing crops/ harvesting			Mustard			Maize, Paddy, Arhar				Wheat		
				Wheat, Arhar					Maize, Paddy			
Disease	Cough & Cold					Gastro Intestinal/ Loose-motion.			Fever			
Purchase/ Expending					☺☺☺☺☺						☺☺☺☺☺☺☺☺☺☺	
Rains												
Fodder Scarcity												
Fuel/ wood scarcity												
Loaning period (required)												
Marriage Period												
Drinking Water Scarcity												
Irrigation Water Scarcity												

13.LAND HOLDING PATTERN

Majority of the watershed farmers are in category of marginal (< 1 ha) and small (1-2 ha). Small land holding are further scattered in different places which makes cultivation very difficult. Size of land holding of the farm families is being given below

The details of the land holding of the farmers in project area is given below.

Table- 3.4: DETAILS OF LAND HOLDING PATTERN IN THE PROJECT AREA

S. No.	Name of the Micro Watershed	Marginal (<1ha)	Small (1-2 ha)	Large (>2 ha)	Total
1.	Gajariya	81	65	17	163
2.	Manigarha-I	14	9	4	27
3.	Manigarha-II	27	18	7	52
4.	Manigarha-III	56	40	17	113
5.	Manigarha-IV	89	62	28	179
6.	Manigarha-V	137	96	42	275
7.	Baroha	81	57	22	160
8.	Mahokhar	161	114	47	322
9.	Parsiya Khurd	40	35	5	80
10.	Gourwa	91	63	26	180
11.	Banjari Khurd-I	75	53	20	148

12.	Banjari Khurd-II	18	14	3	35
13.	Suraj Garh-I	29	21	7	57
14.	Suraj Garh-II	44	31	12	87
15.	Karaundiya	96	67	27	190
16.	Pindariya-I	102	72	27	201
17.	Pindariya-II	79	55	22	156
18.	Pindariya-III	53	36	16	105
	Total :	**1273**	**908**	**349**	**2530**

14. LIVESTOCK POPULATION

Total live stock population of the watershed is 8097. Cow is preferred as milch animal but milk yield is very low. Goats are the other source of milk production but kept mainly for the meat purposes. Backyard poultry rearing is common among marginal and farmers. The village-wise details of livestock population is given in table.

Table – 3.5: LIVE STOCK POPULATION UNDER WATERSHED VILLAGES

S.N.	Name of Village	Buffaloes	Cows	Bullocks	Goat	Sheep	Total
1	Mudpeli	90	171	42	30	-	333
2	Gajariya	60	120	30	20	-	230
3	Dewari	40	190	70	80	35	415
4	Manigarha	170	852	78	400	208	1708
5	Baroha	67	284	70	201	80	702

6	Parsiya Mudpeli	69	282	71	200	79	701
7	Teeta	30	108	30	12	-	180
8	Patpara	30	101	20	100	49	300
9	Jharna	10	40	20	-	-	70
10	Mahokhar	10	50	30	-	-	90
11	Vouguna	32	63	18	50	63	226
12	Gaurwa	25	102	35	70	70	302
13	Parsiya Khurd	30	118	35	69	-	252
14	Karoundiya	20	70	15	-	46	151
15	Jhagraha	31	60	32	40	-	163
16	Paudi Rampur	25	80	30	6	-	141
17	Banjari Khurd	4	15	5	-	-	24
18	Suraj Garh	30	90	30	40	51	241
19	Harbara	42	60	10	20	20	152
20	Baraya	89	190	30	49	-	358
21	Pindariya	81	195	14	60	-	350
22	Phuliyari	100	560	102	43	5	810
23	Chaura	30	60	20	30	-	140
24	Khajurahat	2	3	2	1	-	8
	Total :	**1117**	**3864**	**839**	**1521**	**706**	**8047**

15. LIVELIHOOD ACTIVITIES

Income generating activities i.e. goatery, poultry farming, bee keeping, livestock development activities, chalk and candle making, food processing etc will promoted through self help groups for landless and marginal farmers in the villages of watershed through the involvement of Krishi Vigyan Kendra, Barkacha, Mirzapur. Training of farmers and farm women's, rural youth and field level workers for self employment will be given at Krishi Vigyan Kendra, Barkacha, Mirzapur. To improve water use efficiency sprinkler irrigation set, and pump set as well as Hasti pipe have been proposed to be demonstrated and distributed among the SHGs and UGs of the watershed. Since sesame is one of the major crops in the watershed so therefore it has been planned to installation of an oil mill in the area. Financial outlay proposed for this component is 10% (Rs. 81.936 lacs) of the total project cost.

SUMMARY OF LIVELIHOOD

No. of Villages	Existing livelihood activities	Possible livelihood intervention under the project	Current status of migration(No. of people)	Main reason of migration
24	AgricultureAgricultural, Animal Husbandary Labour, Labour in Mis. Activities	Agriculture, Diary, Poultry Farming, Honey Bee Farming, Plants Nursery, Sewing, Compost Warning Works	40	Poverty & For better employment

16. INFRASTRUCTURE AND SOCIAL FEATURES:

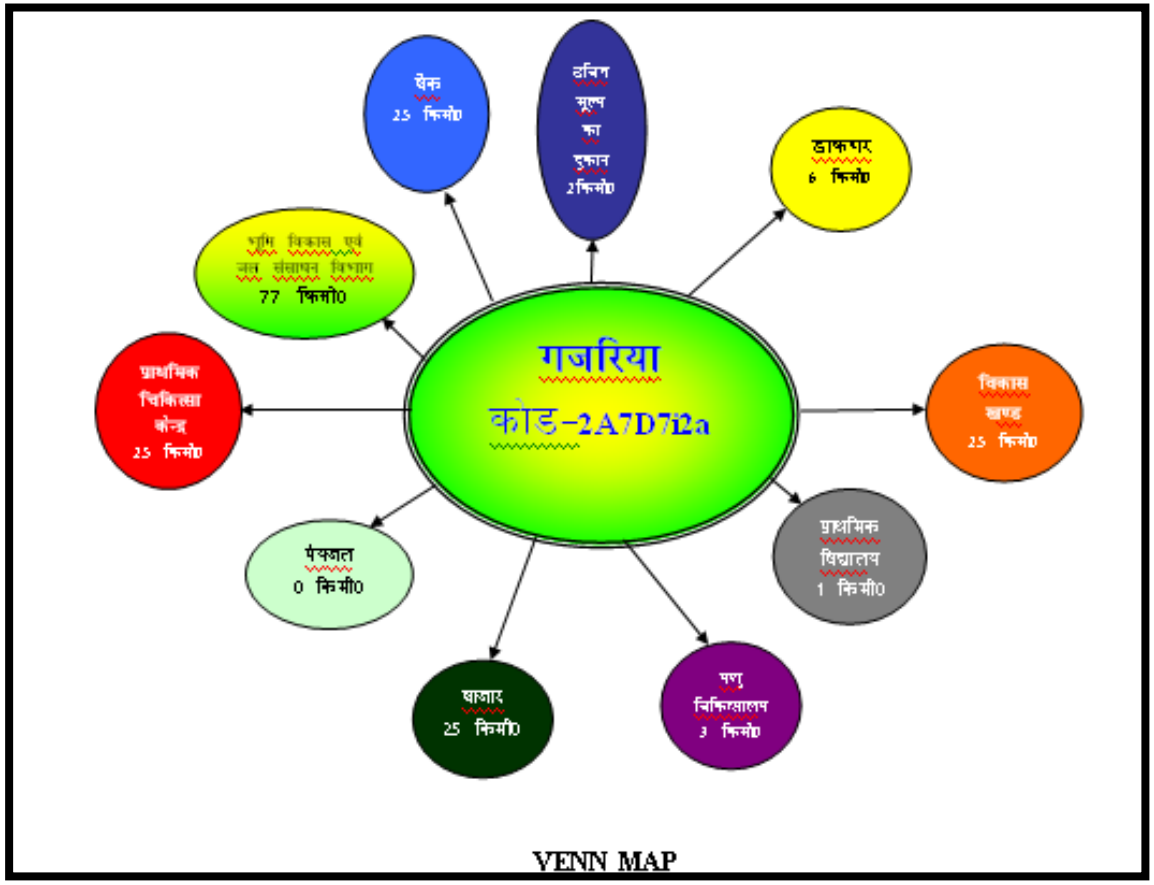
Importance of Development Institution:

In the Venn diagram, farmer's perception was recorded for importance and role of different development institutions is 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 watershed villages are being attached here with.

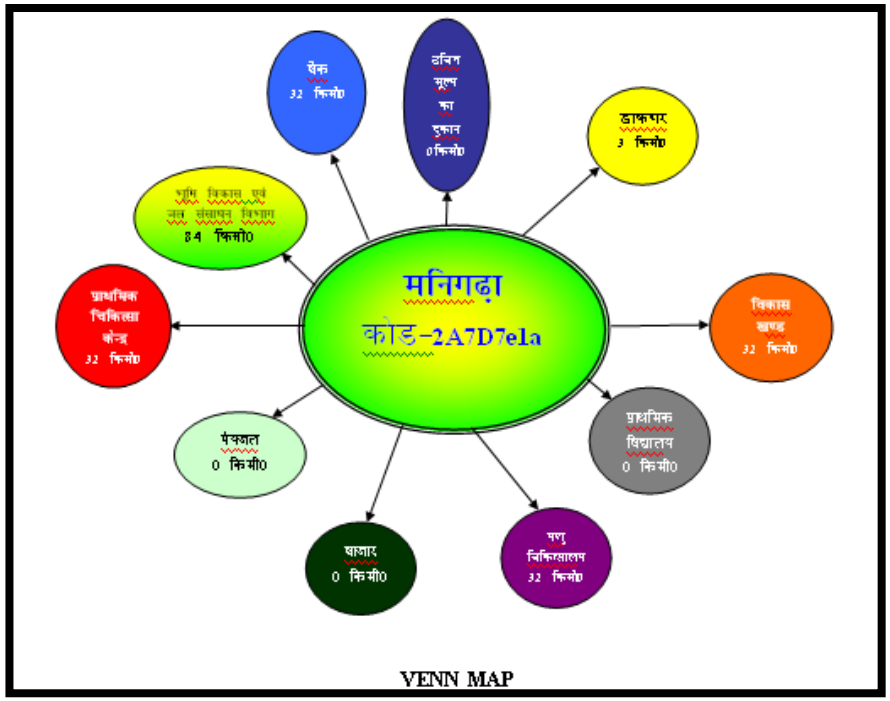
VENN MAP:

Almost all the villages have education facilities up to the primary school; none of the village in the watershed has intermediate college. Intermediate college existing in near by market Hallia. Most of villages in the watershed is electrified and have the radio and telephonic connection through mobile phone. Nearest market is block headquarter Hallia (6 km) and district headquarter Mirzapur (65 km). Details of facilities available in villages have been depicted in venn map.

Table – 3.6 : DETAILS OF FACILITIES AVAILABLE IN VILLAGES HAVE BEEN DEPICTED IN VENN MAP.

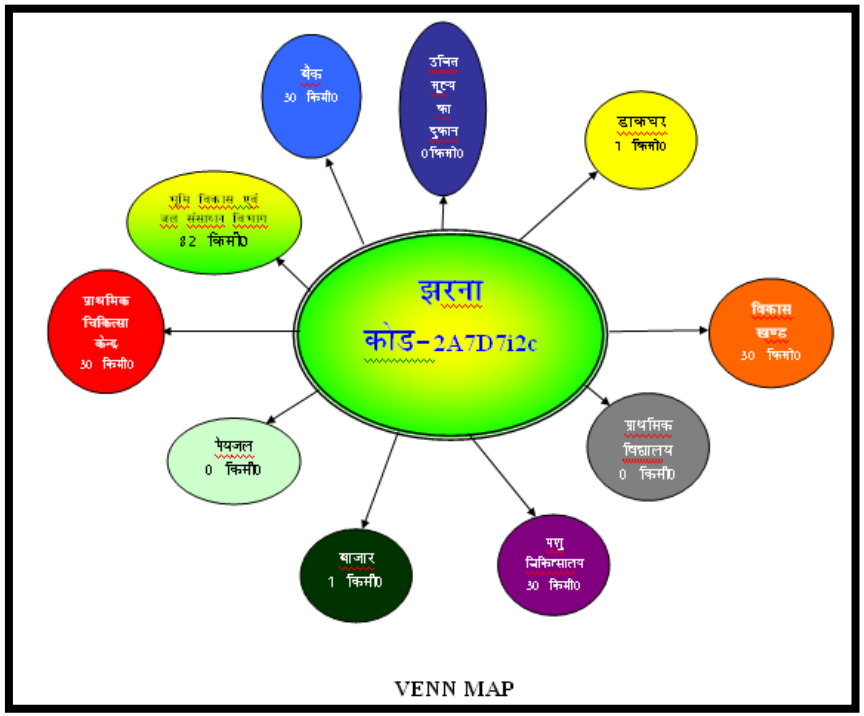


VENN MAP



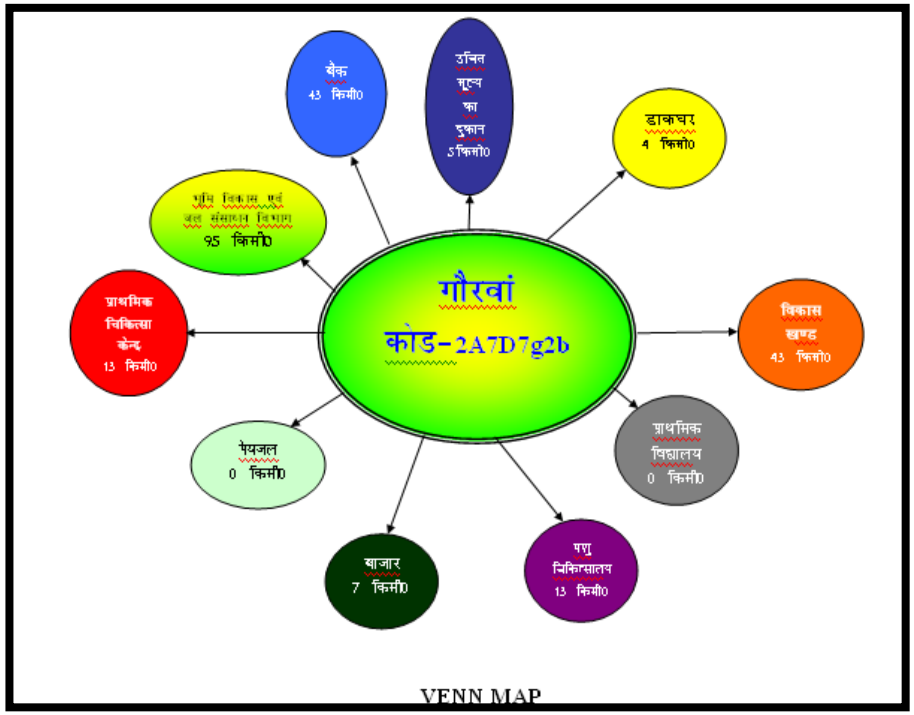
VENN MAP

VENN MAP



VENN MAP

VENN MAP



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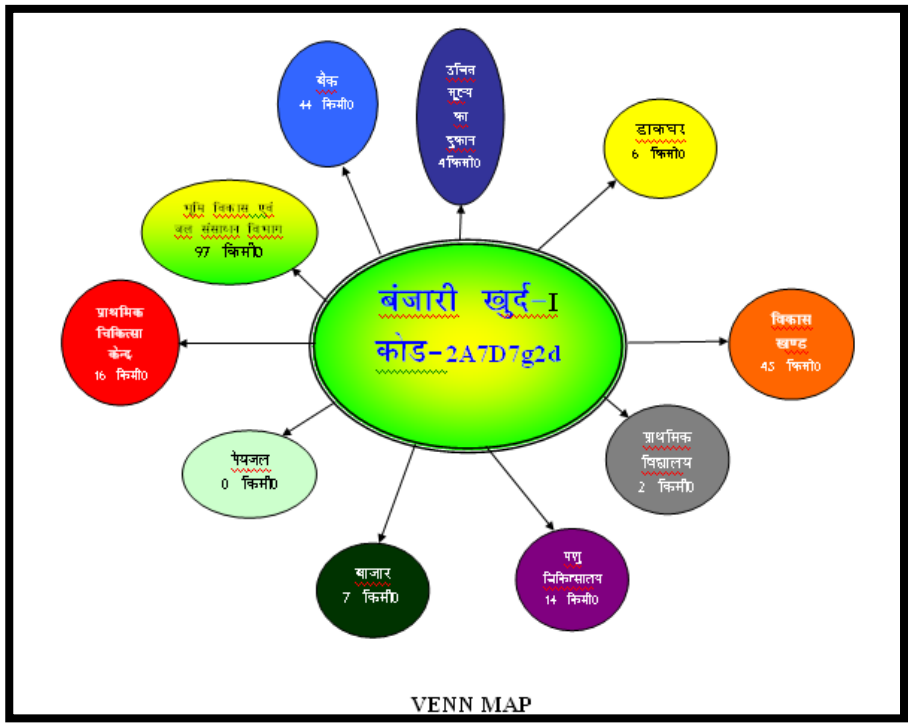

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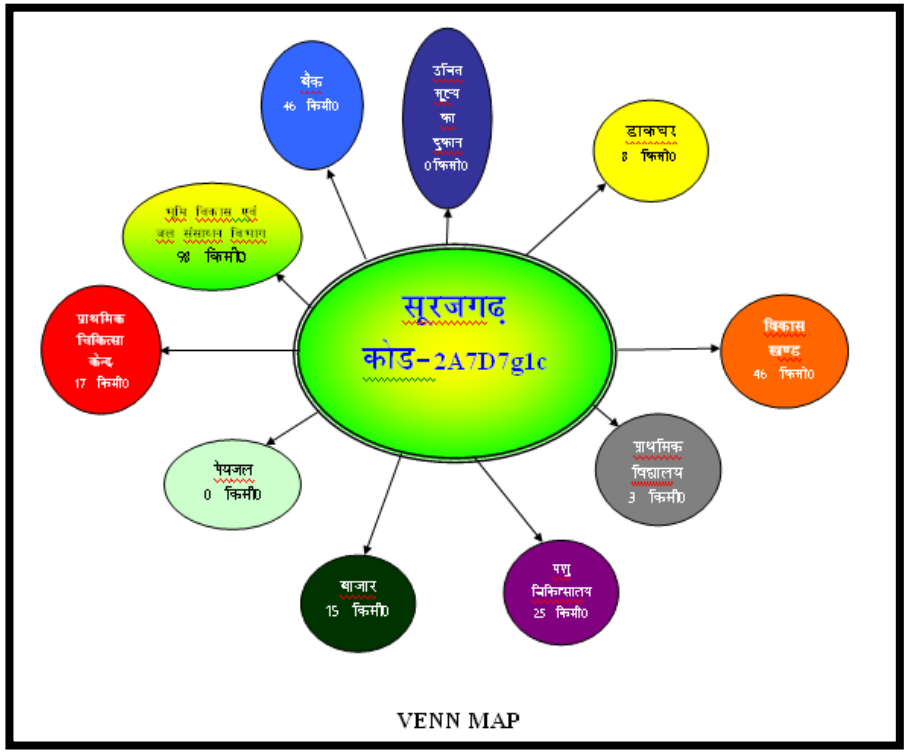

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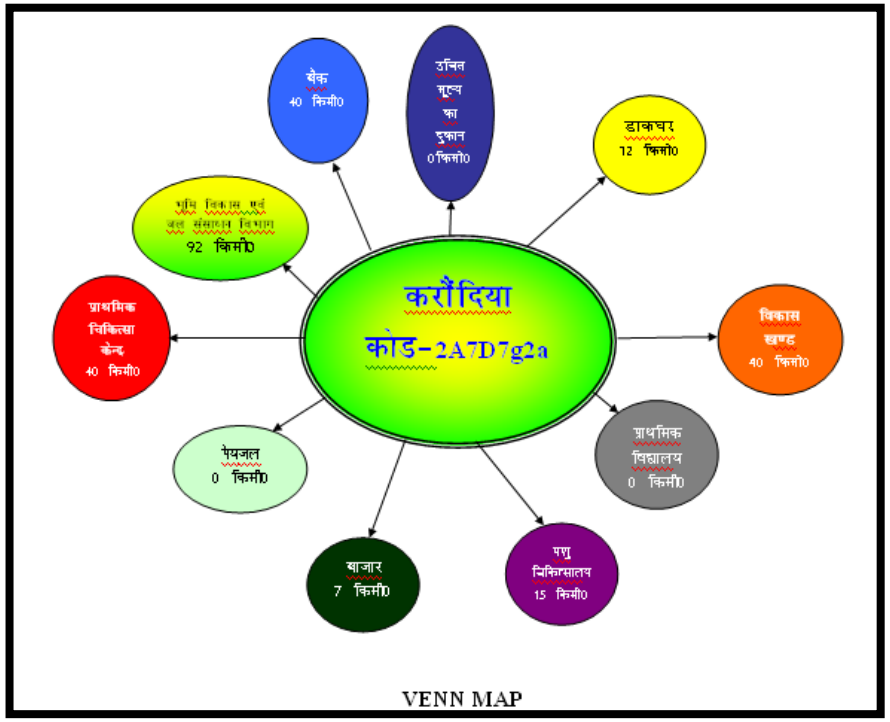

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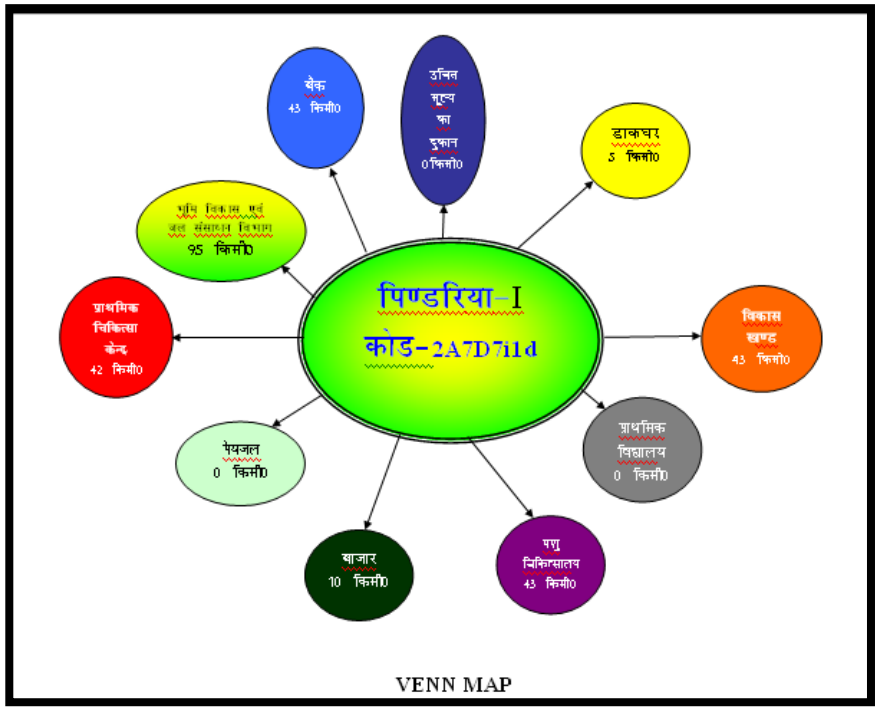

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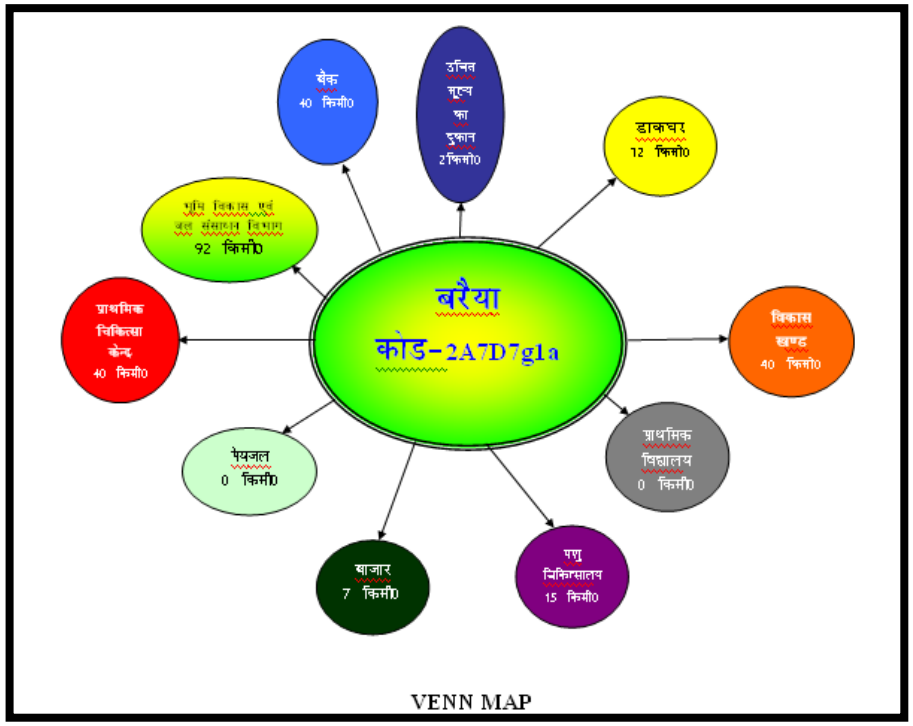

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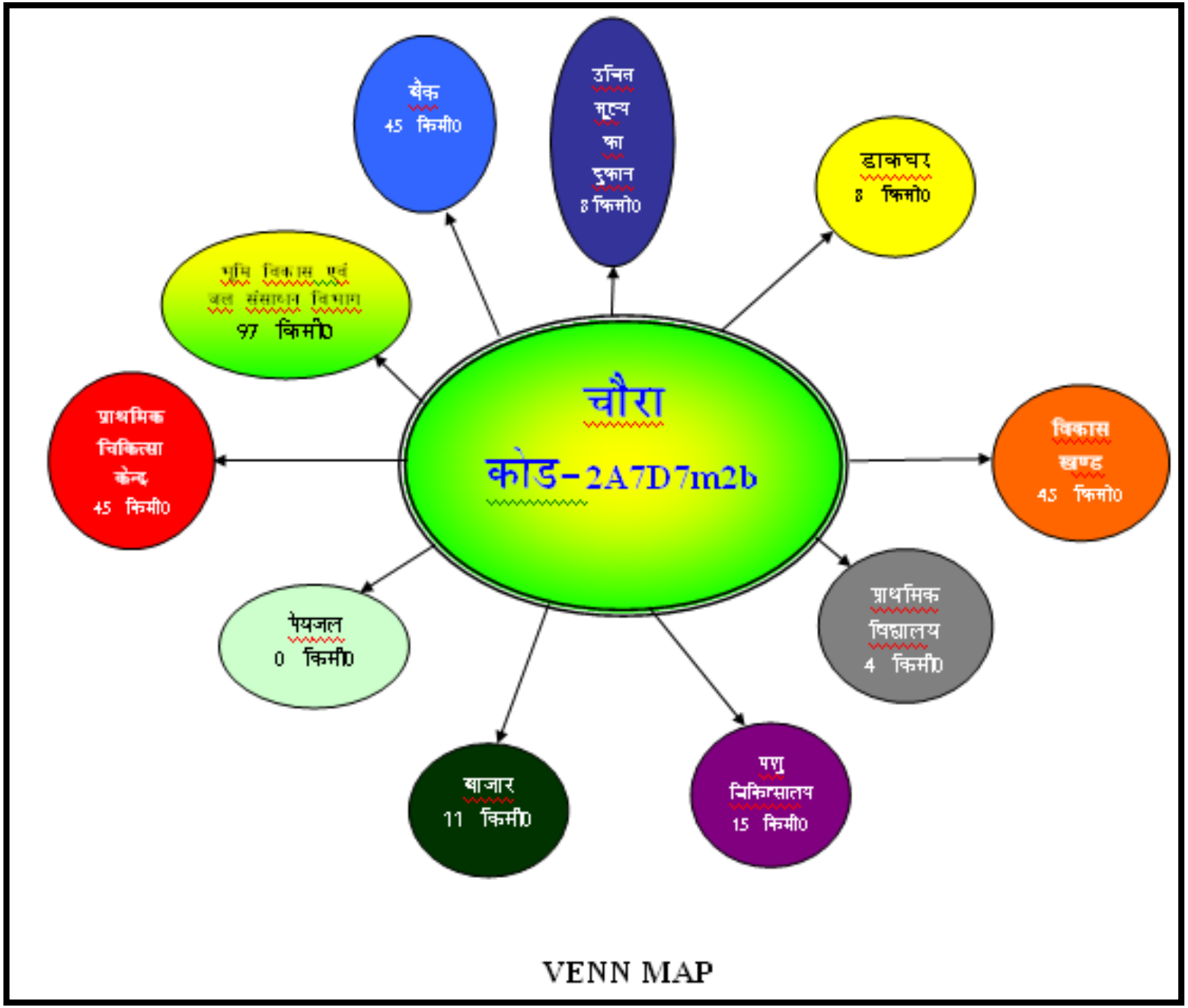
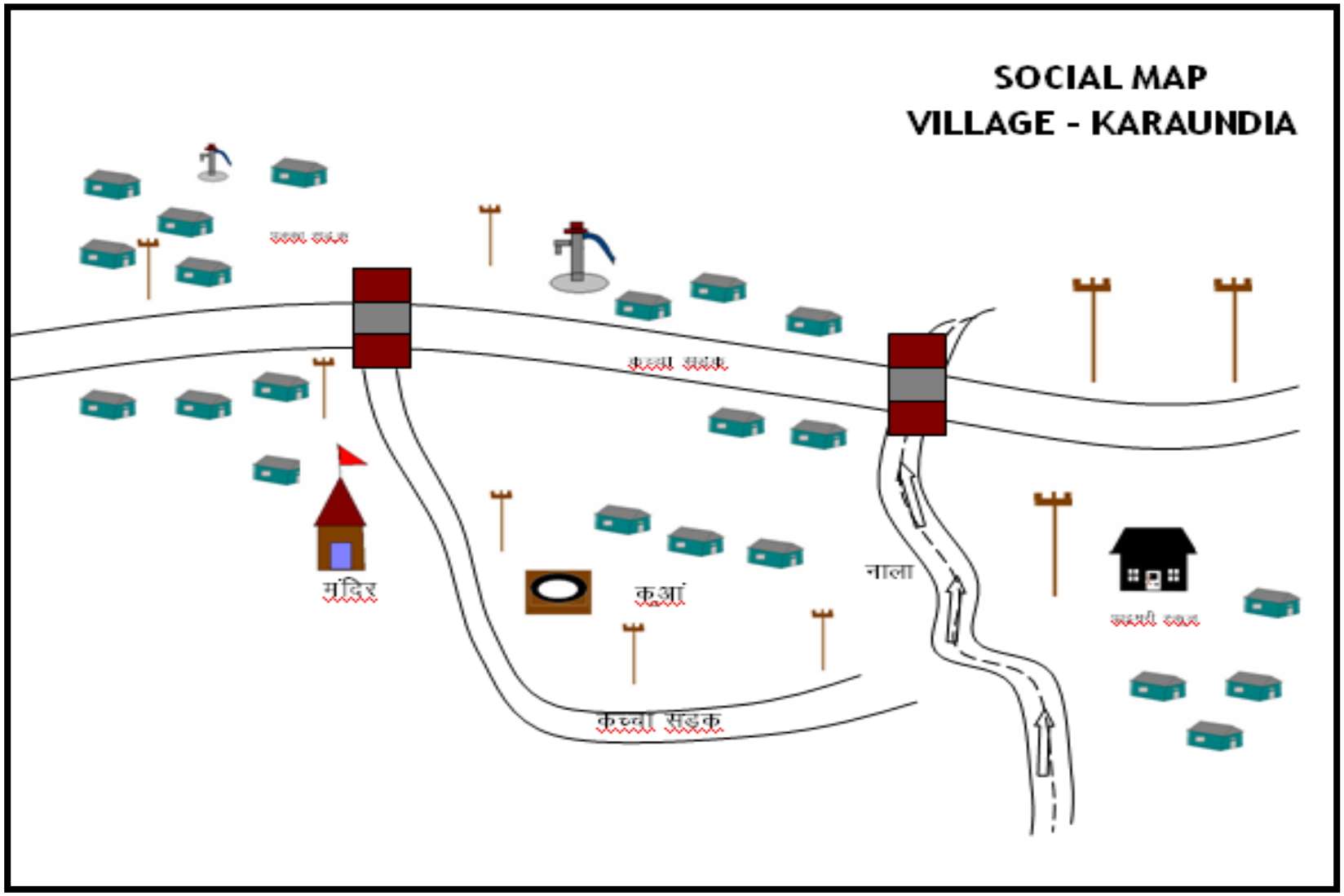
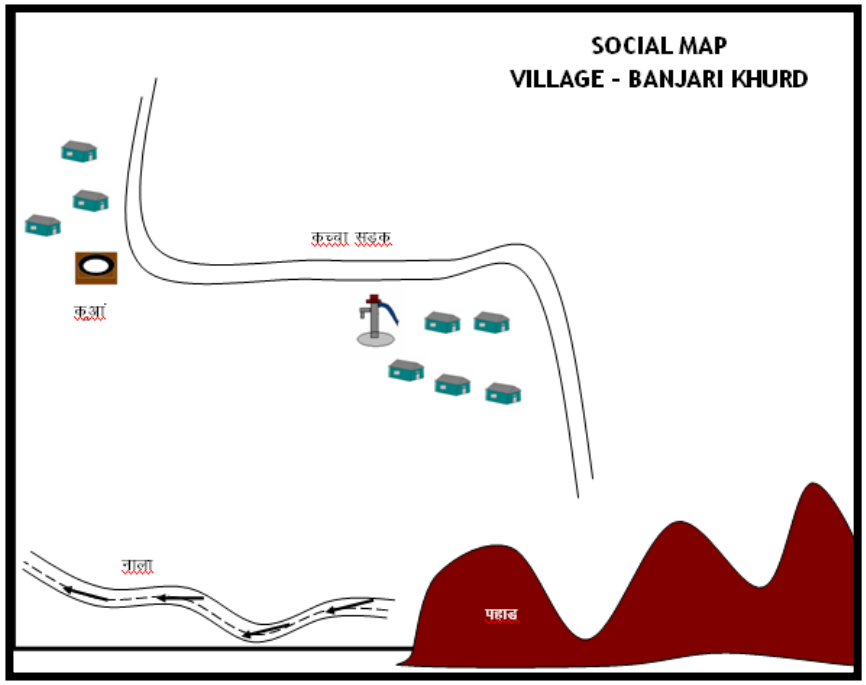
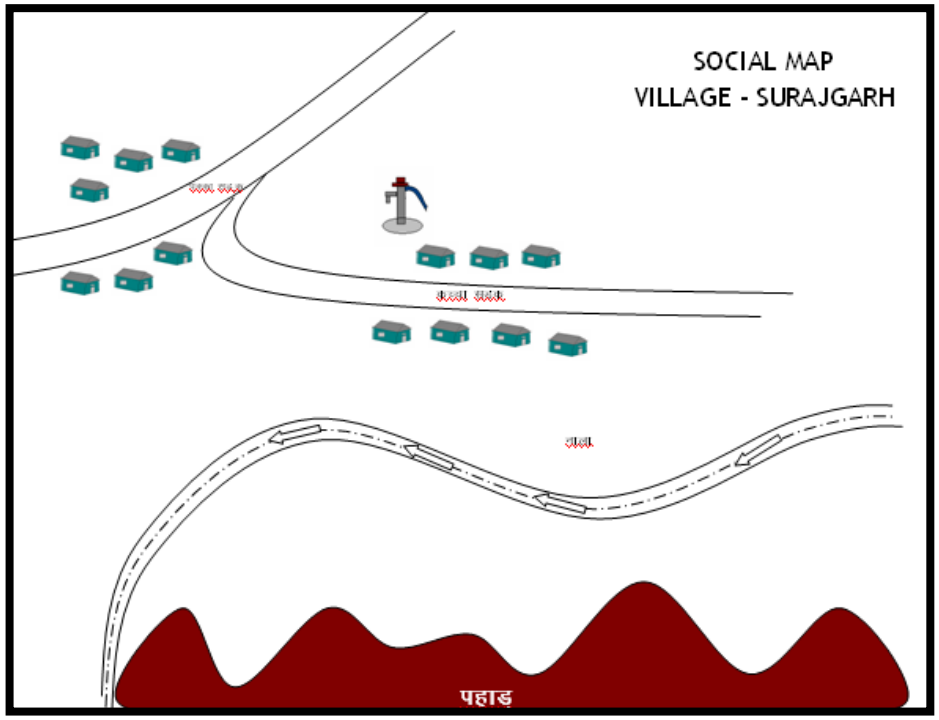

चौरा
कोड-2A7D7m2b
बैंक
45 किमी0
उचित मूल्य की दुकान
8 किमी0
डाकघर
8 किमी0
भूमि विकास एवं जल संसाधन विभाग
97 किमी0
प्राथमिक चिकित्सा केन्द्र
45 किमी0
विकास खण्ड
45 किमी0
पेयजल
0 किमी0
प्राथमिक विद्यालय
4 किमी0
बाजार
11 किमी0
पशु चिकित्सालय
15 किमी0

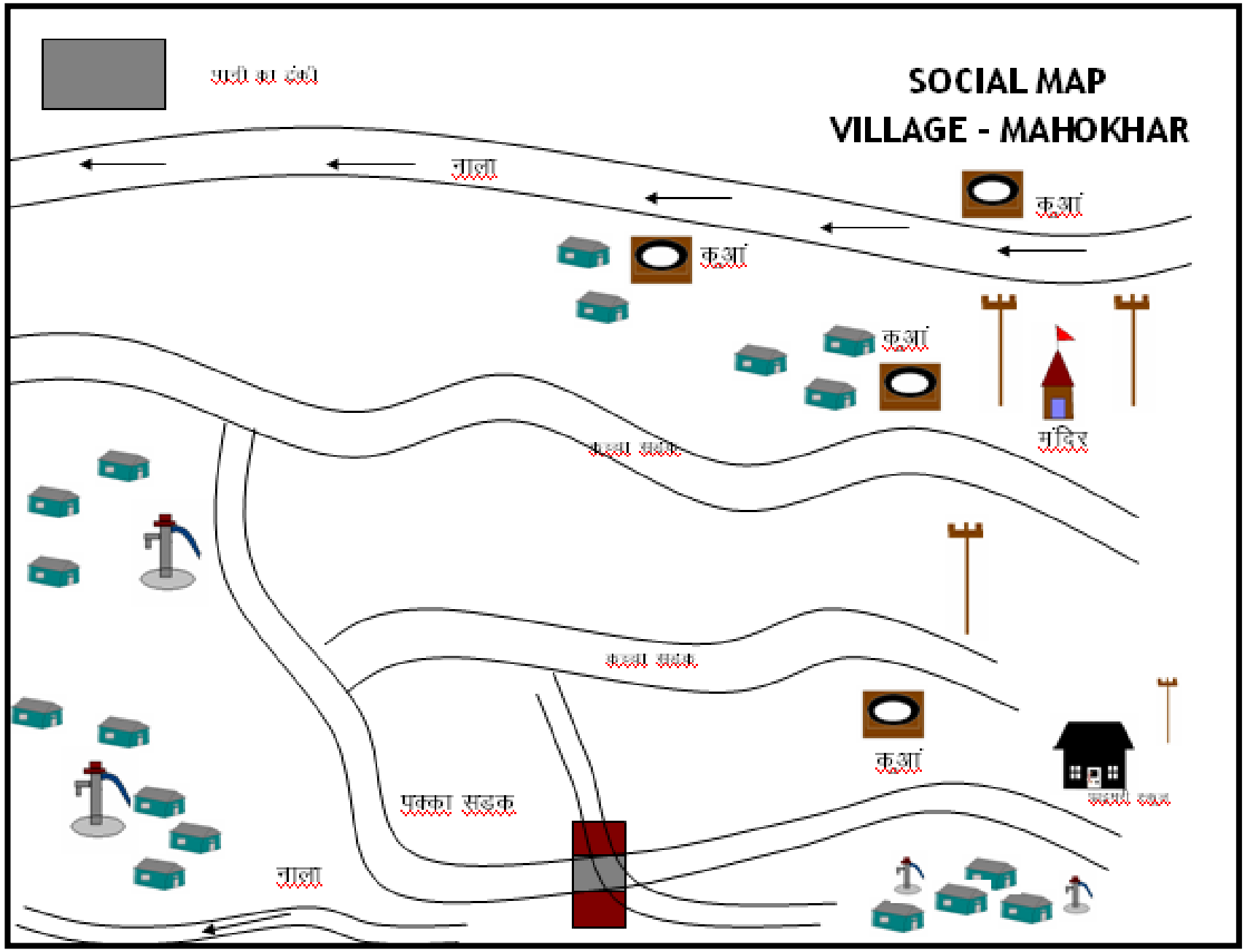
VENN MAP

Social Features: Watershed villages enjoy the facility of motorable pucca road through Hallia and are connected with each other through both the pucca and kuchcha boulder road. Literacy rate in the watershed is very low i.e. 35%. Hindu community is predominant in the watershed villages. Cast composition of the village consists of Kol, Patel, Brahmin, Kshatriya, Gond, Bania, Dharkar etc



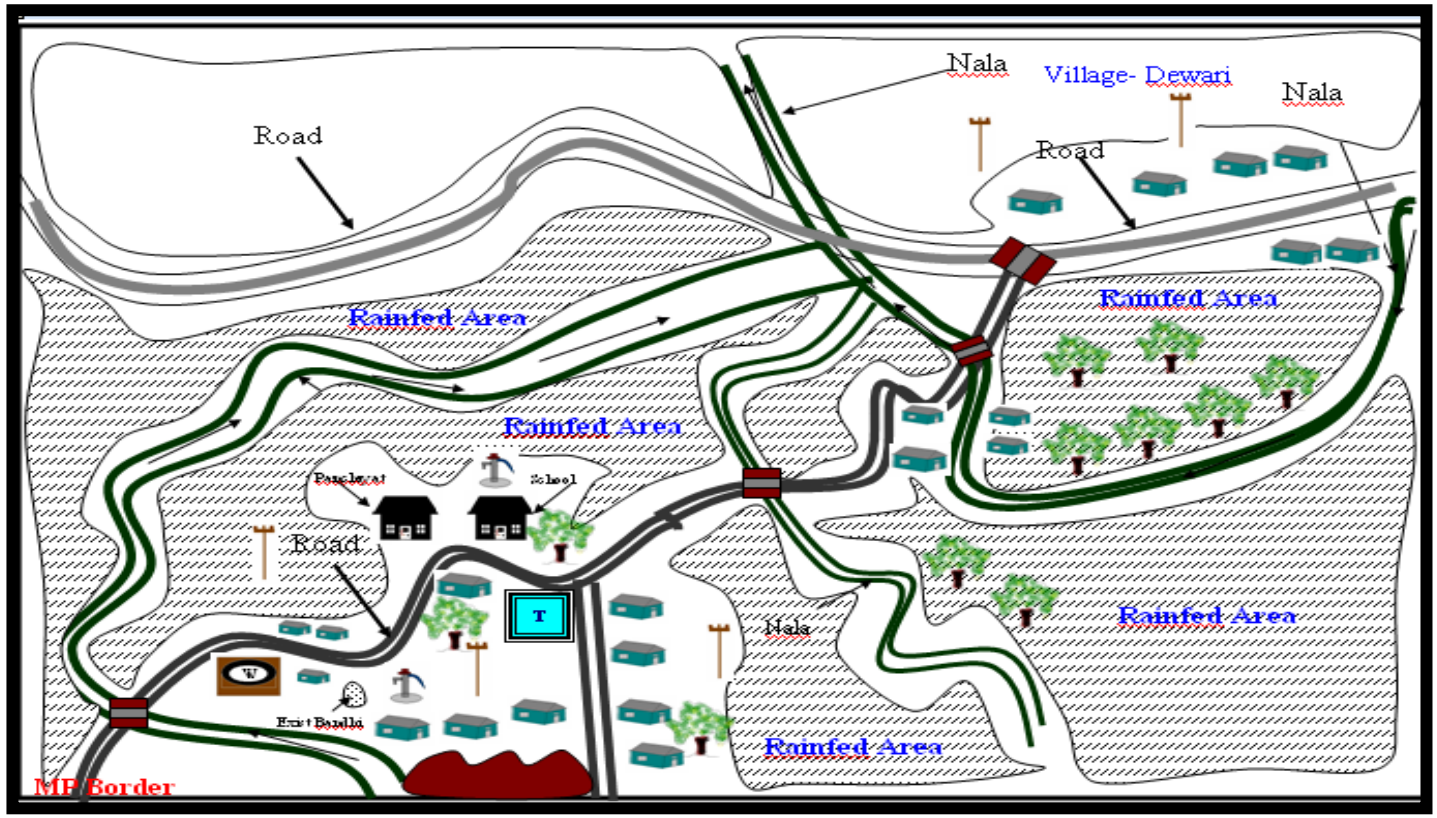

SOCIAL MAP
VILLAGE - BANJARI KHURD
कच्चा सड़क
कुआं
नाला
पहाड


SOCIAL MAP
VILLAGE - SURAJGARH
नाला
पहाड़


SOCIAL MAP
VILLAGE - MAHOKHAR
नाला
कुआं
कुआं
कुआं
कुआं
मंदिर
कुआं
पक्का सड़क
नाला

Resource Features: Crop production in the watershed is entirely dependent on rain although partial irrigation is available on limited area through the water stored in the water bodies. Small land holdings (average less than 1.0 ha) with medium family size (average 6 person) and more than 35% of the labour force of the total population living below poverty line indicating the poor socio-economic status of the watershed community. However a strong community spirit among the villagers shows a positive indication for the success of any programme being implemented in the area in a participatory mode. Traditionally, the entire village community participates in the individual's work needing labor such as sowing, harvesting, house construction works etc.

RESOUCRCE MAP OF MANIGARHA



17. MEAN OF COMMUNICATION

IWMP IIIrd can be approached from NH 7 via pucca road passes though Hallia, Dramandganj-Halia, Lalgang-Dubar. Private rented bus, jeep and auto rickshaw are the main source of movement from the watershed to nearby market, district headquarter and the other places of the area.

18. LIVELIHOOD

Income generating activities i.e. goatery, poultry farming, bee keeping, livestock development activities, chalk and candle making, food processing etc will promoted through self help groups for landless and marginal farmers in the villages of watershed through the involvement of Krishi Vigyan Kendra, Barkacha, Mirzapur. Training of farmers and farm women's, rural youth and field level workers for self employment will be given at Krishi Vigyan Kendra, Barkacha, Mirzapur. To improve water use efficiency sprinkler irrigation set, and pump set as well as Hasti pipe have been proposed to be demonstrated and distributed among the SHGs and UGs of the watershed. Since sesame is one of the major crops in the watershed so therefore it has been planned to installation of an oil mill in the area. Financial outlay proposed for this component is 10% (Rs. 54.876 lacs) of the total project cost.

19. DEPENDING ON FOREST FOR FUEL WOOD AND FODDER

a) Fuel wood: The main source of fuel is forest, woody stem of Arhar crop and Mustard. About 20 percent of the domestic energy requirement is met out from the forest outside the village and watershed boundary.

b) Fodder: Villagers are dependent on forest for their fodder requirement because fodder crop cannot be cultivated throughout the year owing to scarcity of water. There is huge shortage of green

fodder in winter and summer. Due to lack of fodder, low productivity, sterility and frequent mortality among milch animals can be noticed in the watershed villages. These are the few reasons behind the deforestation in the watershed villages.

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21. LABOUR REQUIREMENT

Labour requirement is maximum after the onset of mansoon that is during June-July once the sowing of kharif crop get started. The other crucial periods are October- November when harvesting of kharif crop and sowing of rabi crop done simultaneously.

22. CROP CALENDAR

Since rainfed agriculture is a way of crop production in the watershed so therefore crop production activity is confined to kharif season although, limited sowing of rabi crops takes place depending upon the availability of water present in water bodies, ponds etc. In kharif sesame, sorghum, pearl millet, pigeon pea, *kodo*, paddy etc. are the major crops, in rabi gram, lentil, linseed, mustard, wheat, barley are main crops.

Organized vegetable cultivation, fruit plantation and traditional agro-forestry system are lacking widely in the watershed. The limited vegetable cultivation in the watershed is confined only to kitchen gardens.

23. FARMERS PREFERENCES

Fruit Trees:

Farmers preferences for fruit trees are solicited in terms of attributes like draught resistance, production, market availability and timber wood value etc. Overall, Aonla, Karaunda, Bael, Ber, Sharifa and Lemon is found to be most preferred fruit trees.

Fodder Trees:

Jowar and Bajra are the most preferred fodder crop cultivated in the watershed villages, among forest species subabool is the most preferred tree due to its ability to grow faster in harsh agro climatic situation as well as its utility as fire wood .

The scarcity of irrigation water, marketing facilities, lack of follow up of modern scientific package of practices of cropping potential in the watershed, socio-economical factors etc. is found to be most important factors deciding the preferences of farmers pertaining to selection and cultivation of agricultural crops, fruits, or fodder trees in the watershed.

Agriculture:

Til, Bajra, Jowar, Kodo, Paddy, wheat, Gram, Lentil, Linseed, Mustard, Arhar, Jowar + Arhar, Bajra, are the most preferred agricultural crop in the watershed.

24. VILLAGE WISE AREA IN THE WATERSHED, IWMP-III, MIRZAPUR

Sl.No.	WSCODE	Watershed Name	Location	Area (ha.)
1	2A7D7i2a	Gajaria	1. Mudpeli	174.20
			2. Gajaria	96.50
			3. Dewari	105.90
			4. Manigarha	44.75
			Total	**421.35**
2	2A7D7e1a	Manigarha I	1. Manigarha	40.60
			2. Magarha	24.05
			Total	**64.65**
3	2A7D7e1b	Manigarha II	1. Manigarha	102.25
			2. Magarha	25.02
			Total	**127.27**
4	2A7D7i3b	Manigarha III	1. Manigarha	281.50
			2. Badauha	5.14
			Total	**286.64**
5	2A7D7e1f	Manigarha IV	1. Manigarha	437.26
			2. Magraha	13.30
			Total	**450.56**
6	2A7D7o1d	Manigarha V	1. Mudpeli	174.85
			2. Manigarha	467.44
			3. Gajaria	67.33

			Total	**709.62**
7	2A7D7i3a	Badauha	1. Manigarha	99.81
			2. Badauha	235.49
			3. Parkhiya Mudpeli	70.78
			Total	**406.08**
8	2A7D7i2c	Mahokhar	1. Teeta	2.09
			2. Patpara	102.05
			3. Badauha	42.93
			4. Jharana	194.41
			5. Parsiya Mudpeli	174.59
			6. Mahokhar	226.17
			7. Byoguna	86.09
			8. Gaurwa	18.29
			9. Parsiya Khurd	7.82
			Total	**854.44**
9	2A7D7i3d	Parsiya Khurd	1. Parsiya Mudpeli	80.46
			2. Gaurawa	5.33
			3. Parsiya Khurd	127.09
			Total	**212.88**
10	2A7D7g2b	Gaurawa	1. Mahokhar	25.51
			2. Gaurawa	239.58
			3. Karaudiya	20.93

			4. Jagraha	45.15
			5. Parsiya Khurd	33.96
			6. Paudi Rampur	89.55
			7. Banjari Khurd	9.67
			Total	**464.35**
11	2A7D7g2d	Banjari Khurd I	1. Karaundiya	5.40
			2. Surajgarh	92.61
			3. Paudi Rampur	65.45
			4. Banjari Khurd	236.71
			Total	**400.17**
12	2A7D7g2c	Banjari Khurd II	1. Banjari Khurd	73.95
			2. Paudi Rampur	13.53
			Total	**87.48**
13	2A7D7g2e	Surajgarh I	1. Surajgarh	94.80
			2. Banjari Khurd	48.90
			Total	**143.70**
14	2A7D7g1c	Surajgarh II	1. Surajgarh	210.00
			2. Harabara	6.64
			Total	**216.64**
15	2A7D7g2a	Karaundiya	1. Harbara	117.11
			2. Mahokhar	12.22
			3. Byoguna	39.75

			4. Bariaya	134.39
			5. Karaundiya	109.49
			6. Jhagara	27.58
			7. Surajgarh	50.64
			Total	**491.18**
16	2A7D7c1d	Pidariya I	1. Fhulyari	16.70
			2. Dhaura	97.10
			3. Patpara	25.40
			4. Pidariya	222.80
			5. Khajurahat	100.20
			6. Byogana	47.25
			Total	**509.45**
17	2A7D7g1a	Pidariya II	1. Harbara	1.60
			2. Pndariya	338.40
			3. Byoguna	3.32
			4. Barya	47.88
			Total	**391.20**
18	2A7D7m2b	Pidariya III	1. Dhaura	170.00
			2. Pindariya	110.34
			Total	**280.34**
			Grand Total	**6518.00**

25. HISTORICAL TIME LINE:

The Historical Timeline is the chronological record of important events in the history of a village which is useful in understanding its background in the context of watershed development. Historical time line depicting important events in respect of different villages of the watershed has been prepared through PRA. "Historical timeline" of the selected village are the following.

Historical Time Line

VILLAGE : PARSIA KHURD

1.	Village was established in 1891.
2.	Telephone connectivity in 1998.
3.	Electrification was done in 1998.
4.	Severe draught in 1973.

VILLAGE : MANGARHA

1.	Village established in 1811.
2.	First telephone in 1998.
3.	First television in 1997.
4.	Electrification was done in 1996.
5.	Severe draught in 1973.

VILLAGE : MAHOKHAR

1.	Village was established in 1830.
2.	Electrification work in 1990.
3.	First telephone in 1998.
4.	First TV in 2003.
5.	Primary School in 1999.
6.	Pitch Road Constructed during 2004.

VILLAGE : SURAJGARH

1.	Village was established in 1830.
2.	First Hand Pump established in 2001.
3.	No Electrification in Village.
4.	Severe draught in 1973.
5.	First Radio came in 1983.

VILLAGE: KARAUNDIA

1.	Village was established in 1831.
2.	Village Electrified during 1991.
3.	Primary School established in the village in the year 1999.
4.	First Television came in the village during 2004.
5.	Pitch Road Constructed during 2003.

VILLAGE: CHAURA

1.	Village Chaura Not Electrified.
2.	Primary School was constricted the year 1995.
3.	First Flour Mill established during 1998.
4.	First Hand pump established during 2000.
5.	Severe draught in 1973

VILLAGE: GAURAWA

1.	Village was established about 80 years ago.
2.	Primary School was constricted the year 2003.
3.	Electrification work done in 2004-05.
4.	Pitch Road Constructed during 2003.
5.	Severe draught in 1973.

VILLAGE: BARAUHA

1.	According to the villagers village established before 120 years.
2.	Electrification was done in 1998.
3.	Telephone connection in 1999.
4.	First Television came in 2003.
5.	Severe draught in 1973

26. HYDROLOGY AND WATER RESOURCE CATEGORIES

Water resources are divisible into two distinct categories : the surface-water resources & the ground-water resources. Each of these categories is a part of the earth's water circulatory system,called the hydrologic cycle, & is ultimately derived from precipitation,which is rainfall plus snow. They are interdependent & frequently the loss of one is the gain of the other. The brief description of the run-off cycle,which is a part of

the hydrologic cycle,will help us to understand the origin & the interdependence of these two categories of water resources.

The precipitation that falls upon land & is the ultimate source for both the categories of water resources is dispersed in several ways. A sizeable portion is intercepted by the vegetal cover or temporarily detained in surface depressions.Most of it is later lost through evaporation. When the available interception or the depression storage are completely exhausted & when the rainfall intensity at the soil surface exceeds the infiltration capacity of the soils, the overland flow begins.Once the overland flow reaches a stream channel, it is called surface run-off, which together with other components of flow, forms the total run-off.

Part of the water that infiltrates into the surface soil may continue to move laterally at shallow depth as interflow owing to the presence of relatively impervious lenses just below the soil surface & may eventually reach the stream channel when it is called the sub-surface runoff. A part of the sub-surface run-off may enter the stream promptly, whereas the remaining part may take a long time before joining the stream flow.

A second part of the precipitation which infiltrates is lost through evapo-transpiration via plant roots & thermal gradients just below the soil surface. A third part may remain above the water table in the zone of unsaturated flow.A fourth remaining part percolates deeply into the ground-water.Part of this ground-water may eventually reach the stream channel & become the base flow of the stream. This portion is termed ground-water run-off or ground-water flow.

Apart from infiltrated rain-water, the seepage from canals,ponds,tanks,lakes,irrigated fields,etc.is also dispersed & accounted for in the same manner.

The total run-off in the stream channel includes the snow-melt, the surface run-off the sub-surface run-off, the ground-water run-off & the channel precipitation, i.e. the precipitation falling directly on the water surface of streams,lakes,etc. It constitutes what is known as the surface-water resources. The portion of the precipitation which, after infiltration,reaches the ground-water-table, together with the contribution made to ground water from a neighbouring basin, influent rivers,natural lakes,ponds,artificial storage

reservoirs,canals,irrigation,& constitutes the ground-water resources.That quantity of water in the ground-water reservoir, which is not annually replenishable, is not taken into account, as it is a sort of dead storage which cannot be used on a continuing basis from year to year.

The above phase of the run-off cycle pinpoints the inflow components for the surface-as well as for the ground-water resources. It has to be appreciated that there is always a balance between the inflow factors making up water resources of a region, whether surface or ground, & the outflow components. The surface water resource of a given basin in excess of the withdrawal use is accounted for on the outflow side by one or more of the following factors:

(i) Stream outflow from the basin;

(ii) loss through evaporation;and

(iii) the influent recharge to the ground water.

Similarly, the unutilised ground-water resource of a basin is accounted for by the following outflow factors:

(i) Evapo-transpiration from the ground-water-table;

(ii) outflow to the neighbouring ground-water basin;

(iii) the effluent discharge to the streams;and

(iv) the addition to the ground-water storage.

The interrelationship between the surface-water & the ground-water resources is evident from the above analysis.The surface-water resources contribute to the ground-water recharge in various ways:

(i) by influent recharge from the streams;

(ii) by seepage from natural lakes,ponds,etc;

(iii) seepage from artificial storage reservoirs,canal systems,etc, &

(iv) return flow from irrigation. These factors presently contribute to about 25 percent of the country's total ground-water resources.

On the other hand, the bulk of the base-flow in the rivers, which represents the sustained fair-weather run-off is contributed by the ground-water resources. This contribution,presently, is roughly assessed at about 25 percent of the total surface-water resources of the country.

Factors Affecting Water Resources

The water resources of a region,conceived as a dynamic phase of the hydrologic cycle, are influenced by the following three major groups of factors:

1. Climatic Factors

A. Rainfall : its intensity,duration & distribution.

B. Snow

C. Evapo-transpiration

2. Physiographic Factors

A. Basic characteristics.

1. Geometric factors : drainage area,shape,slope & stream density.
2. Physical factors : land use, surface infiltration conditions,soil types,etc.

B. Channel characteristics : carrying capacity & storage capacity.

3. Geological Factors

A. Lithologic including composition, texture, sequenceof rock types & the thickness of rock formations.

B. Structural, including chief faults & folds that interrupt the uniformity of occurence of rock types or sequence of rock types also beds, joints, fissures, cracks,etc.

C. Hydrologic characteristics of the aquifers permeability, porosity, transmissivity, storability,etc

The physiographic features (including geological factors) not only influence the occurence & distribution of water resources within a region but these, particularly the orography, play a significant role in influencing rainfall & other climatic factors, such as temperature, humidity & wind. However, within a geographical location & physiographic framework, it is primarily the rainfall (its intensity, duration & distribution) & the climatic factors affecting evapo-transpiration that determine the totality of water resources in the region.

27. SOIL AND MOISTURE CONVERSATION AND EFFICIENT USE OF WATER

Water is essential for all life and is used in many different ways - for food production, drinking and domestic uses and industrial use. It is also part of the larger ecosystem on which bio diversity depends. Precipitation, converted to soil and groundwater and thus accessible to vegetation and people, is the dominant pre-condition for biomass production and social development in drylands. The amount of available water is equivalent to the water moving through the landscape. It also fluctuates between the wet and dry periods. Fresh water scarcity is not limited to the arid climatic regions only. Even in areas with good supply, the access to safe water is becoming a critical problem. Lack of water is caused by low water storage capacity, low infiltration capacity, large inter-annual and annual fluctuations of precipitation and high evaporative demand.

A variety of essential soil moisture and water conservation technologies must be adopted to reduce the cost of irrigation, extend it throughout and promote sustainable small-scale irrigation on a watershed basis. These technologies are essential especially in drought-prone areas. Even though drought is a purely natural

calamity caused by the failure of (monsoon) rain, it can be minimized by careful planning and operation. During good rainy years, excess rainwater should be stored in the soil and also underground using suitable soil moisture conservation measures and water harvesting structures on a watershed basis. This stored water can subsequently be used for irrigation.

Conceptual approach

Watershed development and management implies an integration of technologies within the natural boundary of a drainage area for optimum development of land, water and plant resources, to meet the people's basic needs in a sustained manner. A watershed is an area from which runoff resulting from precipitation flows past a single point into a large stream, river, lake or pond. Each watershed is an independent hydrological unit. It has become an acceptable unit of planning for optimum use and conservation of soil and water resources.

The concept of integrated watershed development refers to the development and management of the resources in the watershed to achieve higher sustainable production without deterioration in the resource base and any ecological imbalances. This concept requires the formulation and implementation of a package of programmes with activities for optimum resource use in the watershed without adversely affecting the soil and water base or life supporting system. The concept assumes more importance in the context of planning for sustained development. Watershed development aims at preventing watershed degradation resulting from the interaction of physiographic features. It eliminates unscientific land use, inappropriate cropping patterns and soil erosion, thereby improving and sustaining productivity of resources leading to higher income and living standards for the inhabitants in the watershed area. It therefore involves restoration of the ecosystem, protecting and utilizing the locally available resources within a watershed to achieve sustainable development.

Rainfall failure occurs once every 3 to 5 years and is usually below 50% of the average annual rainfall of the region. During periods of rainfall failure, the groundwater level lowers since fluctuations in the water table levels depend on the rainfall when both surface and groundwater availability becomes critical. Drought begins to prevail and there is difficulty to cope up with the water demand during this period. Similarly, in some

locations or areas water shortage is observed just before the rainy season commences. These two situations can be managed if suitable soil and moisture conservation measures are systematically implemented on a small watershed basis.

There are always strong links between soil conservation and water conservation measures. Many actions are directed primarily to one or the other, but most contain an element of both. Reduction of surface runoff can be achieved by constructing suitable structures or by changes in land management. Further, this reduction of surface runoff will increase infiltration and help in water conservation.

Appropriate structures and their functions

To increase the period of water availability and overcome water scarcity in drought years, the following activities can be implemented in the field for a compact, viable watershed of about 200 - 500 ha.

Soil and water conservation can be approached through agronomic and engineering procedures. Agronomic measures include contour farming, off season tillage, deep tillage, mulching and providing vegetative barriers on the contour. These measures mainly prevent soil erosion but will also help in improving soil moisture availability in the watershed.

Soil and water conservation measures on a watershed basis

The engineering measures adopted differ with location, slope of the land, soil type, amount and intensity of rainfall. Depending on these parameters, the methods commonly used are contour trenching, contour stone walls, construction of temporary and permanent check dams and gully plugging structures. Additionally, percolation ponds, silt detention tanks and irrigation tanks are constructed to harvest water and recharge it to the groundwater for use in agriculture (irrigation). Farm ponds can also be constructed for every 4-5 ha in the watershed to provide protective/supplemental irrigation.

The above soil and water conservation management and water harvesting programme should be implemented in an integrated manner on a catchment/watershed basis.

Functions of the structures

Contour bunds, contour barriers (vegetative and stone), contour trenches and contour stone walls will not only prevent soil erosion but also obstruct the flow of runoff water. Consequently, the obstructed water will increase the soil moisture and recharge the groundwater in the area.

Check dams: This may be a temporary structure constructed with locally available materials. The various types are: Brush wood dam, loose rock dam and woven wire dam. The main function of the check dam is to impede the soil and water removed from the watershed. This structure is cheap, but lasts about 2-5 years. The cost of the structure depends on the materials used, the size of the gully and the height of the obstruction (dam). A permanent check dam can be constructed using stones, bricks and cement. Small earth work is also needed on both sides. This water recharges the groundwater.

Percolation Pond: The percolation pond is a multipurpose conservation structure depending on its location and size. It stores water for livestock and recharges the groundwater. It is constructed by excavating a depression, forming a small reservoir or by constructing an embankment in a natural ravine or gully to form an impounded type of reservoir. The capacity of these ponds or tanks varies from 0.3 to 0.5 mcft (10 000 - 15 000 m^3). Normally 2 or 3 fillings are expected in a year (season) and hence the amount of water available in one year in such a tank is about 1 mcft to 1.5 mcft (30 000 - 45 000 m^3). This quantity of water, if it is used for irrigation, is sufficient to irrigate 4-6 hectares of irrigated dry crops (maize, cotton, pulse, etc.) and 2-3 hectares of paddy crop.

Irrigation Tank: The main function of this storage structure is irrigating crops. It is constructed below the above-mentioned structures in a watershed. Each tank can irrigates from 10 to 5 000 hectares. Earthen bunds are reinforced with masonry to collect and store rainwater for irrigation. The cost of this tank (dam) depends upon the size, location and site condition. Water from the tanks is normally used to grow paddy crop.

Apart from the above, to increase moisture availability to agricultural and tree crops, in situ moisture conservation techniques must be adopted in addition to the large scale soil and moisture conservation and water harvesting structures in the watershed.

The following are some of the *in situ* moisture conservation measures which can be practised in the watershed to increase production.

For agricultural crops, the measures adopted are forming ridges and furrows, broad bed and furrows, basins, tie ridging (random tie ridges) and water spreading.

For tree crops micro catchment, saucer basin, semi-circular bund, crescent shaped bunds, V ditch technology, catch pits and deep pitting can be practised.

In addition to the above measures and structures, small storage structures with a water storage capacity for an area of about 0.4 to 0.5 ha can be constructed in large numbers one for every 10 to 20 ha catchment or watershed at the foot hills slopes and hilly areas. These storage facilities would attenuate the floods during storms. These measures will also ensure soil moisture for good growth of trees grown down stream recharging the groundwater in the region and making available more water for drinking and irrigation water.

28. PROBLEMS AND NEEDS

The main problem in a watershed is the soil erosion by rainfall. The run off water transport the sediments which may block the channel head, dam, reservoir and storage structures are the major problems faced in the project area and attempts made so far to overcome them. The other main problems in the selected watershed are : lack of awareness amongst the villagers about the deteriorating environmental condition of the area, 75% of the run off water makes it away to way towards Belan, Adwa, Lonmati Nadi Kehnjua & Sepraha Nala rivers carrying fertile soil which has nutrients and this decreases soil fertility, there is a decline in the productivity of cereals, pulses and vegetable crops, dependency of farmers on the rain water. Therfore it is an urgent need, that rainwater should be harvested for crops and re-charged to improve the quality of the water.

CHAPTER - 4

INSTITUTION BUILDING &

PROJECT MANAGEMENT

1. PARTICIPATORY RURAL APPRAISAL (PRA)

PRA was developed for quick field – oriented results with objectives as follows :

(a) Appraising agricultural and other needs of rural community;

(b) Prioritizing areas of research tailored to such needs;

(c) Assessing feasibility of developmental needs and action plands;

(d) Implementing action plans, monitoring and evaluating them.

2. PROJECT MANAGEMENT AGENCY (PIA):

The SLNA would evolve appropriate mechanisms for selecting and approving the PIAs, who would be responsible for implementation of watershed projects in different districts. These PIAs may include relevant line departments, Autonomous organizations under State/Central Governments, Government Institutes/Research bodies, Intermediate Panchayats, Voluntary Organizations (VOS).

However, the following criteria may be observed in the selection of these PIAs:

1- They should preferably have prior experience in watershed related aspects or management of watershed development projects.

2- They should be prepared to constitute dedicated Watershed Development Teams.

Selected PIAs will sign a contract/MOU with the concerned DWSUs/District Level Committee as referred in para29 that will spell out well –defined annual outcomes, against which the performance of each PIA will be monitored each year and evaluated on a regular basis by institutional evaluators from a panel approved by the SLNA/Departmental Nodal Agency at the central level.

Each PIA must put in position a dedicated watershed development team (WDT) with the approval of DWDU. The WDT will be hired on contract/deputation. Transfer etc for a term not exceeding the project period. The composition of the WDT will be indicated in the contract/MOU. No programme funds for DPR and watershed works under any circumstances should be released to either the PIA or Watershed Committee (WC) unless the composition of the WDT has been clearly indicated in the MOU/contract and the team members are fully in place.

Roles and Responsibilities of the PIA:

The project Implementing Agency(PIA) will provide necessary technical guidance to the Gram Panchayat for preparation of development plans for the watershed through Participatory Rural Appraisal(PRA) exercise, undertake community organization and training for the village communities, supervise watershed development activities, inspect and authenticate project accounts, encourage adoption of low cost technologies and build upon indigenous technical knowledge, monitor and review the overall project implementation and set up institutional arrangements for post-project operation and maintenance and further development of the assets created during the project period.

The PIA, after careful scrutiny, shall submit the action plan for watershed development project for approval of the DWDU/DRDA and other arrangements. The PIA shall submit the periodical progress report to DWDU. The PIA shall also arrange physical, financial and social audit of the work undertaken. It will facilitate the mobilization of additional financial resource from other government programs, such as NREGA, BRGF, SGRY, National Horticulture Mission, Tribal Welfare Schemes, Artificial Ground Water Recharging, Greening India, etc.

3. STAFF AT PROJECT IMPLEMENTING AGENCY (PIA)

U.P. Government, Land Development And Water Resources Department section -1 Lucknow has nominates as PIA to Bhoomi Sanrakshan Unit, Land development and water resources Department Mirzapur for IWMP IInd vide letter no- 1394/54-1-10/1(9)/2008 TC, Dated 22-09-2010.

Table 4.1 : DETAILS OF PROJECT STAFF

S.No.	Name	Designation	Qualification	Experience (Year)
1.	Sri B.K. Singh	BSA	Diploma in Ag. Engg.	30
2.	Sri A.K. Srivastava	Jr. Engineer	Diploma in Civil Engg.	28
3.	Sri Umesh Kumar	A.S.C.I.	MSc. Ag.	25
4.	Sri Amar Singh Chauhan	A.S.C.I.	MSc. Ag.	25
5.	Sri S.P. Yadav	A.S.C.I.	Diploma in Ag.	32
6.	Sri Pramod Kumar Gupta	Draft Man	I.T.I.	25
7.	Sri Nand Ram	Accountant	M.Com.	30
8.	Sri G.C. Sonkar	Accountant	B.Com	26
9.	Smt. Shesha Devi	A.Accountant	M.Com, LLB, B.Ed.	10
10.	Sri R.M. Mishra	Sr. Clerk	Intermediate	35
11.	Sri Tribhuvan Nath Verma	Sr. Clerk	B.A.	30
12.	Sri Ashok Singh	Jr. Clerk	Intermediate	30
13.	Sri Dilip Kumar	Work Incharge	Intermediate Ag.	24
14.	Sri Tribhuvan Singh	Work Incharge	B.A.	24
15.	Sri Jairam Rai	Work Incharge	B.A.	25
16.	Sri R.B. Maurya	Work Incharge	Intermediate	25
17.	Sri Chandrika Prasad	Work Incharge	Intermediate	24
18.	Sri Surendra Kumar	Work Incharge	B.A.	7
19.	Sri Virendra Singh	Work Incharge	Intermediate	30
20.	Sri Bachanu Ram	Work Incharge	B.A.	7
21.	Sri Harikesh Pandey	Work Incharge	High School	31

4. WATERSHED DEVELOPMENT TEAM

The WDT is an integral part of the PIA and will be set up by the PIA. Each WDT should have at least four members, broadly with knowledge and experience in agriculture, soil science, water management, social mobilization and institutional building. At least one of the WDT members should be a woman. The WDT members should preferably have a professional degree. However, the qualification can be relaxed by the DWDU with the approval of SNLA in deserving cases keeping in view the practical field experience of the candidate. The WDT should be located as close as possible to the watershed project. At the same time, it must be ensured that the WDT should function in close collaboration with the team of experts at the district and state level. The expenses towards the salaries of the WDT members shall be charged from the administrative support to the PIA. DWDU will facilitate the training of the WDT members.

As per new common guideline direction/instruction given in Para 5.3 point 40 P. I. A. has been constituted Watershed Development Team as given below.

Table 4.2: DETAILS OF WATERSHED DEVELOPMENT TEAMS (WDTS) IN THE PROJECT AREA.

Sl. No.	Subject	Name of Member of WDT	Address	Qualification	Designation	Experience
1.	Agriculture	Shri Jai Sankar Singh	Vill- Chiurapur, P.O. Chiurapur Distt. Varanasi	B.Sc. (Ag)	Rtd. Asstt. Soil Conservation Inspector, Department of Agriculture, U.P. Lucknow	Broad knowledge and experience in Agriculture, Extension works and soil conservation
2.	Soil Science	Shri Umesh Kumar	Office of B.S.A. ,LDWR, Mirzapur	M.Sc. (Ag) Soil Science	A.S.C.I.	Experiences in Department works since 25 years

3.	Social Mobilization & Capacity Building	Smt. Pushpa Singh	Village- Devgarh P.O.- Shivdwar, Ghoraval Distt. Sonbhadra (U.P.)	B.A. (Sociology)	Social Worker	Work Experience of Social Mob. & Capacity building.
4.	Water Management	Shri A. K. Srivastva	Office of B.S.A., LDWR, Mirzapur	Diploma in Civil Engineering	Junior Engineer	Experience of 28 years in soil & water conservation work
5.	Animal Husbandry	Shri Amar Singh Chauhan	Office of B.S.A., LDWR, Mirzapur	M.Sc. (Ag.) (Animal Husbandry)	A.S.C.I.	25 years experience in departmental works
6.	Field Workers	Sri S.P. Yadav	Office of B.S.A., LDWR, Mirzapur A.S.C.I.	Diploma in Agriculture	A.S.C.I.	32 years
7.	-do-	Sri Dilip Kumar	Office of B.S.A., LDWR, Mirzapur A.S.C.I.	Intermediate (Ag)	Work In-charge	24 years
8.	-do-	Sri Tribhuvan Singh	Office of B.S.A., LDWR, Mirzapur A.S.C.I.	B.A.	Work In-charge	24 years
9.	-do-	Sri Jairam Rai	Office of B.S.A., LDWR, Mirzapur A.S.C.I.	B.A.	Work In-charge	25 years
10.	-do-	Sri R.B. Maurya	Office of B.S.A., LDWR, Mirzapur A.S.C.I.	Intermediate	Work In-charge	25 years
11.	-do-	Sri Chandrika Prasad	Office of B.S.A., LDWR, Mirzapur A.S.C.I.	Intermediate	Work In-charge	24 years
12.	-do-	Sri Surendra Kumar	Office of B.S.A., LDWR, Mirzapur A.S.C.I.	B.A.	Work In-charge	7 years

ROLES AND RESPONSIBILITIES OF WDT

The WDT will guide the watershed committee (WC) in the formulation of the watershed action plan. An indicative list of the roles and responsibilities of the WDT would include among other s, the following.

a. Assist Gram Panchayat /Gram Sabha in constitution of the watershed committee and their functioning.
b. Organizing and nurturing User Groups and Self-Help Groups.
c. Mobilizing women to ensure that the perspectives and interests of women are adequately related in the watershed action plan.
d. Conducting the participatory base –line surveys, training and capacity building.
e. Preparing detailed resource development plans including water and soil conservation or reclamation etc. to promote sustainable livelihood at household level.
f. Common property resource management and equitable sharing.
g. Preparing Detailed Project Report (DPR) for the consideration of Gram Sabha.
h. Undertake engineering surveys, prepare engineering drawing and cost estimates for any structure to be built.
i. Monitoring, checking, accessing, and undertaking physical verification and measurement of work done.
j. Facilitating the development of livelihood opportunities for the landless.
k. Maintaining project accounts.
l. Arranging physical, financial and social audit of the work undertaken.
m. Setting up suitable arrangements for post-project operation, maintenance and future development of the assets created during the project period.

Social Moibilization and Community Organisation

The participatory approach have been adopted for the community wise development of waterhshed area. Therefore a watershed committee for each micro watershed project have been formed. The details of watershed committee of project area is given

5. WATERSHED COMMITTEE (WC)

It is committee that is constituted by Gram Sabha to implement the watershed with technical support of WDT in the village. This committee is registered under society Registration Act 1860. The Gram Sabha of the village select the chairman of the watershed committee with the secretary who will be a paid functionary. A watershed committee was formed accordingly in I.W.M.P-III, Mirzapur . The watershed committee has a pivotal role to play during and after the project implementation period Watershed committee has been constituted in all 18 no.s of micro watershed separately by W.D.T. & Gram Sabha village of micro watershed. Detail of W.C. is given below.

Table – 4.3: DETAILS OF WATERSHED COMMITTEES (WC)

Sl. No.	Namke of Micro watershed	Name of Chairperson	Name of Seceratary	Name of WDT Member	Number of Members in WC
1.	Gajariya	Sri Suresh	Sri Rajendra	Sri Amar Singh Chohan	10
2.	Manigarha-I	Smt. Butali	Sri Amrit Lal	Sri Shiv Prasad Yadav	10
3.	Manigarha-II	Smt. Butali	Sri Ram Murat	Sri Shiv Prasad Yadav	11
4.	Manigarha-III	Smt. Butali	Sri Ramesh	Sri Shiv Prasad Yadav	10
5.	Manigarha-IV	Smt. Butali	Sri Lokman	Sri Shiv Prasad Yadav	10
6.	Manigarha-V	Smt. Butali	Sri Tileshwar	Sri Amar Singh Chohan	10

7.	Baroha	Smt. Butali	Sri Dev Saran	Sri Surendra Kumar	10
8.	Mahokhar	Sri Ram Bahal	Sri Daya Ram	Sri Jay Ram Ray	11
9.	Parsiya Khurd	Smt. Sashi Singh	Sri Indal	Sri Virendra Singh	10
10.	Gourwa	Sri Munshi Raza	Sri Jageshwar	Sri Dilip Kumar	10
11.	Banjari Khurd-I	Sri Chandra Sekhar Patel	Sri Munna	Sri Ram Baran Maurya	10
12.	Banjari Khurd-II	Sri Munshi Raza	Sri Khichhdu	Sri Ram Baran Maurya	10
13.	Suraj Garh-I	Sri Shyam Lal	Sri Budhi Ram	Sri Umesh Kumar	10
14.	Suraj Garh-II	Sri Shitla	Sri Ram Suhawan	Sri Umesh Kumar	11
15.	Karaundiya	Sri Basant Lal	Sri Chotey Lal	Sri Tribhuhan Singh	10
16.	Pindariya-I	Sri Munshi Raza	Sri Chintamani	Sri Umesh Kumar	10
17.	Pindariya-II	Sri Munshi Raza	Sri Kamlesh	Sri Umesh Kumar	10
18.	Pindariya-III	Sri Munshi Raza	Sri Kailash Chandra	Sri Chandrika Prasad	10

6. SELF HELP GROUP

Self Help Groups are motivated, small homogenous groups organized together through credit and thrift activities. Self help group initiative especially for women, help uplift their livelihood. Generally self help groups include landless and poor women. Before formation of the SHGs, during PRA activities, Focused Group Discussions (FGDs) were held with the women, which came up with the following observations:

a) Lack of proper credit facilities due to low intervention of formal financial credit institution.

b) Excessive exploitation of weaker section by money lenders

c) Lack of attitude for saving among poor people

d) Lack of knowledge on credit and thrift activity and banking.

The details of the self help group of the project area are given below.

Table-4.4 : DETAILS OF SELF HELP GROUPS (SHGS) IN THE PROJECT AREA

Sl. No.	Name of Micro watershed	Name of Chairperson	Name of Seceratary	Name of Tresurer	Name & Acitivities
1.	Gajariya	Sri Rajju	Sri Mahadev	Sri Meva	Goatry
2.	Manigarha-I	Sri Daya Shankar	Sri Rama Shankar	Sri Chudamal	Animal Husbandry
3.	Manigarha-II	Sri Ram Sajivan	Sri Bal Krishna	Sri Baiju	Goatry
4.	Manigarha-III	Sri Ramesh	Sri Girja	Sri Radey Shyam	Animal Husbandry
5.	Manigarha-IV	Sri Bodai	Sri Tolan	Sri Lalla	Goatry
6.	Manigarha-V	Sri Mahngu	Sri Chhtey	Smt. Raj Kumari	Animal Husbandry
7.	Baroha	Sri Kamlesh	Sri Ram Tirath	Sri Mirch Lal	Animal Husbandry
8.	Mahokhar	Smt. Jairani	Smt. Sita	Smt. Shivkali	Goatry
9.	Parsiya Khurd	Sri Jagdish	Sri Golu	Sri Ram Dayal	Animal Husbandry
10.	Gourwa	Sri Ram Baran	Sri Radey	Sri Ram Narayan	Goatry
11.	Banjari Khurd-I	Smt.Muniya	Smt. Muniya-II	Sri Kusum Kali	Tailring
12.	Banjari Khurd-II	Smt. Sushila	Smt. Hirawati	Smt. Parwati	Tailring
13.	Suraj Garh-I	Smt. Amarawati	Smt. Hirakali	Smt, Asha	Animal Husbandry
14.	Suraj Garh-II	Sri Shankar	Sri Ramji	Sri Rajendra	Goatry
15.	Karaundiya	Smt. Rekha	Smt. Manti	Smt. Shimla	Animal Husbandry
16.	Pindariya-I	Sri Aditya	Sri Moti Lal	Sri Sukhlal	Goatry
17.	Pindariya-II	Sri Ram Sagar	Sri Suresh	Sri Daya Shankar	Animal Husbandry
18.	Pindariya-III	Sri Ram Singh	Sri Mukesh	Sri Chhotey	Goatry

7. USER GROUP

User Groups are normally formed to manage an activity or asset created under the programme on a long term basis. The user group collects user charges from their members, oversee the works and manage the benefits. It was decided that each group would formulate certain internal rules and have a feeling of ownership with community spirit. The details of the user groups of the project area is given below.

Table – 4.5 : DETAILS OF USERS GROUPS IN PROJECT AREA

Sl. No.	Name of Micro watershed	Nos. of User group	Total Member in User groups
1.	Gajariya	1	10
2.	Manigarha-I	1	10
3.	Manigarha-II	1	10
4.	Manigarha-III	1	11
5.	Manigarha-IV	1	10
6.	Manigarha-V	1	10
7.	Baroha	1	12
8.	Mahokhar	1	10
9.	Parsiya Khurd	1	10
10.	Gourwa	1	11
11.	Banjari Khurd-I	1	10
12.	Banjari Khurd-II	1	10
13.	Suraj Garh-I	1	11

14.	Suraj Garh-II	1	10
15.	Karaundiya	1	11
16.	Pindariya-I	1	12
17.	Pindariya-II	1	10
18.	Pindariya-III	1	10

8. INSTITUTIONAL ARRANGEMENT AT PROJECT LEVEL

The SLNA would evolve appropriate mechanisms for selecting and approving the PIAs, who would be responsible for implementation of watershed projects in different districts. These PIAs may include relevant line departments, Autonomous organizations under State/Central Governments, Government Institutes/Research bodies, Intermediate Panchayats, Voluntary Organizations (VOS).

However, the following criteria may be observed in the selection of these PIAs:

i. They should preferably have prior experience in watershed related aspects or management of watershed development projects.

ii. They should be prepared to constitute dedicated Watershed Development Teams.

Selected PIAs will sign a contract/MOU with the concerned DWSUs/District Level Committee as referred in para29 that will spell out well –defined annual outcomes, against which the performance of each PIA will be monitored each year and evaluated on a regular basis by institutional evaluators from a panel approved by the SLNA/Departmental Nodal Agency at the central level.

CHAPTER – 5

MANAGEMENT / ACTION PLAN

1. PROBLEM & NEED OF THE AREA:

The major crop in kharif is rice grown in the project area with productivity of 16.96 q/ Ha which is very low which is due todelay in rice transplantation, poor seed & variety replacement rate.Decreasing factor productivity in rice, wheat cropping system is a major challenge to accelerate the economy of farmer.Infestation of pod borer & poor varirty replacement rate in pulses is a major factor in low productivity of pulses & oil seeds.Broad coasting of seed & fertilizer in kharif pulses affect the yield of pulse.Most of the milch animal is local breed with low milk potential affect the milk productivity in the study area.

2. PROBLEM OF AGRICULTURAL LAND:

Low yield of rice and wheat crop,Infestation of pod borer, small size of agricultural fields, soil erosion and uneven character of serface of the land require better variety of seed,Deficiency of multy nutrient specially sulphur,iron,zink,cheking the wheat yield.Breed improvement of animal and training to the farmers of the study area are the fundamental need.

To deal with these problems A two-fold approach- physical and social,as they are complementaty to each other should be adopted because physical reclamation of land is achieved through chemical treatment of water logged soils and is followed with scientific rotation of crops. Social approach on the other hand is reflected through overall rural reconstruction, promoting agriculture and its productivity in particular.

Consolidation of land holdigs is one of the measures among many.

Soil erosion has become now one of the major environmental problems and a serious constraint for aricultural production. There are many physical and socialfactors which determine the extent and severity of soil erosion.the principal physical factor are erosivity of rainfall, erodibility of soil, severity of periodic floods, length and steepness of the slope. The important social factors are deforestation, over grazing, nature of land

use and mathods of cultivation.On the other hand, sheet erosion cause by rains and erosion due to winds are least visible but eqully serious as the too take a heavy toll of presious top soils.

Soil conservation:-

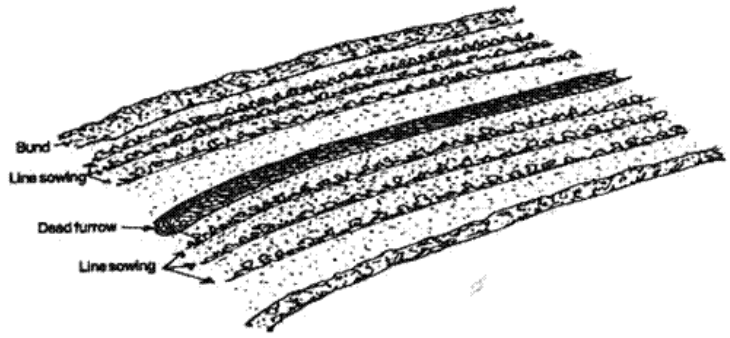
Soil and water conservation measures consist of agronomical and mechanical methods. Agronomic methods are supported with mechanical measures where land slope exceeds permissible limits and runoff gains erosive velocities.

The following boxes explain the nature of agronomic measures which are essential in inter-bunded or terraced areas. These practices enhance the utility value of all kinds of mechanical structures.

Contour Tillage

All agricultural operations such as ridging, ploughing, harrowing, sowing, trenching, etc., are recommended to be done on the contour wherever possible or at least generally across the direction of the slope where holdings are very small. Even though the operation is very simple, it plays a major role in retarding the process of soil erosion through runoff. It also conserves soil, and due to increased time of concentration, more rainwater seeps through the soil profile to recharge ground water. Summer ploughing leaves the soil highly absorbent of initial rains

Contour cultivation in inter-bunded area



DeaFurrows

When all tillage operations are complete; it is advisable to leave a deep dead furrow at every 10 m interval. This should remain in position until the crop is harvested. Dead furrows aid in reducing the runoff velocity and they also conserve water.

Organic Matter

The study area soils are very poor in organic matter, especially in deob areas. This can be improved by leaving the crop residue in situ (on the fields).

Adding organic manures such as farmyard manure and compost every year as basal application to the soil improves the physical condition of the soil considerably. Soil – Air, Soil – Temperature, and Soil – Moisture relationships are well balanced with the presence of organic matter. Organic matter improves the activities of soil microorganisms and also provides the much needed micro plant nutrients of all kinds, besides nitrogen, phosphorus and potash.

Addition of large amounts of chemical fertilizers to study area crops should be discouraged as it damages the soil due to:

- excessive depletion of scarce soil moisture for its own transformation;
- reduction in all soil microorganism activity; and
- destruction of soil structure

Strip Cropping

Raising Erosion Permitting Crops (EPC) with Erosion Resistant Crops (ERC) having abundant adventitious root system and providing high percentage of canopy in strips in a ratio of 2:1 or 3:1 (i.e. 20 to 10 rows or 30 to 10 rows) helps in trapping soil from EPC strips to ERC strips

The increased resistance to runoff in ERC results in higher volume of water percolating through soil profile, due to increased time of (on-ground) concentration.

The close-growing ERC strips are generally legumes which fix nitrogen in the soil and enrich it.

The canopy of the ERC also protects the soil from beating action of rain drops. Strip cropping also helps in stabilizing crop production.

HORTICULTURE DEVELOPMENT

As per the current senerio of the country under the yellow revolution, Horticulture is an important component of land use management. Now India is the second largest producer of fruits in the world after Brazil.

However, 53% of the total geographical area of the country is degraded due to various reasons. Fruit trees and fruit based systems are the viable alternatives for economic utilization of such lands. The basic philosophy behind the conservation horticulture is the use of available resources and skillful choice of fruits. The use of available soil moisture , collection of the runoff water from the catchment area to make up the deficit requirements as well as in situ water harvesting techniques are some of the measures . The in situ water harvesting techniques should be used for growing trees in such a way that each tree has its own micro catchment area. The success of the conservation of horticulture entirely depends on the selection of economically viable hardy varieties of fruit crops resistant to moisture stress or drought and other adverse climate conditions. The fruit crops selected for degraded lands must be such that their maximum growth take place during the period of maximum water availability in the soil and should have low demand.

The main constraints which restrict development of the horticulture land use in degraded lands are enumerated below:

(A) Basic constraints

1- Lack of suitable agro-techniques for degraded lands

2- Lack of trained resource persons

3- Inadequate dissemination of the technologies

4- Lack of community approach

5- High biotic interference

6- 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 branches, 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 evapotranspiration, 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.

Horticulture Practices (For plantation)

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 ie. 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).

Mango, Ber, Guava, Karonda, Bel, Amla, Lemon, and Phalsa etc. are the plants which fulfill this requirement and all these fruit plants are most suitable for this 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 Site 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 dryfarrming 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 mare 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.

In Vedas, Upanishad and Puran, the importance of trees is said. There are 27 Nakshatras in a year and there is one of each Nakshtra. The people should planted the tree of their Nakshtra, And they should be never destroyed.

The name of Nakshtra and their tree are as follows:

S.No.	Name of Nakshatras	Name of Tree
1.	Bharini	Aamla
2.	Kritika	Goolar
3.	Rohini	Jaamun
4.	Mrigshira	Khair
5.	Aadra	Agar
6.	Punarvasu	Baans
7.	Pushya	Peepal
8.	Ashalekha	Chameli
9.	Magha	Bar (Banyan)
10.	Purvafalguni	Dhak
11.	Chitra	Bel

12.	Swati	Arjun
13.	Vishakha	Babool (Acacia)
14.	Mool	Raal Vriksha (Bitumen)
15.	Purvaabhadrapad	Aam (mango)
16.	Uttaraabhadrapad	Nimbu (Lemon)
17.	Revati	Mahua

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

S.No.	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	80.00
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**
Say								**Rs. 172.00**

Agro-horticulture

Marginal lands do not produce good annual crop returns even in normal season. These kinds of soils are best used for raising trees of economic value and creating permanent assets. Some of these lands are also very good for raising horticultural crops such as mango, ber, pomegranate, tamarind etc. A part of the land could be earmarked specially for planting mixed tree species known in the area for providing fuel, fodder and timber for household needs and agricultural implements. Trees provide stable and sustained income every year, especially in drought years.

Role of Vegetation

Vegetation is crucial in preserving productive soil and conserving rain water for sustaining life. Soil and water need to be preserved for crop production (both annual and plantation crops) as well as plants that give fuel, fodder, fruits, industrial raw materials, medicinal and aromatic plants and the like.

Minor vegetation such as creepers, shrubs, various kind of grasses, legumes and plants like Agave, which yield fibre have an important role when grown in gullies of various kinds and also on upstream and downstream sides of mechanical structures such as gully checks, water harvesting structures, etc. These provide reinforcement and extend the life span of the structures by binding the soil through the network of their root systems. These plants also provide fodder to animals in the area.

Seed Rates

Normal season : Sowing is done with the normal seed rate. However, if there is a drought during the plant’s growth period and wilting is likely to occur, selective thinning is recommended to reduce the plant population to effectively use the scarce soil moisture among fewer plants.

Late season : Where the monsoon is moderately delayed, normal cropping with reduced seed rate is advised.

Line Sowing

Line-sowing on contours is essential. It arrests runoff and conserves soil being eroded. It helps in the use of labour-efficient implements in weeding (i.e., removal of unwanted vegetation through use of different sizes of blade harrows between the rows).

Wider Spacing

In all drought-prone areas, the most important objective is to raise a successful crop under scarce soil moisture conditions. One of the recommended practices is wider spacing between rows and between plants within the row. This reduces plant population and competition between plants for scarce soil moisture. Fewer plants have greater access to limited available soil moisture.

Weeding

Frequent weeding is an important part of dryland agriculture. Line sowing and mechanical weeding, with appropriate size of blade harrows, remove unwanted vegetation which competes with the main crop. It is not uncommon to see the dryland farmer hitching several blade harrows to one yoke and a pair of bullocks. Weeding within rows can be done using hand hoes. Removal of unwanted vegetation helps the main crop obtain greater accessibility to soil moisture and plant nutrients for its own growth.

Mixed/Inter Cropping

Mixed cropping of different crops along with the main crops, such as millets and different legumes, is an insurance against the vagaries of the monsoon. The different root systems of mixed crop feed at different depths of the soil. Moreover, mixing cropping provides small quantities of grain of different kinds for home consumption at different times.

Mulching

Mulches are ground covers that prevent the soil from being washed away, reduce evaporation, increase infiltration, and control growth of unwanted weeds. Mulch can be organic crop residue, pebbles, or materials such as polythene sheets. Mulching prevents the formation of hard crust after each rain. Organic mulches add plant nutrients to soil upon decomposition. Use of blade harrows between rows also creates "dust mulch" by breaking the continuity of capillary tubes of soil moisture.

Contingent Planning

With every care taken to undertake timely agricultural operations, it is still possible that the whole operation becomes a gamble due to unpredictable monsoons. The main crop could fall in the early part of its life cycle. In such cases, the farmer should come up with an alternate crop that can mature in a very short time and under hard conditions to take advantage of what is left of the rainy season. Contingent planning helps catch and make the best use of late rains. Advance planning is necessary in selecting a contingent crop. And all the requisites for its sowing should be ready within the main season itself. Credit for farmers must be made available at the right time.

Mechanical Methods

Where the slope of the soil is more than permissible, mechanical measures such as bunding, terracing and trenching are recommended in addition to agronomic methods. Agronomic methods are used in inter-bunded areas and mechanical practices complement to help boost crop yields in rainfed drylands.

Indigenous technical knowledge

Local technologies evolved by people over generations of experience should be used before any new recommendation is made.

ENTRY POINT ACTIVITIES

Integrated Watershed Development Programme IIIrd is aimed at the socio-economic upliftment of the dwellers of watershed and to create trust about the programme being implemented so that they can coordinate in participatory mode for success of the programme. As per the New Common Guidelines total financial outlay for 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 the *pucca jagat* will be constructed, to increase the irrigation water availability existing older Bundhis that are not functioning will be reconstructed/ renovated. Repairing and maintenance of water bodies have been proposed on priority basis. Schools lies in the watershed area will be equipped with drinking water facility and extracurricular activities will be promoted among the children's of the watershed by supplying sport goods to the schools. To approach watershed village's construction and repairing of damaged *pulia* has also been proposed. Total estimated cost for these activities is Rs. 21.95 lacs.

Table -5.1 : Entry point activities (EPA) (All financial figures in lakh Rs.)

Sl.No.	Name of Village	Amount Earmarked for EPA	Entry Point Acitivies Planned	Estimated Cost (Rs. in Lakh)
1.	Mudpeli, Gajaria, Manigarha, Dewari, Baroha, Parisa Mudpeli, Tita, Patpara, Jharha, Mahokhar, Vyoguna, Gaurva, Parisa khurd, Karaoundia, Jhagraha, Paudi Rampur, Banzari Khurd, Surajgarh, Harbara, Baraya, Pidaria, Fhuliyari, Chaura, Khajurahat	21.95	Renovation of existing Bandhi, well Repairing, Const. of Chabutra, Culvert, Rapata etc.	21.95

Repair & Renovation of old well (EPA)

REPAIR AND RENOVATION OF EXISTING BUNDHI (EPA)

WORK PROPOSED FOR NATURAL RESOURSE CONSERVATION IN WATERSHED MANAGMENT:

For soil and moisture conservation, water resource development, horticulture, agro-forestry vegetation/ plantation work and construction of engineering structures have been proposed under the project. Engineering structures are important components of soil and water conservation that can play a vital role in erosion control on arable land. Engineering measures usually involve creating mechanical barriers across the direction of flow of water and thus retard or retain runoff on the following principles:

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

1. A. Contour bunding:

Contour bunding is an effective measure to check erosion and helpful in moisture conservation in dry areas having less than 2% slop by reducing the length of slope. Contour bund will be constructed against the slope in 2187 ha. of land with total estimated cost of Rs. 69.984 Lacs.

B. Marginal, Peripheral Bund, Submergence Bundhis and Gully Plug:

Marginal bunds are the engineering structure to reduce the volume and speed of runoff. Those locations where there is a change in slope and soil texture peripheral bund will constructed along with the nala bank. Submergence Bundhis will be constructed at middle reaches of the watershed have in lesser slop. However, gully plug structure has been proposed to be formed on upper reaches / I^{st} and II^{nd} order streams. Total proposed a treatable area is 525.0 ha with financial outlay of Rs. 24.15 Lacs.

2. Water Harvesting Bundhis & Pucca Check Dams:

Water harvesting bundhis are primarily aimed at collecting and storing any form of water either through rainfall, runoff or sub-surface flow for multiple purposes. These structure of built of masonry. Check dams have been proposed constructed in big gullies/ravines carrying relatively high run of and sediment load. Water stored in check dams will be utilized as source of irrigation water during post monsoon season. Total proposed a treatable area is 1645.0 ha with financial outlay of Rs. 158.646 Lacs.

4. Agro Forestry

About 144.0 ha land 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 and Mungbean, til, etc planted as intercrop; Subabool will be used as fuel as well as fodder. Estimated financial outlay for agro forestry is Rs. 10.80 lacs.

5. Dry Land Horticulture

About 72.0 ha. Area in the watershed have been proposed to be planted of fruit trees like Aonla, Karaunda, Bael, Guava, Sharifa and Mango . Estimated financial outlay for Dry land horticulture is Rs. 10.80 lacs.

Table : 5.2 : Treatment of Micro Watershed:

S. No.	Watershed Reaches	Proposed Work	Treatable Area (ha.)	Proposed Cost (Rs.lakh)
1	**Upper Reaches**	a) Contour bund	2187.00	69.984
2	**Middle Reaches**	a) Marginal bund, Peripheral bund, Submergence bund, Earthen check dams	525.00	24.150

		b) Agro-forestry/Horticulture	216.00	21.600
3	**Lower Reaches/Drainage Line Treatment**	a) Water harvesting bundhi with Drop spill way/Drop inlet spill way and pucca check dam	1645.00	158.646
		Total	**4573.00**	**274.38**

Table : 5.3 : DETAILS OF ACTIVITIES OF PREPARATORY PHASE

Name of villages	Institutional and capacity buildings	Detailed Project Report	Total estimated cost
24	27.438	5.488	32.926

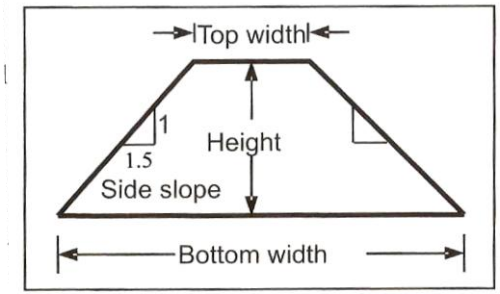
Table – 5.4 : OTHER ACTIVITIES OF WATERSHED WORKS PHASE - PROPOSED TARGET

Name of Villages, Watersheds	Construction of bunds (Field bund, contour bund, Marginal bund & Peripheral Bund)		Treatment of Soil and Construction of water recharging structures, horticulture		Agro-forestry/Hoticulture		Rain fed Horticulture without fencing	
	Area (ha)	Cost Rs. in Lakh	Area (ha)	Cost Rs. in Lakh	Area (ha)	Cost Rs. in Lakh	Area (ha)	Cost Rs. in Lakh
1	2	3	4	5	6	7	8	9
2A7D7i2a, 2A7D7e1a, 2A7D7e1b, 2A7D7i3b, 2A7D7e1f, 2A7D7o1d, 2A7D7i3a, 2A7D7i2c, 2A7D7i3d, 2A7D7g2b, 2A7D7g2d, 2A7D7g2c, 2A7D7g2e, 2A7D7g1c, 2A7D7g2a, 2A7D7i1d, 2A7D7g1a, 2A7D7m2	525.00	24.150	2187.00	69.990	216.00	21.6	-	-

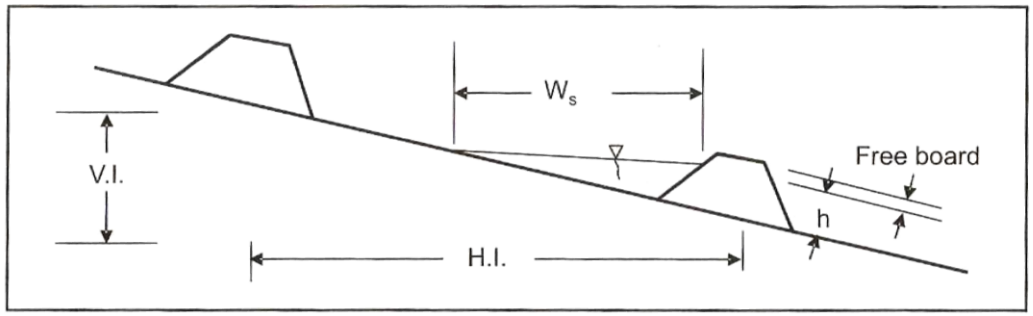
New and renovation of existing water harvesting structures such as talab and water bodies etc.		Afforestation and development of Silvi Pastoral		Drainage Line Treatment Pucca Structure Inlet, Outlet and Spillway	
10	11	12	13	14	15
Area Ha	Cost in Lacs	Area Ha	Cost in Lacs	Area Ha	Cost in Lacs
1645.00	158.64	-	-	-	-

Abstract of Micro Watershed wise Treatable Area & Proposed Cost

SL.No.	MWS Code	Project Name	Treatable Area in Ha.	Proposed Cost in Lakh
1	2A7D7i2a	Gajaria	**305.00**	**36.60**
2	2A7D7e1a	Manigarha-I	**60.00**	**7.20**
3	2A7D7e1b	Manigarha-II	**115.00**	**13.80**
4	2A7D7i3b	Manigarha-III	**237.00**	**24.44**
5	2A7D7e1f	Manigarha-VI	**315.00**	**37.80**
6	2A7D7o1d	Manigarha-V	**429.00**	**51.48**
7	2A7D7i3a	Badoha	**305.00**	**36.60**
8	2A7D7i2c	Mahokhar	**482.00**	**57.84**
9	2A7D7i3d	Parsia Khurda	**193.00**	**23.16**
10	2A7D7g2b	Gaurwa	**320.00**	**38.40**
11	2A7D7g2d	Banjari Khurd-I	**265.00**	**31.80**
12	2A7D7g2c	Banjari Khurd-II	**85.00**	**10.20**
13	2A7D7g2e	Surajgarh-I	**125.00**	**15.00**
14	2A7D7g1c	Surajgarh-II	**180.00**	**21.60**
15	2A7D7g2a	Karaundia	**322.00**	**38.64**
16	2A7D7i1d	Pindaria-I	**325.00**	**39.00**
17	2A7D7g1a	Pindaria-II	**285.00**	**34.20**
18	2A7D7m2b	Pindaria-III	**225.00**	**27.00**
		Total	**4573.00**	**548.70**



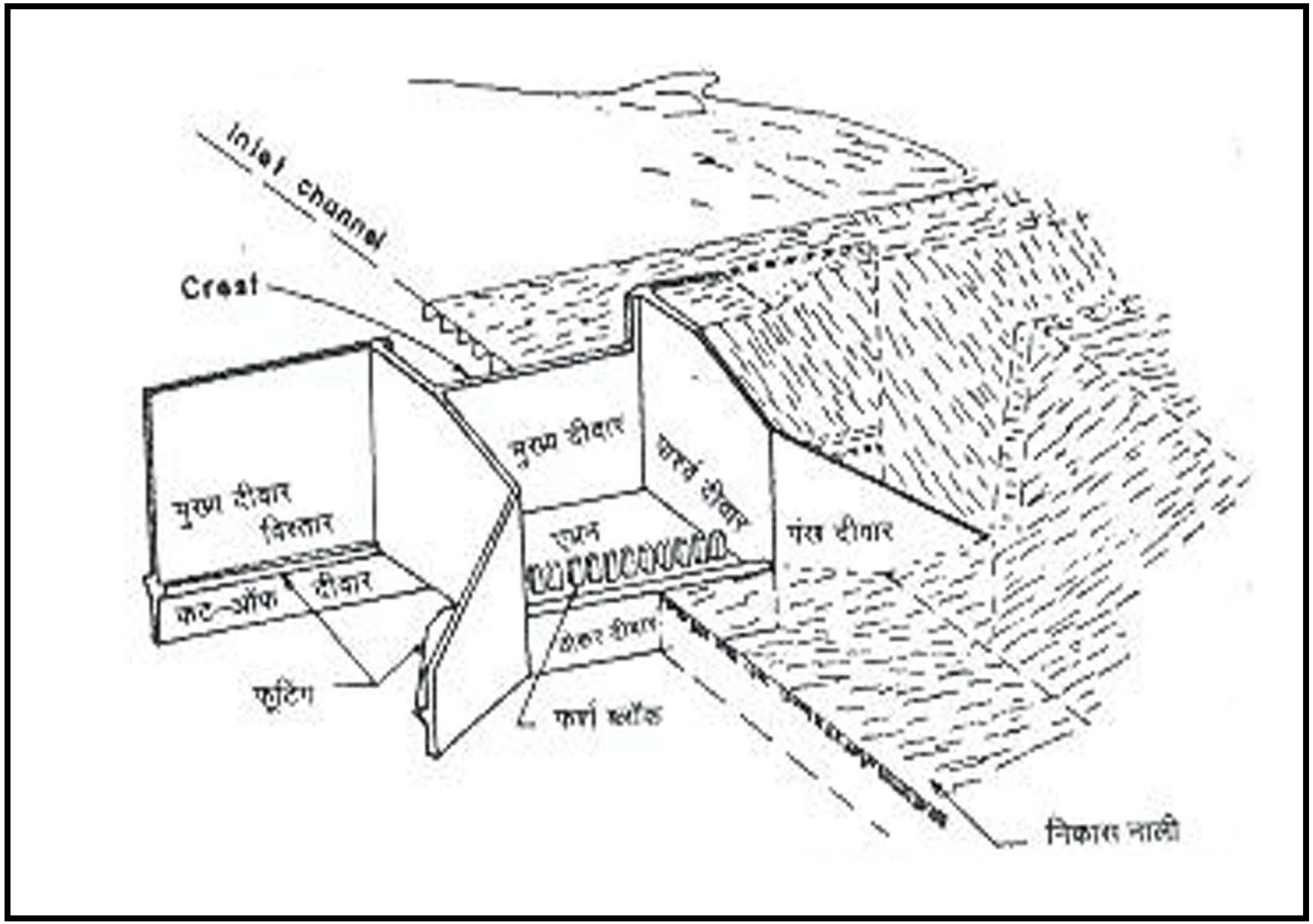
Cross-section of a contour bund



Definition sketch for a contour bund


फार्म पाण्ड


जल संचय बंधी


Inlet channel
Crest
मुख्य दीवार
पार्श्व दीवार
मुख्य दीवार
विस्तार
एप्रन
पंख दीवार
कट-ऑफ दीवार
छोटा दीवार
फुटिंग
फर्श ब्लॉक
निकास नाली

कृषि वानिकी एवं उद्यानीकरण

DRAWING OF DETAIL ESTIMATE OF PRODUCTION SYSTEM AND MICRO-ENTERPRISES IN WATERSHED WORK PHASE

DEMONSTRATION OF WHEAT

1- Variety recommended for District-Mirzapur

Irrigated-RR-21

Unirrigated –HD2285, K68

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 WATERSHED (PER ha)

S.No.	Particulars	Quantity	Rate	Amount	Remark
1	Tillage operation or preparation of field for sowing	1.0ha	1000.00/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	100.00kg	18.00/kg	1800.00	
3	Sowing by seed drill	1.0ha	1000.00/ha	1000.00	
4	D.A.P. 18:46	160kg	573.00/ 50 kg	1833.60	
5	Urea	210kg	270.00/ 50 kg	1134.00	
6	Potash(M.O.P.)	150kg	300.00/50kg	900.00	
7	Irrigation(three irrigation)	1.00ha	650.00/ha	650.00	
8	Harvesting	1.00ha	2000.00/ha	2000.00	
Total				**5667.60**	
Say				**5700.00**	

Hence demonstration cost of wheat /ha is Rs. 5700.00

DEMONSTRATION OF ARHAR IN WATERSHED AREA(PER ha)

1- Variety - Malviya-13, narendra-1, Amar

2- Seed rate/ha -30 kg

3- Requirement of fertilizers/ha N-20.0 kg, P-50 kg, K-40 kg

ESTIMATE FOR DEMONSTRATION OF ARHAR (PER ha)

S.No.	Particulars	Quantity	Rate	Amount	Remark
1	Tillage operation in preparation of field and seed sowing	1.0ha	1000.00/ha	2000.00	Since the project is to be operated in participatory Mode, contribution by the farmer in the form of tillage, operation, sowing and harvesting provided by participating farmers, hence this cost is not included in the estimates.
2	Cost of seed	30.0kg	120.00/kg	3600.00	
3	Nitrogen N.P.K 16:32:16	190.0kg	470.00/50kg	1786.00	
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				**Rs. 6400.00**	

Hence per hectare of demonstration –Rs. 6400.00

DEMONSTRATION OF HYBRID BAJRA IN WATERSHES (per ha)

1- Requirement of Seed / ha -10kg

2- Requirement of fertilizers/ ha N- 60.00 kg, P- 40.00 kg, K-40.00 kg

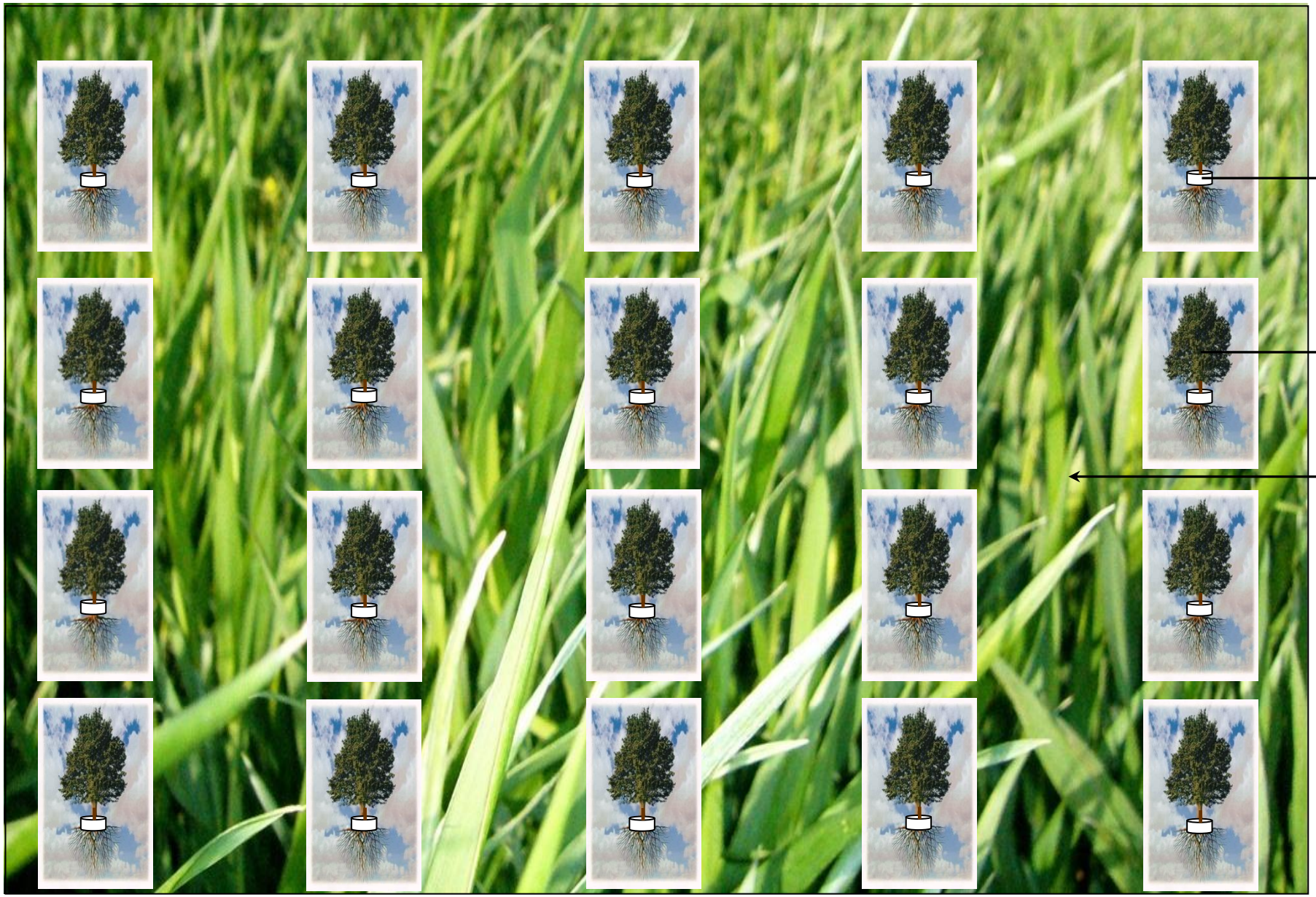
3-

ESTIMATE FOR DEMONSTRATION OF BAJRA (per ha) RAINFED

S.No.	Particulars	Quantity	Rate	Amount	Remark
1	Tillage operation in preparation of field and for sowing	1.0ha	1000.00/ha	2000.00	Since the project is to be operated in participatory Mode, contribution of tillage operation, and harvesting cost
2	Cost of seed	10.0kg	130.00/kg	1300.00	
3	Nitrogen N.P.K 16:32:16	125.0kg	470.00/50kg	1175.00	
4	Urea	90kg	270.00/50 kg	486.00	
5	M.O.P.	40kg	300.00/50kg	240.00	
6	Harvesting	1.00Ha	650.00/ha	600.00	
Total				**3201.00**	
Say				**Rs. 3200.00**	

Hence per hectare of demonstration of Bajra is Rs. 3200.00/ha

DEMONSTRATION OF AGRO-FORESTRY / HORTICULTURE



DEMONSTRATION OF AGRO-HORTICULTURE USING PLASTIC DRUM OF 2OO LITRES CAPACITY

District Mirzapur is situated in Eastern U.P., where there is water problem and in summer temperature rises up to 48°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 Anna Pratha and 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 able to take nutrients from upper layer of fields and there will 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 goes 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 by Anna Pratha.

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

For 1.00 Hectare

S.No.	Description of Work	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**
2.	Farm yard manure	156x10				1560 kg
3.	Filling of earth work with farm yard manure	156	3.14 x 1.00	-	1.20	587.80 cum
4.	C.C.W. 1:2:4 for fencing poll	133	0.20	0.20	0.20	1.064 cum

5.	Angle iron for poll	133	1.80	-	-	239.40 m
6.	Barbed wire	3	400	-	-	1200.00 m
7.	Plants	156	-	-	-	156 nos.
8.	Plastic drums (200 litre)	156	-	-	-	156 nos.

CONSUMPTION OF MATERIALS

S.No.	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	0.446	0.883	-	-	-
2.	Angle iron	239.4 m	-	-	-	-	239.40	-	-
3.	Barbed wire	1200.0 m	-	-	-	-	-	1200.0	-
4.	Farmyard manure	1560.0 kg	1560 kg	-	-	-	-	-	-
5.	Plastic drum	156 nos.	-	-	-	-	-	-	156
Total			**1560.0 kg**	**6.49**	**0.446**	**0.883**	**239.40**	**1200.0**	**156**
Say			**1560.0 kg**	**6.50 bags**	**0.450 cum**	**0.900 cum**	**239.40**	**1200.0 m**	**156**

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Farm yard manure	1560.0 kg	10.00/kg	15600.00
2.	Barbed wire	1200.0 m/120.0 kg	60.50/kg	7260.00
3.	Angle iron	239.40 m/785 kg	40.50/kg	31792.50
4.	Plastic drum	156 nos	690.00 each	107640.00
5.	Cement	6.50 bags	285.00/bag	1852.50
6.	Coarse sand	0.450 cum	2500.00/cum	1125.00
7.	G.S.Grit 10-20 mm	0.900 cum	1250.00/cum	1125.00
8.	Plants	156 nos	18.00 each	2808.00
Total				**Rs. 1,69203.50**

LABOUR CHARGES

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth work	1514.02 cum	36.66/cum	55503.97
2.	C.C.W. 1:2:4	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	1,69203.50
2. Labour Charges	58,527.85
Total	**Rs. 227730.35**
Say	**Rs. 2,27,730.00 only**

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 *Crotolaria 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 I.W.M.P. Project, efforts will be made to oblise the farmers for Green Manuring.

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

ESTIMATE FOR GREEN MANURING IN THE WATERSHED (PER ha)

S.No.	Particulurs	Rate	Cost	Remark
1	Seed of Sesbania (Dhaincha)25Kg/ha	25.00/Kg	625	Since the project is to be operated in a participatory mode, contribution in the form of tillage will be done by farmers is 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 L.B. Ghaghra, Sarju Branch, Soti Jori 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- Jawar+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 tress 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	Forge 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 determent 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.

CHAPTER – 6

CAPACITY BUILDING

CAPACITY BUILDING

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.

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 project staff, this would also provide opportunities to community members to develop their capacity as the future custodians of the programme after project's withdrawal. Member of project implementation agency (PIA) and watershed development team (WDT) will be equipped with recent technical knowledge of watershed development at Deen Dayal Upadhyay Gramya Vikash Sansthan BKT, Lucknow and KVK BHU, Barkachha, while members of watershed committee, (WC), Self Help Group (SHG), Users Group (UG) and other beneficiaries will be trained at KVK, BHU Barkachha, Mirzapur and in

the filed i.e. at the project area of IWMP IIIrd Hallia Mirzapur. Total financial outlay for capacity building is @5% (Rs. 27.438 Lacs) of the total project cost have been proposed.

SCOPE OF CAPACITY BUILDING AT PROJECT AREA

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

CHAPTER -7
PHASING OF PROGRAMME & BUDGETING

SCIENTIFIC PLANNING

Watershed management as a strategy has been adopted by Government of India especially in the rain-fed regions of semi-arid tropics. These regions 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 watershed development. The common guidelines generate a fresh and flexible framework for the next generation watershed development.

Cluster Approach

This envisages integrated development of Geo-hydrological unit i.e. Treatment of cluster of micro – watershed. The IWMP Mirzapur Project consist of 18 micro watersheds.

Base line Survey

To access the impact of any watershed development programmed a detailed baseline survey has been 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 Talati – cum mantri. Household census survey includes a detailed questionnaire which has 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 and net consumption rate in the village, average milk production of the cattle and various schemes running and their benefits

Participatory Rural Appraisal (PRA)

PRA was developed for quick field – oriented results with objectives as follows :

a) Appraising agricultural and other needs of rural community;

b) Prioritizing areas of research tailored to such needs;

c) Assessing feasibility of developmental needs and action plands;

d) Implementing action plans, monitoring and evaluating them.

Use Of GIS And Remote Sensing For Planning

Use of various GIS and Remote Sensing Technologies has been promoted at various stages of watershed development.

Prioritization

Geographical Information System (GIS) has been used for prioritization process. Various maps were created using spatial and non spatial data like Geo-morphological maps, Soil data, Crop productivity data, Meteorological data, BPL Population, SC/ST population, Ground water Status, Drinking water situation, Slope percent. These were all given proper weightage according to the DoLR specification. This will be helpful for effective dissemination of information on land and water resources to the users.

Planning

An 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 0.3 meter at a scale of 1:4000 was used for identifying various locations for soil and water conservation structures. GIS study is used to identify the area require the degree of concentration for the implementation of Watershed Plan.

Hydrological modeling

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

Bio-physical survey was undertaken to identify various natural resources available in the village. It included the soil typology, wells in the area, crop taken in the field, Cropping pattern, fertilizer used and various sources of irrigation in the field. The details of scientific planning and inputs of the projects area is given below.

Table- 7.1 : Details of Scientific Planning and Inputs in IWMP projects

Scientific criteria / input used	Whether scientific criteria was used
(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	Yes
Cadastral map	Yes
Village boundaries	Yes
Drainage	Yes
Soil (Soil nutrient status)	Yes
Land use	Yes
Ground water status	Yes
Watershed boundaries	Yes
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
Bio-pesticides	No
Organic manures	No
Vermi compost	Yes
Bio-fertilizer	Yes
Water saving devices	Yes

Mechanized tools/ implements	Yes
Bio-fencing	Yes
Nutrient budgeting	Yes
Automatic water level recorders & sediment samplers	NO
Any other (please specify)	NO

Water Budgetting

The over all information about the water budgeting is given below :

The total runoff of the water from ridge to value is about 630.00 (mm/year). The status is ground water is about 16 to 16.50 mtrs. The water harvesting structures have been proposed for the upliftment of ground water table.

runoff volume of watershed

To check the runoff the water the existing structure should be restrore like marginal bund, farm bund etc. A Planning for ridge to valley basis have been proposed and accordingly the structures should be made.

(i) Prepatory Phase

As per the requirement of the project area briefly discussed with watershed development teem and the farmers of the project area following activities as prepatory level are being given below :

- Repairment of existing wells.
- Construction of common chabutra.
- Repairment of chuckroad and other kharanja.

- Treatment of drainage.

(ii) Watershed Work Phase :

As discussed in the earlier chapter the protection of watershed and maintenaning ecological balance the area should be treated by constructing countour bunds, marginal bunds, peripherals bunds etc. as required according the slope of the project area.

(iii) Livelihoods :

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 Units for S.H.G.'s formed in I.W.M.P.- III Project

District St. Ravidas Nagar is situated in Eastern U.P. region where the number of sheep is very less and they are small in nature. Goat population is appreciable and in 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, there 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 farmers to goat farming with the formation of more S.H.G.'s and in turn availability of goats for processing units.

Goat excreta shall be of immense help in enrichment of soil fertility.

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

In Eastern U.P. 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. Keeping in view the above facts, goat units shall be formed in the area in intensive way.

16 Goat Units are proposed in I.W.M.P. IIIrd 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 units, from old units for which database maintained shall be of use and it should be assured by buy back arrangement. The details of goat rearing estimate is given below.

Details of the Goat rearing Financial Component

S.No.	Component	Amount
1.	Cost of 10 goats of improved breed (not less than 6 months of age) @ Rs. 3000.00 each	30000.00
2.	Cost of 1 buck of improved breed @ Rs. 5000.00	5000.00
3.	Cost of insurance @ 11.63 / unit	4070.00
4.	Feed cost for 3 months @ 250 gm/ day for goats @ Rs. 11.84/ 250 gm	2930.40
5.	Provision of deworming, mineral and vitamin supplement, treatment, vaccination @ Rs.160/ animal	1760.00
6.	The expense including monitoring expenses, register and records @ Rs. 170.00/ unit	170.00
	Total	**Rs. 43,930.40**
		Say Rs. 43,950.00

Activities of Self Help Groups

Vebbing of carpets, goat rearing, sheep rearing and pheri of carpet are the main SHG activities of the project area.

Head & activity wise budget estimates

Year wise and headwise summery of budget expenditure may be given in **Table. 7.4**., **Table. 7.4(a) & Table. 7.4(b)**

Table- 7.2 IWMP-IIIrd (2010-11) DISTRICT- MIRZAPUR

Work Component financial physical & YEAR WISE PHASING OF IWMP WORKS

(Area in ha. & Rs. in Lac.)

S. No.	Particulars	Ist Year (2010-11)		IInd Year (2011-12)		IIIrd Year (2012-13)		IVth Year (2013-14)		Vth Year (2014-15)		Total	
		Financial Lac.	Physical Hac.	Financial Lac.	Physical Hac.	Financial Lac.	Physical Hac.	Financial Lac.	Physical Hac.	Financial Lac.	Physical Hac.	Financial Lac.	Physical Hac.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Administration Cost 10%	-	To meet out the administrative works/charges	10.975	As per column 4	14.817	As per column 4	14.816	As per column 4	14.268	As per column 4	54.876	As per column 4
2.	Monitoring 1%	-	Monitoring of the Project	1.098	As per column 4	1.097	As per column 4	1.098	As per column 4	2.195	As per column 4	5.488	As per column 4
3.	Evaluation 1%	-	Evaluation of the Project	1.646	As per column 4	1.097	As per column 4	0.823	As per column 4	1.921	As per column 4	5.487	As per column 4

4.	Entry Point Activities 4%	21.950	Renovation of existing Bandhi, well Repairing, Cons. of Chabutra, Culvert, Rapata etc.	-	-	-	-	-	-	-	-	21.950	-
5.	Institution & Capacity Building 5%	5.488	Training and exposure visit	10.975	As per column 4	4.116	As per column 4	4.115	As per column 4	2.744	As per column 4	27.438	As per column 4
6.	DPR 1%	5.488	Preparation of DPR	-	-	-	-	-	-	-	-	5.488	-

S. No.	Particulars	Ist Year (2009-10)		IInd Year (2010-11)		IIIrd Year (2010-11)		IVth Year (2012-13)		Vth Year (2013-14)		Total	
		Fin. Lac.	Phy. Hac.	Fin. Lac.	Phy. Hac.	Fin. Lac.	Phy. Hac.	Fin. Lac.	Phy. Hac.	Fin. Lac.	Phy. Hac.	Fin. Lac.	Phy. Hac.
7.	Watershed Dev. Works 50% A. Soil & moisture conservation i. Construction of Bunds (graded, contour and field Bund)	- -	Treatment of Soil and Construction of water recharging structures, horticulture etc.	8.064	252.00	18.976	593.00	19.001	594.00	23.936	748.00	69.990	2187.00
	ii. Marginal & Peripheral Bundh, Gully Plug	-	-	2.622	57.00	6.302	137.00	6.348	138.00	8.878	193.00	24.150	525.00
	B. Water Resources development i. Water Harvesting	-	-	25.071	323.00	41.484	419.00	41.680	421.00	50.411	482.00	158.64	1645.00

	Bundhi, Pucca Check Dams, Form Pond												
	C. Agro forestry & Horticulture i. Agro forestry ii. Horticulture	- -	- -	2.70 2.70	36.00 18.00	2.70 2.70	36.00 18.00	2.70 2.70	36.00 18.00	2.70 2.70	36.00 18.00	10.80 10.80	144.00 72.00
	Sub Total	**-**	**-**	**41.157**	**686.00**	**72.162**	**1203.00**	**72.436**	**1207.00**	**88.625**	**1477.00**	**274.380**	**4573.00**
8.	Livelihood Activities 10%	-	Dairy, Goat & Poultry Farming & Bee Keeping & Tailoring ect.	5.488	-	21.950	-	16.463	-	10.975	-	54.876	-
9.	Production System & Micro Enterprises 13%	-	Farming system approach-animal, husbandry activities, horticulture, vegetables growing etc.	5.488	-	21.951	-	27.437	-	16.463	-	71.339	-
10.	Consolidation Phase 5%	-	Consolidation activities	-	-	-	-	-	-	27.438	-	27.438	-
	Total	**32.926**	**-**	**76.826**	**686.00**	**137.190**	**1203.00**	**137.190**	**1207.00**	**164.628**	**1477.00**	**548.76**	**4573.00**

Table- 7.3: Abstract of Component wise Physical & Financial outlay of the selected watershed I.W.M.P.-IIIrd (18 Nos.) Mirzapur

S. No.	Component	Total (Rs. in lakhs)
1.	**Administration Cost**	54.876
A.	TA & DA, POL/Hiring of vehicles/ office and payment of electricity and Phone bill etc. computer, stationary and office consumable and contingency. (10%)	
B.	Monitoring (1%)	5.488
C.	Evaluation (1%)	5.487
	Sub Total (12%)	**65.851**
2.	**Preparatory Phases**	21.950
A.	Entry Point Activities, like improvement of drinking water system, Repairing & Renovation Bundhis, check dam and school Activities & const/repair of culverts. (4%)	
B.	Capacity Building (5%)	27.438
C.	Preparation of DPR (1%)	5.488
	Sub Total (10%)	**54.876**
3.	**Watershed works (50%)**	
A.	Soil & moisture conservation	
	i. Construction of Bunds. (graded, contour and field Bund)	69.990
	ii. Marginal/Peripheral Bund, Submergence Bund & Gully Plug	24.150

B.	**Water Resources Development** i. Water Harvesting Bundhi, Pucca Check Dams & Form Pond	158.646
C.	**Agro forestry & Horticulture** i. Agro forestry ii. Horticulture	 10.800 10.800
	Sub Total	**274.380**
4.	**Livelihood Activities (10%)** Income generating 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)	54.876
	Sub Total	**54.876**
5.	**Production System & Micro enterprises (13%)** Demonstration and assessment of improved composting system. i. Seed, Chemical Fertilizer/ Bio Fertilizer, Pest control, Advance Agriculture Equipment, Production of compost ii. Small scale/cotatge industries	71.339
	Sub Total	**71.339**
6.	**Consolidation Phase (5%)**	**27.438**
	Sub Total	**27.438**
	Grand Total	**548.760**

Abstract of Component wise Financial outlay of All Micro Watershed of IWMP- III

Sl. No.	Component	Micro Watershed Code No.						
		2A7D7i2a	2A7D7e1a	2A7D7e1b	2A7D7i3b	2A7D7e1f	2A7D7o1d	2A7D7i3a
		1	2	3	4	5	6	7
1	Administrative Cost							
	i. Admin 10%	3.660	0.720	1.380	2.844	3.780	5.148	3.660
	ii. Monitoring 1%	0.366	0.072	0.138	0.285	0.378	0.515	0.366
	iii. Evaluation 1%	0.366	0.072	0.138	0.285	0.378	0.514	0.366
	Sub Total	**4.392**	**0.864**	**1.656**	**3.414**	**4.536**	**6.177**	**4.392**
2	Preparatory Work							
	1. E.P.A. 4%	1.464	0.288	0.552	1.138	1.512	2.059	1.464
	2. Capicity Building 5%	1.830	0.360	0.690	1.422	1.890	2.574	1.830
	3. D.P.R. 1%	0.366	0.072	0.138	0.285	0.378	0.515	0.366
	Sub Total	**3.660**	**0.720**	**1.380**	**2.845**	**3.780**	**5.148**	**3.660**
3	watershed Works 50%							
	1. Soil Moist. Conser.	6.278	1.235	2.367	4.878	6.484	8.831	6.278
	2. Water Resources Dev.	10.822	1.165	3.333	8.142	11.216	15.709	10.822

	3. Agroforestry /Hoticulture	1.200	1.200	1.200	1.200	1.200	1.200	1.200
	Sub Total	**18.300**	**3.600**	**6.900**	**14.220**	**18.900**	**25.740**	**18.300**
4	Livilihood Activities 10%	3.660	0.720	1.380	2.844	3.780	5.148	3.660
5	Production System & Micro Enterprises 13%	4.758	0.936	1.794	3.695	4.914	6.693	4.758
6	Consolidation 5%	1.830	0.360	0.690	1.422	1.890	2.574	1.830
	Grand Total	**36.600**	**7.200**	**13.800**	**28.440**	**37.800**	**51.480**	**36.600**

Sl. No.	**Component**	**Micro Watershed Code No.**						
		2A7D7i2c	**2A7D7i3d**	**2A7D7g2b**	**2A7D7g2d**	**2A7D7g2c**	**2A7D7g2e**	**2A7D7g1c**
		8	**9**	**10**	**11**	**12**	**13**	**14**
1	Administrative Cost							
	i. Admin 10%	5.784	2.316	3.840	3.180	1.020	1.500	2.160
	ii. Monitoring 1%	0.578	0.232	0.384	0.318	0.102	0.150	0.216
	iii. Evaluation 1%	0.578	0.232	0.384	0.318	0.102	0.150	0.216
	Sub Total	**6.940**	**2.780**	**4.608**	**3.816**	**1.224**	**1.800**	**2.592**
2	Preparatory Work							
	1. E.P.A. 4%	2.314	0.926	1.536	1.272	0.408	0.600	0.864
	2. Capicity Building 5%	2.892	1.158	1.920	1.590	0.510	0.750	1.080

	3. D.P.R. 1%	0.578	0.232	0.384	0.318	0.102	0.150	0.216
	Sub Total	**5.784**	**2.316**	**3.840**	**3.180**	**1.020**	**1.500**	**2.160**
3	watershed Works 50%							
	1. Soil Moist. Conser.	9.922	3.973	6.587	5.455	1.750	2.573	3.705
	2. Water Resources Dev.	17.798	6.407	11.413	9.245	2.150	3.727	5.895
	3. Agroforestry /Hoticulture	1.200	1.200	1.200	1.200	1.200	1.200	1.200
	Sub Total	**28.920**	**11.580**	**19.200**	**15.900**	**5.100**	**7.500**	**10.800**
4	Livilihood Activities 10%	5.784	2.316	3.840	3.180	1.020	1.500	2.160
5	Production System & Micro Enterprises 13%	7.520	3.010	4.992	4.134	1.326	1.950	2.808
6	Consolidation 5%	2.892	1.158	1.920	1.590	0.510	0.750	1.080
	Grand Total	**57.840**	**23.160**	**38.400**	**31.800**	**10.200**	**15.000**	**21.600**

Sl. No.	Component	**Micro Watershed Code No.**				**Total**
		2A7D7g2a	2A7D7i1d	2A7D7g1a	2A7D7m2b	
		15	16	17	18	
1	Administrative Cost					
	i. Admin 10%	3.864	3.900	3.420	2.700	**29.292**

	ii. Monitoring 1%	0.386	0.390	0.342	0.270	**2.930**
	iii. Evaluation 1%	0.386	0.390	0.342	0.270	**2.929**
	Sub Total	**4.636**	**4.680**	**4.104**	**3.240**	**35.151**
2	Preparatory Work					
	1. E.P.A. 4%	1.545	1.560	1.368	1.080	**11.717**
	2. Capicity Building 5%	1.932	1.950	1.710	1.350	**14.646**
	3. D.P.R. 1%	0.386	0.390	0.342	0.270	**2.930**
	Sub Total	**3.863**	**3.900**	**3.420**	**2.700**	**29.293**
3	Watershed Works 50%					
	1. Soil Moist. Conser.	6.628	6.690	5.867	4.633	**50.246**
	2. Water Resources Dev.	11.492	11.610	10.033	7.667	**85.414**
	3. Agroforestry /Hoticulture	1.200	1.200	1.200	1.200	**10.800**
	Sub Total	**19.320**	**19.500**	**17.100**	**13.500**	**146.460**
4	Livilihood Activities 10%	3.864	3.900	3.420	2.700	**29.292**
5	Production System & Micro Enterprises 13%	5.025	5.070	4.446	3.510	**38.078**
6	Consolidation 5%	1.932	1.950	1.710	1.350	**14.646**
	Grand Total	**38.640**	**39.000**	**34.200**	**27.000**	**292.920**

CHAPTER -8
QUALITATIVE ISSUES

PLAN FOR MONITORING OF THE PROJECT

The above project would be monitored regularly by the Watershed Development Team as per the norms of common guideline 2008. There will be every fortnight monitoring schedule have been proposed by the PIA of the project. 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 stakeholder of the project. The system shows the entire state of Uttar Pradesh 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 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.

PLAN FOR EVALUATION OF THE PROJECT

The evaluation of the project would be done by the state and central agency as proposed by the SLNA of the state. The evaluation of the project would also be done by the expert of the respective field like Water Management and Land Resources Management after the completion of the project.

PLAN FOR PROJECT MANAGEMENT

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

CHAPTER -9
CONSOLIDATION / EXIT STRATEGY

WATERSHED DEVELOPMENT FUND

The major source of financial assistance after post implementation period is Watershed Development Fund. The contribution of it will comes mainly from the fund generated.

USER CHARGES

Various user groups will be formed in village. These user groups will collect user 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.

SUSTAINABILITY AND ENVIRONMENT SECURITY

In the proposed watershed management plan of I.W.M.P.-3rd Mirzapur watershed, proper blending of bio engineering measures will be applied on 60% of the total watershed area. Based on the results of studies conducted in this region, it is estimated that more 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 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.

ECONOMIC ANALYSIS

Economic analysis of the project was carried by taking direct benefits and costs considering 25 year project life at 10 per cent discount rate. For this purpose of economic analysis, whole watershed development plan was divided into three sectors namely,

Agriculture, horticulture and forest/fuel wood plantation. Net present value(NPV), Benefit cost ratio (BC) ratio criteria were employed to judge the economic efficiency of each enterprise and sector.

AGRICULTURE

In rainfed agriculture the development cost can be recovered within one year as the present rainfed agriculture is being done on well maintained field, therefore, does not require much investment.

HORTICULTURE

The Economic analysis of the horticulture plantation in agri-horticulture system at I.W.M.P.-2nd watershed has been done and it is expected that the Project life is considered to be 25 years and discount rate for NPV estimation is 10%.

CHAPTER -10
EXPECTED OUTCOME

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. 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 other enter prise development.

Labour migration in search of gainful employment is one of the major problems in the remote watershed in particular. Causal employment opportunities will be generated during the implementation of the project activities. However, the changes in land use pattern and adoption of other subsidiary enterprises will generate employment opportunities for persons in the watershed. The details of the employment generation is given below.

Table - 10.1 : EXPECTED EMPLOYMENT RELATED OUTCOMES

S.No.	No. of the Villages	Wage employment										Self employment				
		No. of mandays (Lakhs)					No. Of beneficiaries					No. Of beneficiaries				
		SC	ST	Others	Women	Total	SC	ST	Others	Women	Total	SC	ST	Others	Women	Total
1	24	1.782	-	0.388	0.114	2.284	1580	-	1475	95	3150	270	-	60	30	360

MIGRATION

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. The detail of the migration is given in **Table 10.2**.

Table- 10.2 : DETAILS OF MIGRATION (I.W.M.P.-III) MIRZAPUR

Name of the Project	No. of Villages	No. of persons migrating	No. of days per year of migration	Main reason for migration	Expected reduction in no. of persons migrating
I.W.M.P.-III	24	279	165	Poverty & beeter employment	75%

DRINKING WATER

As a result of the watershed activities, it is expected that the quantity and quality of drinking water would be improve. The ground water quality of the project area is normal to good, the average Ph value is 6.7 to 7.8, the Electric conductivity of the ground water is about 957 to 1125 U . The overall analysis of the ground water shows that the water is good for the drinking purpose. The water level in the project area ranges from 16.0 to 16.5 metre. Status of the drinking water is given in below.

Table-10.3 : STATUS OF DRINKING WATER

S. N.	No. of the villages	Availability of drinking water (no. of months in a year)		Quality of drinking water	
		Pre-project	Expected Post-Project	Pre-project	Expected Post-Project
1	24	07 months	9 to 10 months	Hard Water, not good	Good

Table- 10.4 : DETAILS OF AVERAGE GROUND WATER TABLE DEPTH IN THE PROJECT AREAS (IN METERS)

S. N.	No. of the villages	Sources	Pre-project	Expected Post-Project	Remarks
1	24	Open wells	16.50 m	15.50 m	-

VEGETATIVE COVER

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

AGRICULTURE

Food crop production is a major land based activity in the watershed. Traditional cultivation practices, coupled with poor quality seeds and long duration crops varieties result in low crop yields. Crops are taken under rainfed as well as irrigated conditions. The yield levels of rainfed crops are particularly very poor. Large variation has been noticed in productivity of wheat and Jowar under rainfed and irrigation, condition respectively. At present level of rainfed farming, the total produce from Rabi and Kharif crops obtained by a medium size of holding owning family can meet food requirements for up to 6 to 7 months only.

The farmers also do not have suitable cropping systems to deal aberrant weather. Weeds impose considerable constraints in producing of both Kharif and rabi crops under irrigation as well as rain-fed production system. Use of weedicide is rare in the watershed. It is expected that the post project period would

see a substantial increase in agriculture production and yield from them. The details of crop area is given in below.

Table-10.5 : MAJOR CROPS GROWN AND THEIR PRODUCTIVITY IN THE PROJECT AREA

S. N.	Names of the crop	Current status		Expected Post-Project Status	
		Area (ha)	Productivity (kg/ha)	Area(ha)	Productivity(kg/ha)
1	Kharif				
	Paddy	2640.00	1150.00	3391.00	1550.00
	Arhar	2161.00	550.00	2701.00	785.00
	Other	1305.00	450.00	1632.00	650.00
	Total	**6106.00**	**-**	**7724.00**	**-**
2	Rabi				
	Wheat	2951.00	950.00	3746.00	1650.00
	Gram	1713.00	650.00	2141.00	850.00
	Other	1332.00	750.00	1667.00	810.00
	Total	**5996.00**	**-**	**7554.00**	**-**
3	Zaid/Other season	-	-	-	-

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.

Table-10.6 STATUS OF FOOD REQUIREMENT AND AVAILABILITY PER ANNUM IN WATERSHED

S. No.	Items	Requirement (q/yr)	Before Project		Proposed	
			Availability (q/yr)	Deficit or surplus	Availability (q/yr)	Deficit or surplus (q/yr)
1	Cereals	49915	39952	-9963	51235	+ 1320
2	Pulses	15050	19772	+4722	21877	+ 6827
3	Oil seeds	11452	9895	-1557	12581	+ 1129
4	Vegetable	37591	25675	-11916	38093	+ 502

LIVESTOCK

The village has quite a good of livestock population. These include cows, bullocks, buffaloes, goats. 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.

ABTRACT OF OUTCOMES

The over all assessment of the project certain parameters have been evaluated on the present and future basis. As mentioned in the above the food grain production according to the expenditure have been analysised after the completion of the project. The ratio of cost benefit and Overall assessment of the project is given in the Table below.

Table-10.7 BENEFIT COST RATIO OF I.W.M.P.- III[rd] MIRZAPUR

Year	Proposed cost (00,000 Rs.)	Operation and maintenance cost (00,000 Rs.)	Proposed Benefit (00,000 Rs.)
1.	32.926	-	0.00
2.	76.826	-	10.00
3.	137.190	-	100.00
4.	137.190	-	250.00
5.	164.628	-	400.00
6.	-	-	400.00
7.	-	-	400.00

BENEFIT: COST RATIO

S.No.	Item	1	2	3	4	5	6	7	Total Cost (Rs.00000)
1.	Discount factor 12%	0.893	0.797	0.712	0.636	0.567	0.507	0.452	
2.	Total cost (00,000 Rs.)	32.926	76.826	137.19	137.19	164.628	-	-	
3.	Benefit(00,000 Rs.)	0.20	10.00	100.00	250.00	400.00	400.00	400.00	
4.	∑ Cost(Rs.00,000)	29.403	61.23	97.679	87.253	93.344	-	-	368.909
5.	∑ Benefit(Rs.00,000)	1.786	7.97	71.20	159.00	226.80	202.80	180.80	850.356

Benefit cost ratio = $\frac{\sum Benefit}{\sum Cost}$

=850.356/368.909

=2.30:1

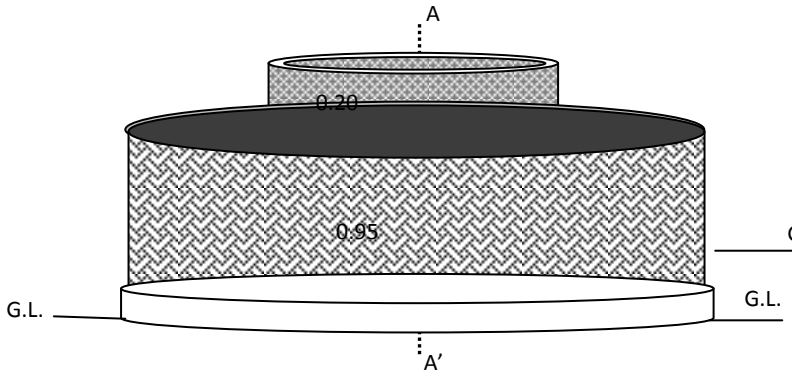
Table - 10.8 : SUMMARY OF EXPECTED /ESTIMATED OUTCOMES OF IWMP-III(2010-2011)

S.No.	Name of Districts	Item		Unit of Me-asurement	Pre-project Status	Expected Project Status
1	2	3		4	5	6
1	Mirzapur	Status of Water Table		Mtr.	17.00	15.50
2		Ground Water Structures Repaired/Rejuvenated		Stage	Poor	Good
3		Quality of Drinking Water		Quality	Unhygienic Drinking Water	Good Quality of Drinking Water
4		Availability of Drinking Water		Month	6-8 Month	9-11 Month
5		Increase in Irrigation Potential		%	10	25
6		Change in Cropping/Land Use Pattern			Mono cropping	Double Cropping
7		Area Under Agricultural Crops				
		I.	Area Under Single Crop	Ha.	**4678.00**	2500.0
		II.	Area Under Double Crop	"	259.0	2178.0
		III.	Area Under Multiple Crop	"	-	50.00
8		Net Increase in Crop Production Area		"	-	1000.0
9		Increase in Area Under Vegetation		"	7.68	144.0
10		Increase in Area Under Horticulture		"	-	72.0
11		Increase in Area Under Fuel & Fodder		"	-	100
12		Increase in Milk Production		%	-	25
13		No. of SHGs		No.	18	35
14		Increase in No. of Livelihood		"	-	Significant Increase
15		Increase in Income		%	-	30
16		Migration		No.	700	150
17		SHG Federation Formed		"	-	1
18		Credit Linkage with Banks		"	-	100
19		Resources Use Agreements		"	-	15
20		WDF Collection & Management		%	-	10
21		Summary of Lessons Learnt		Proposed watershed development work in the area is likely to increase the agriculture and milk production so therefore, food processing work should be promoted in the watershed. To alleviate the poverty from the area self employment via micro enterprises should be effectively and to ensure crop production short duration varieties of oilseeds, pulses and millets should be introduced		

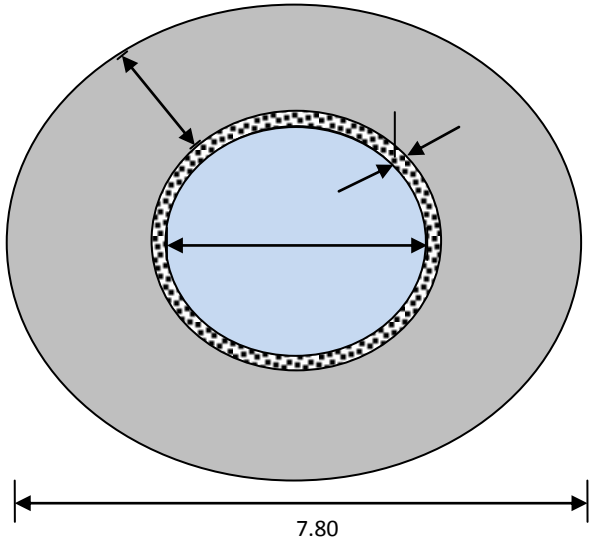
Chapter-11

COST NORMS & DESIGN OF STRUCTURE PROPOSED

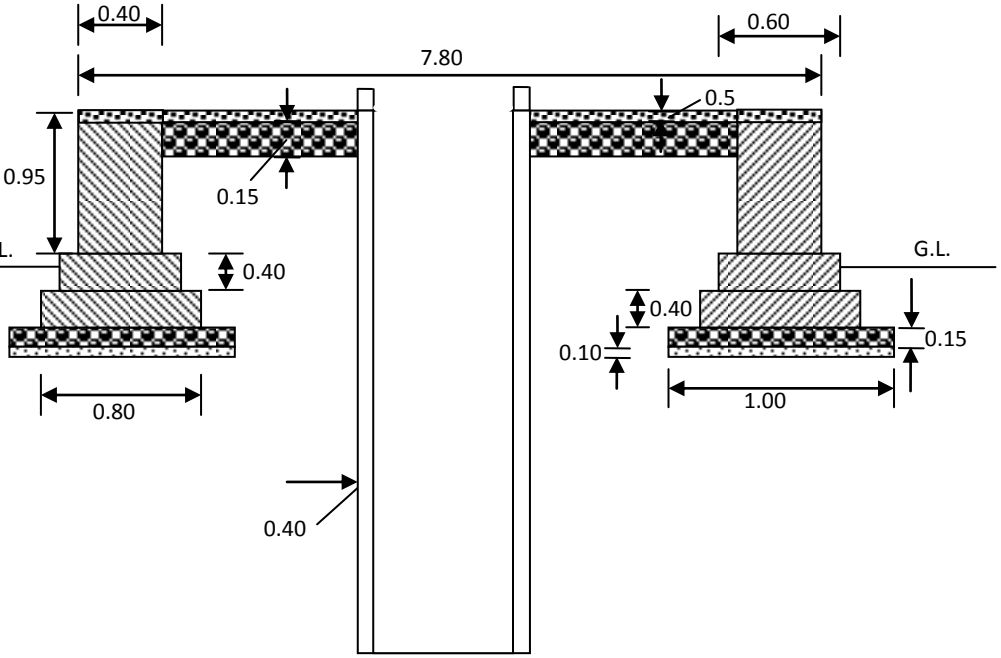
DRAWING OF WELL



ISOMETRIC VIEW OF WELL



PLAN



SECTION AT A-A'

DESCRIPTION

1. C.C.W. - 1:4:8.
2. Brick Work- 1:4
3. Plastering- 1:4
4. Raised Pointing- 1:3.

DETAIL ESTIMATE OF JAGAT OF WELL

S.No.	Description of Work	No.	L	B	D/H	Quantity
1.	Earth work in foundation	1	3.14 x 7.4	1.20	1.00	27.88
2.	Laying of sand	1	3.14 x 7.4	1.00	0.10	2.32
3.	C.C.W. 1:4:8	1	3.14 x 7.4	1.00	0.15	3.48
4.	Brick Work 1:4	1	3.14 x 7.4 3.14 x 7.4 3.14 x 7.4 3.14 x 3.4	0.80 0.60 0.40 0.40	0.40 0.40 0.90 0.20	7.43 5.57 8.36 0.85
						22.21
5.	Filling of earth work	1	3.14 x 5.4	1.60	0.75	20.34
6.	C.C.W. 1:4:8	1	3.14 x 5.4	1.60	0.15	4.06
7.	C.C.W. 1:2:4	1	{(3.14 x 7.8 x 7.8)/4 – (3.14 x 3.8 x 3.8)/4} x 0.05			1.821
8.	Raised pointing	1	3.14 x 7.8	-	0.90	22.04

CONSUMPTION OF MATERIALS

S. No.	Description of Work	Quantity	Cement Bags	Coarse Sand (cum)	Brick (cum)	G.S.B. 25-40 mm (cum)	Grit 10-20 mm (cum)
1.	Sand Laying	2.32 cum	-	2.320	-	-	-
2.	C.C.W. 1:4:8 (4.06 + 3.48)	7.54 cum	25.63	3.393	-	7.012	-
3.	Brick Work 1:4	22.21 cum	53.30	7.551	22.21	-	-
4.	C.E.W. 1:2:4	1.821 cum	11.10	0.764	-	-	1.547
5.	Raised Pointing	22.04 m^2	1.01	0.103	-	-	-
Total			**91.04**	**14.131**	**22.21**	**7.012**	**1.547**
Say			**91 bags**	**14.13 cum**	**22.20**	**7.01**	**1.55**

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	91 Bags	285.00/bag	25935.00
2.	Coarse Sand	14.13 cum	2500.00/cum	35325.00
3.	Coarse	20.20 cum	950.00/cum	19190.00
4.	Brick Ballast 25-40 mm	7.01 cum	855/cum	5993.55
Total				**Rs. 86443.00**

LABOUR CHARGES

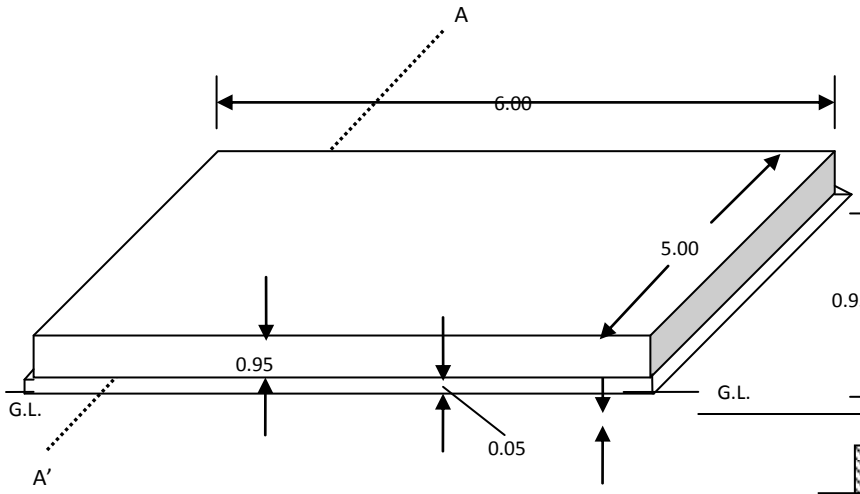
S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	48.22 cum	36.66/cum	1769.01
2.	Sand Laying	2.32 cum	33.33/cum	77.32
3.	C.C.W. 1:4:8	7.54 cum	492.00/cum	3709.68
4.	C.C.W. 1:2:4	1.821 cum	492.00/cum	894.11
5.	Brick Work	22.210 cum	370.00/cum	8217.70
6.	Raised Pointing	22.04 m^2	51.61/m^2	7.48
7.	Curing 22.21	22.210 cum	25.00/cum	555.25
8.	Chowkidar	13 Man days	100.00/man day	1300.00
9.	Head load & transportation charges 10% of cost of materials			6674.90
Total				**Rs. 24,335.45**

TOTAL EXPENDITURE	
1. Cost of materials	65,914.00
2. Labour charges & transportation	24,335.45
Total	**Rs. 90,249.45**
	Say Rs. 90,250.00 only

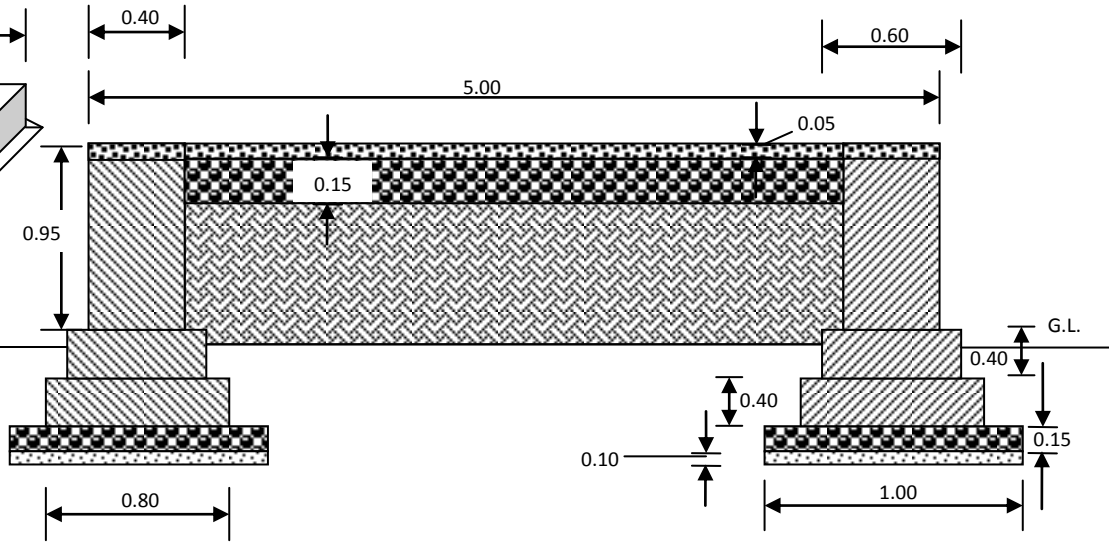
DETAIL ESTIMATE OF INDIA MARK-II HAND PUMP FOR WATER SHED AREA, DISTRICT - MIRZAPUR U.P.

S.No.	Description of work	Unit	Quantity	Rate	Amount
1	Transportation of rig machine, hand Pump material, P.V.C. Pipe, strainer and cement from store to work site.	work	1	3000.00	3000.00
2	Supply of material to install Hand Pump i- Lowering and installation of India mark-II Hand Pump with G.I. Pipe & connecting rods. ii- 140 mm P.V.C. Pipe 8kg/cm2. iii- medium G.I.Pipe of the 32 mm Ø.	No. metre metre	1 20 30	5380.00 240.00 202.90	5380.00 4800.00 6087.00
3	Boring work by D.T.H. Rig machine and lowering of P.V.C. assembling	meter	50	396.00	19800.00
4	Development of Hand Pump after installation	work	1	100.00	100.00
5	work after development with material	work	1	50.00	50.00
6	construction of Platform of 1.86 m Ø with all material and cement	work	1	2525.00	2525.00
7	construction of channel with all material and labour	meter	3	125.00	375.00
8	Embossing work	work	1	50.00	50.00
9	Water testing work	work	1	400.00	400.00
				Total	**Rs. 42,567.00**
				Says	**Rs. 42,600.00**

DRAWING OF PANCHAYATI CHABUTARA



ISOMETRIC VIEW OF PLATFORM (CHABUTRA)



SECTION AT A-A'

DESCRIPTION

1. C.C.W. - 1:4:8.
2. Brick Work - 1:4
3. Plastering- 1:4
4. Raised Pointing- 1:3.

DETAIL ESTIMATE OF WATERSHED VILLAGE CHABUTARA

S.No.	Description of Work	No.	L.	B.	D/H	Quantity
1.	Earth work in foundation					
	Long Wall	2	8.00	1.20	1.15 1.15	22.08
	Short Wall	2	4.00	1.20		11.04
	Total					**33.12 cum**
2.	Laying of Sand					
	Long Wall	2	6.60	1.00	0.10	1.32
	Short Wall	2	3.60	1.00	0.10	0.72
	Total					**2.04 cum**
3.	C.C.W. 1:4:8					
	Long Wall	2	6.60	1.00	0.15	1.98
	Short Wall	2	3.60	1.00	0.15	1.08
	Total					**3.06 cum**
4.	Brick masonary work 1:4 in foundation & super structure					
	1st Footing.					
	Long Wall	2	6.40	0.80	0.40	4.096
	Short Wall	2	3.80	0.80	0.40	2.432
	2nd Footing					
	Long Wall	2	6.20	0.60	0.40	2.976
	Short Wall	2	4.00	0.60	0.40	1.920

	Super Structure					
	Long Wall	2	6.00	0.40	0.90	4.320
	Short Wall	2	4.20	0.40	0.90	3.024
Total						**18.768 cum**
5.	Earth work in filling	1	5.20	4.20	0.75	16.38 cum
6.	C.C.W. 1:4:8	1	5.20	4.20	0.15	3.276 cum
7.	C.C.W. 1:2:4	1	6.00	5.00	0.05	1.500 cum
8.	Raised Pointing 1:3					
	Long Wall	2	6.00	-	0.90	10.80
	Short Wall	2	5.00	-	0.90	9.00
Total						**19.80 m^2**

ABSTRACT OF WORK

1.	Earth Work	33.12 + 16.38	49.50 cum
2.	Sand Laying		2.040 cum
3.	C.C.W. 1:4:8	3.060 + 3.276	6.336 cum
4.	Brick Work 1:4		18.568 cum
5.	C.C.W. 1:2:4		1.500 cum
6.	Raised Pointing 1:3		19.80 m^2

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (cum)	Coarse Sand (cum)	Brick (cum)	G.S.B. 25-40 mm (cum)	Brick Grit 10-20 mm (cum)
1.	Sand Laying	2.040 cum	-	2.040	-	-	-
2.	C.C.W 1:4:8	6.336 cum	21.54	2.851	-	5.892	-
3.	Brick Work	18.768 cum	45.04	6.381	18.768	-	-
4.	C.C.W. 1:2:4	1.500 cum	9.15	0.630	-	-	1.275
5.	Raised Pointing	19.800 m^2	0.91	0.093	-	-	-
Total			**76.64**	**11.995**	**18.768**	**5.892**	**1.275**
Say			**77 Bags**	**12.000**	**18.768**	**5.900**	**1.280**

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	77 Bags	285/Bag	21945.00
2.	Coarse Sand	12.00 cum	910.00/cum	10920.00
3.	Coarse	11.04 cum	950.00/cum	10490.40
4.	G.S.B. 25-40 mm	5.900 cum	855.00/cum	5044.00
5.	G.S. Grit 10-20 mm	1.280 cum	1250.00/cum	1600.00
Total				**Rs. 50000.00**

LABOUR CHARGES

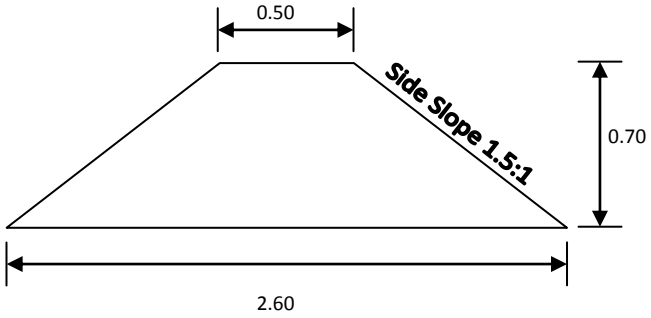
S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	49.50 cum	36.66/cum	1814.67
2.	Sand Laying	2.060 cum	33.33/cum	68.65
3.	C.C.W. 1:4:8	6.336 cum	494.00/cum	3129.98
4.	C.C.W. 1:2:4	1.500 cum	494.00/cum	741.00
5.	Brick Work 1:4	18.768 cum	370.00/cum	6944.16
6.	Raised Pointing 1:3	19.800 m^2	51.61/cum	1021.87
7.	Curing Charges	18.768 cum	25.00/cum	469.20
8.	Chowkidar	6 Man Days	100.00/Man Day	600.00
Total				**Rs. 14,789.53**

Total Expenditure	
1. Cost of Materials	57,338.60
2. Labour Charges	14,789.53
Total	**Rs. 72,128.13**
Say	**Rs. 72,130 only**

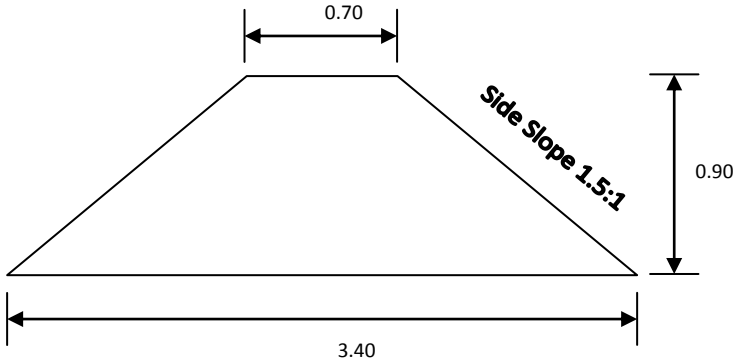
DETAILS ESTIMATE OF WATERSHED DEVELOPMENT WORK PHASE

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

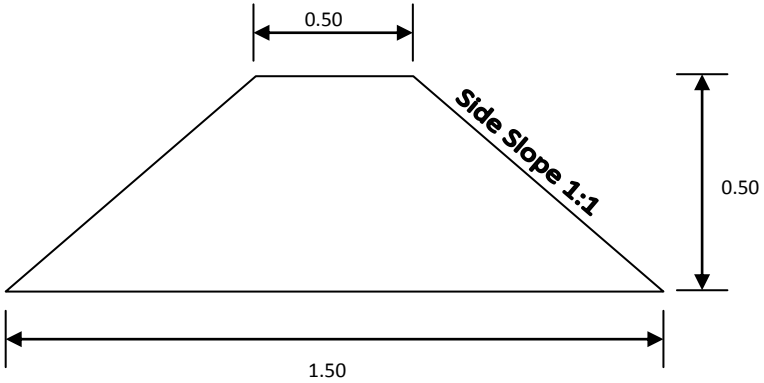
(Not to Scale)



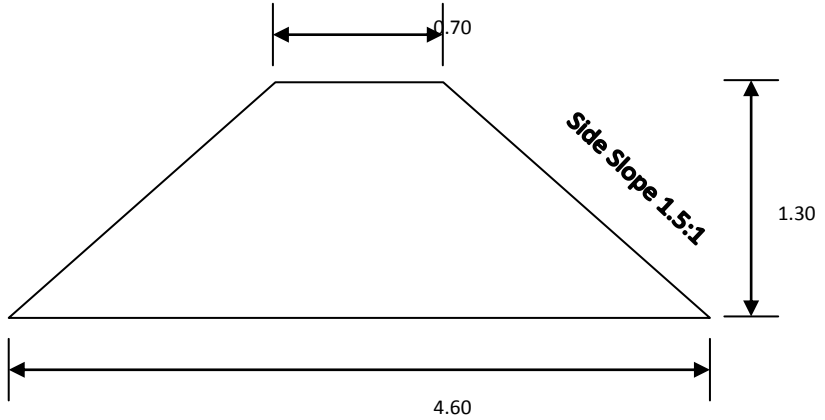
(C.B., Cross-Section – 1.085 m^2)



(S.B., Cross-Section – 1.845m^2)



(Field Bund, Cross-Section – 0.50 m^2)

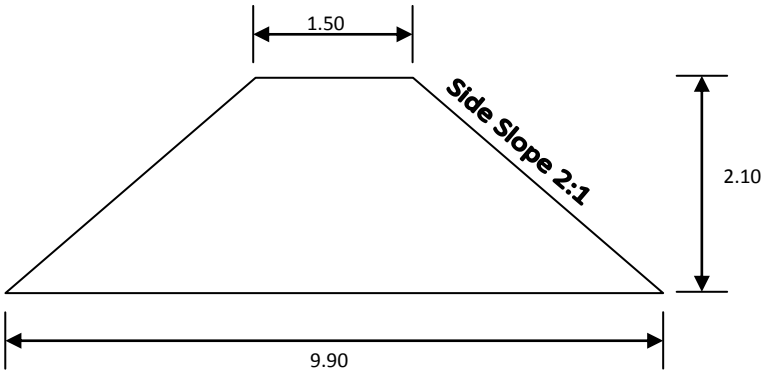


(S.B. /P.B. /M.B., Cross-Section – 3.445 m^2)

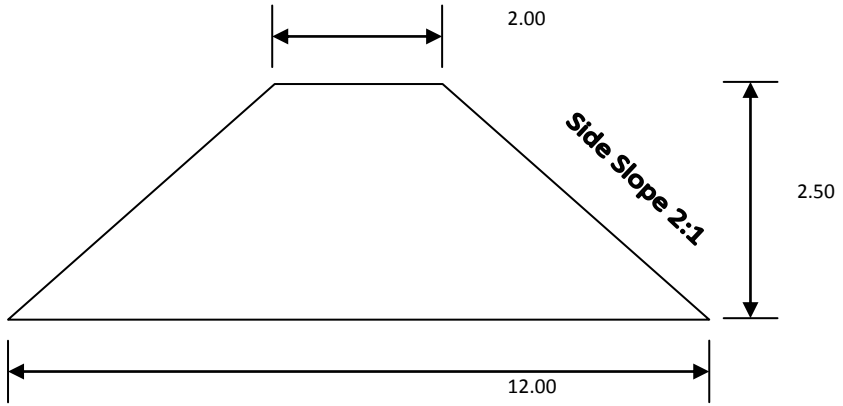
(All dimensions in Metre)

DRAWING OF EARTHEN CHEKDAM / GULLY PLUG

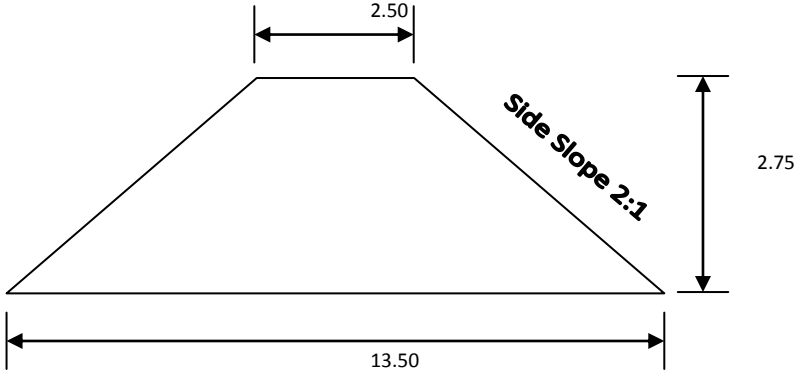
(Not to Scale)



(C.D. /G.P., Cross-Section – 11.97 m^2)



(C.D. /G.P., Cross-Section – 17.50 m^2)



(W.H.B., Cross-Section – 22.00 m^2)

(All dimensions in Metre)

DESIGN OF CONTOUR BUND

Type of Soil	-Loam,Sandy Loam
Rain fall	-24 hr in cm -25 cm
Field Stop -1%	
Vertical Interval (VI)	= [s/3+2] x 0.3
	= [1/3+2] x 0.3
	= 0.70 m
Horizontal Interval (HI)	= 100 x V.I/s
	= 100 x 0.7/1
Height of bund h	$= \sqrt{(\text{Re x VI})/50}$ Re=maximum rainfall in cm
	$= \sqrt{(25 \text{ x } 0.7)/50}$
	$= \sqrt{0.35}$
	= 0.59
	Say 0.60 m
Free board	=15% of height minimum -10 cm
Height	= 0.60 + 0.10
	= 0.70 m

Taking top width of bund 0.50 m and side slope 1.5:1

Then base of Bund	= 0.50 + (1.50 d) x 2
	= 2.60 m
Cross-Section of bund	= (0.50 + 2.60) x 0.70 / 2
	= 1 .085 m^2
Length of bund	= 100 s / V.I.
	= 100 x 1 / 0.70
	=142.85 m/ha
	Say 150 m/ha
Earth work/ha	= 150x1.085
	= 162.75 cum
Cost Rs. / ha	= 162.75 x 39.16 = 6373.29
	Say 6375.00

DESIGN OF SUBMERGENCE BUND

Types of soil – -Loam,Sandy Loam — Rainfall intensity for 24 hrs – 25cm

Field slope 3% — V.I.=[s/3+2]x0.30

=0.90 m

Horizontal Interval = (100xV.I.)/s — = (100x0.90)/3

=30 m

Height of bund $h=\sqrt{(Re \times V.I.)/50}$ — $=\sqrt{(25 \times 0.90)/50}$ $=\sqrt{0.45}$ = 0.67 m. **Say 0.70m**

Free board 20% of height minimum 20cm

Total Height =0.90m

Taking top width of bund 0.70m and side slope 1.5:1

Bottom of bund = 0.70+2 x 1.5d
= 0.70+2.70
= 3.40

Cross Section of Submergence Bund = (0.70+3.40) x 0.90 / 2
= 1.845 m^2

Length of bund = 100 s / V.I.
= (100 x 3) /0.90
= 333 m

Feasible length 100 + 25 + 25
= 150 m

Earth work/ha =150 x 1.845
=276.75

Cost per ha =276.75 x 39.16
=10,837.53
Say 10,850=00

TYPICAL SECTION OF FIELD BUND

Top width	= 0.50 m
Side slope	= 1:1
Height of bound	= 0.50 m
Bottom Width	= 1.50 m
Cross section	= (0.50+1.50)x0.50/2 = 0.50 m^2
Length per hectare	= 200 m
Earthwork	= 200 x 0.50 = 100 cum
Cost 39.16/cum	= Rs. 3916.00
Cost per hectare	= Rs. 3916.00

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

Top width	= 0.70 m
Side slope	= 1.5:1
Height	= 1.30 m
Bottom	= 4.60 m
Cross section	= (0.70+4.60)x1.30/2
	= 3.445 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) x 2.10 / 2
	= 11.97 m^2
Cost per meter	= Rs. 551.45

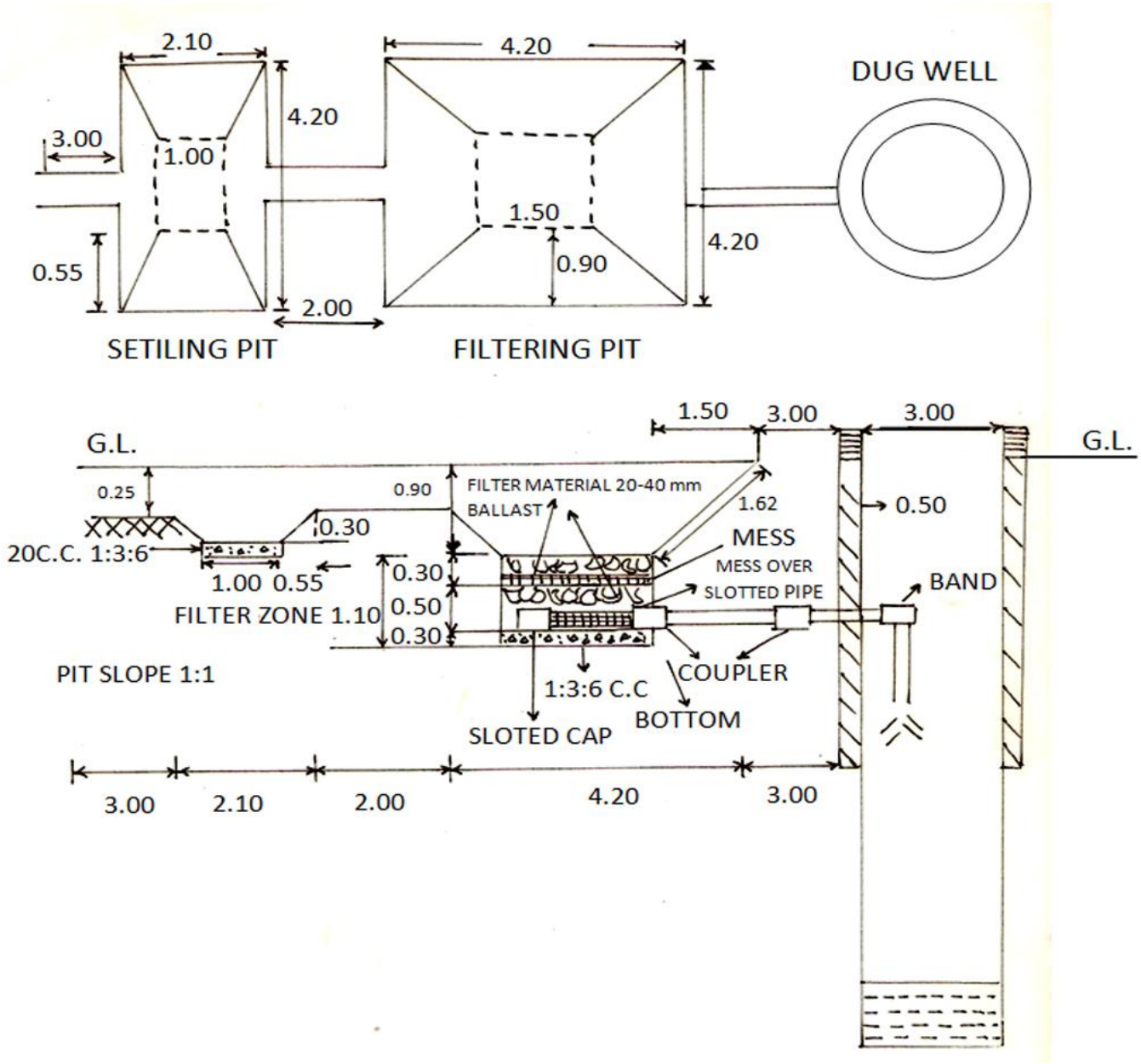
TYPICAL SECTION OF CHECK DAM / GULLY PLUG

Top width	= 2.00m
Side slope	= 2:1
Height	= 2.50 m
Bottom Width	= 12.00 m
Cross Section	= (2.00 + 12.00) x 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) x 2.75 / 2
	= 22.00 m^2
Per meter cost	= Rs. 1085.92

DUG WELL RECHARGING STRUCTURE



ABSTRACT OF COST BRICK WORK JAGAT

S.No.	Name of Work	Quantity	Unit	Rate	Amount
1.	Earth Work	25.84	M^3	36.36	947.29
2.	C.C.W. Work in 1:3:6	1.49	M^3	2766.00	4121.34
3.	Laying Brick Supply & fixing	1.16	M^3	4000.00	4640.00
4.	Plaster work in 1:2	9.00	M^3	81.98	737.80
5.	S/F of 110 mm P.V.C. pipe	6.00	R.M	150.00	900.00
6.	Slotted Cap 110 mm P.V.C	1	No.	150.00	150.00
7.	P.V.C. bend 10 mm	1	No.	130.00	130.00
8.	P.V.C. Coupler 110 mm	2	No.	100.00	200.00
9.	Mesh ss S/F between	2	Job	100.00	200.00
10.	S/O fixing of sign board	1	Job	1850.00	1850.00
11.	Filter material 20-40 mm blast	1.8	M^3	855.00	1539.00
12.	Slotted P.V.C. pipe 110 mm	1	R.M.	250.00	250.00
Total					**Rs. 15,665.43**
Say					**Rs.15,670.00 only**

DETAILS OF MEASUREMENT (DUG WELLS RECHARGING)

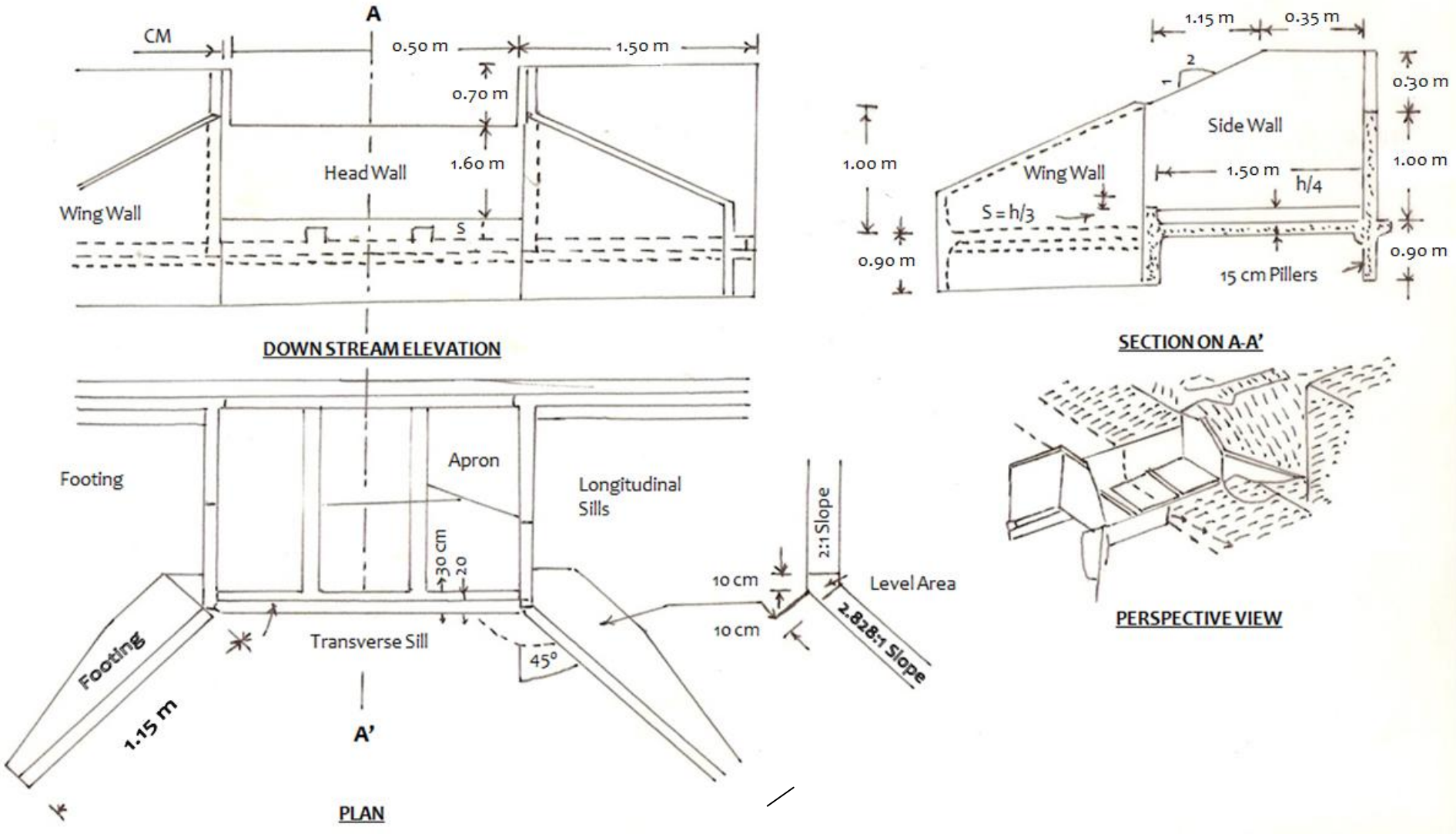
S.No.	Name of Work	No.	L B D/H	Unit	Quantity
1.	Earth work in excavation hard soil mixed with *kanker* gravel, etc. in foundation.				
a	Settling pit (i) Long Wall	4	0.65 x 1.75 x 0.10/2	M^3	0.09
		2	1.50 x 0.62 x 0.75	M^3	1.39
	(ii) Short Wall	4	0.55 x 0.75/2 x 0.10	M^3	0.08
		2	1.00 x 0.55 x 0.75	M^3	0.82
b	Filtering pit	8	1.85 x 1.00 x 1.00 x /2 x 0.10	M^3	1.19
		2	1.50 x 1.62 x 0.90	M^3	4.37
c	Drain-Filter zone	1	1.50 x 1.50 x 1.10	M^3	2.47
		1	7.10 x 0.75 x 0.25	M^3	1.86
d	Excavation for laying of P.V.C. pipe & filling after laying of P.V.C. pipe				

		1	4.35 x 2.00 x 0.80	M^3	6.96
		1	1.35 x 0.90 x 2.00/2	M^3	1.21
		1	3.00 x 2.00 x 0.90	M^3	5.40
	Total				25.84
2	C.C. in 1:3:6 settling pit	1	1.00 x 1.50 x 0.20	M^3	0.30
	Filtering pit filter zone	1	1.50 x 1.50 x 0.30	M^3	0.67
	Drain –Filter Zone	1	7.00 x 0.75 x 0.10	M^3	0.52
				M^3	1.49
3	Cut- Brick work 1:4				
a	Settling pit Long wall	4	1.05 x 0.55 x 0.10/2		0.11
		2	1.50 x 0.62 x 0.05		0.09
	Settling pit Short wall	4	0.55 x 0.55 x 0.10/2		0.06
		2	1.00 x 0.62 x 0.05		0.06
b	Filtering pit	8	1.85 x 1.62 x 0.05/2		0.60
		2	1.50 x 1.62 x 0.05		0.24
				M^3	1.16
4	Plaster work 1:2				
	Drain-Bottom	1	7.00 x 0.25	M^2	1.75
	Drain-Side	2	7.00 x 0.25	M^2	3.50
	Selting base	1	1.50 x 1.00	M^2	1.50
	Filtering base	1	1.50 x 1.50	M^2	2.25
	Total			M^2	9.00
5	Supply & Fixing of 110 mm P.V.C. Pipe	1	6.00	M	6.00
6	Slotted cap of 110 mm P.V.C.	1		No.	1.00
7	P.V.C. Bend 110 mm	1		No.	1.00
8	P.V.C. coupler 110 mm	1x2		No.	2.00
9	Mesh ss S/F between	1x2		Job	2.00
10	S/O Brick sign board	1		Job	1.00
11	Filter Material of 20-40 mm blast	1	1.50 x 1.50 x 0.80	M^3	1.80
12	Slotted pipe P.V.C. 110 mm	1	1 x 1	M	1.00

DRAWING OF SPILLWAY OF CREST LENGTH 0.5 m

All Dimensions in Metre

Not to Scale



Design of Drop Spillway for 1.00 ha Catchment Area

Design of Drop Spillway to be constructed at a place in a gully having width of 1.0 m and catchment area 1.00 ha 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 120mm/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 from 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

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

To find suitable value of L & H

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

$$0.10 = \frac{1.711\ L\ H^{3/2}}{(1.10+0.01 \times 0.5)} = \frac{1.711\ L\ H^{3/2}}{(1.105)}$$

$$L\ H^{3/2} = \frac{1.105 \times 0.10}{1.711} = \frac{0.1105}{1.711} = 0.064$$

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

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

Test: $L / h = \frac{0.50}{0.25} = 2.0 \geq 2.0$ hence O.K.

$h / f = \frac{0.25}{0.50} = 0.50 \leq 0.5$ hence O.K.

3. Structural design –

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

E = 3x0.5+0.6 or 1.5x0.50

E = 2.10 m or 0.75 m

Adopted 2.10 m

2- Length of apron basin $L_B = f (2.28 h/f + 0.54) = 0.50 (2.20 \times \frac{0.5}{0.5} + 0.54)$

= 0.50 x 2.74 = 1.37 m says 1.40 m

3- Height of end sill , $S = \frac{h}{3} = \frac{0.50}{3} = 0.16$ m says 0.20 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 x 0.50 or [0.50+0.50+0.16 – (1.37+0.10)/2]

= 1.0 or [1.16 – 0.735]

$= 1.0 \text{ or } 0.425$

adopt $J = 1.00$ m

5- $M = 2(f + 1.33\,h - J) = 2(0.50 + 1.33 \times 0.25 - 1.00)$

$= 2 \times (-0.167) = -0.335$ m

6- $K = (L_B + 0.1) - M = (1.37 + 0.1) - 0.335$

$= 1.47 - 0.335$

$= 1.135$ m

Toe and cut off walls

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

$= 0.473 \times (0.1/1)^{1/3}$

$= 0.473 \times 0.464$

$= 0.219$

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

$= 1.5 \times 0.219$

$= 0.328$ m

says 0.35 m

Depth of cutoff /Toe wall = 0.35 m

Apron thickness : For an over fall of 0.5 m. The Apron thickness in concrete construction is 0.20 m since the structure is constructed in masonry, the Apron thickness will be 0.20 x 1.50 = 0.30 m

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

Description	Thickness of wall	
	Top width	Bottom width
Head wall	0.40	1.00
Side wall	0.30	0.80
Wing wall and head wall extension	0.30	0.60

CHAPTER -12

LIST OF MAP

MAPS

An attempt has been to map the surface details of the project area, as per the instruction of the common Guide lines-2008, All the thematic maps of the study area have been prepared through using remote sensing and geographical information system(G.I.S.) technique, following the fundamental norms of the National Map Policy-2006. The details of the thematic maps have been given below.

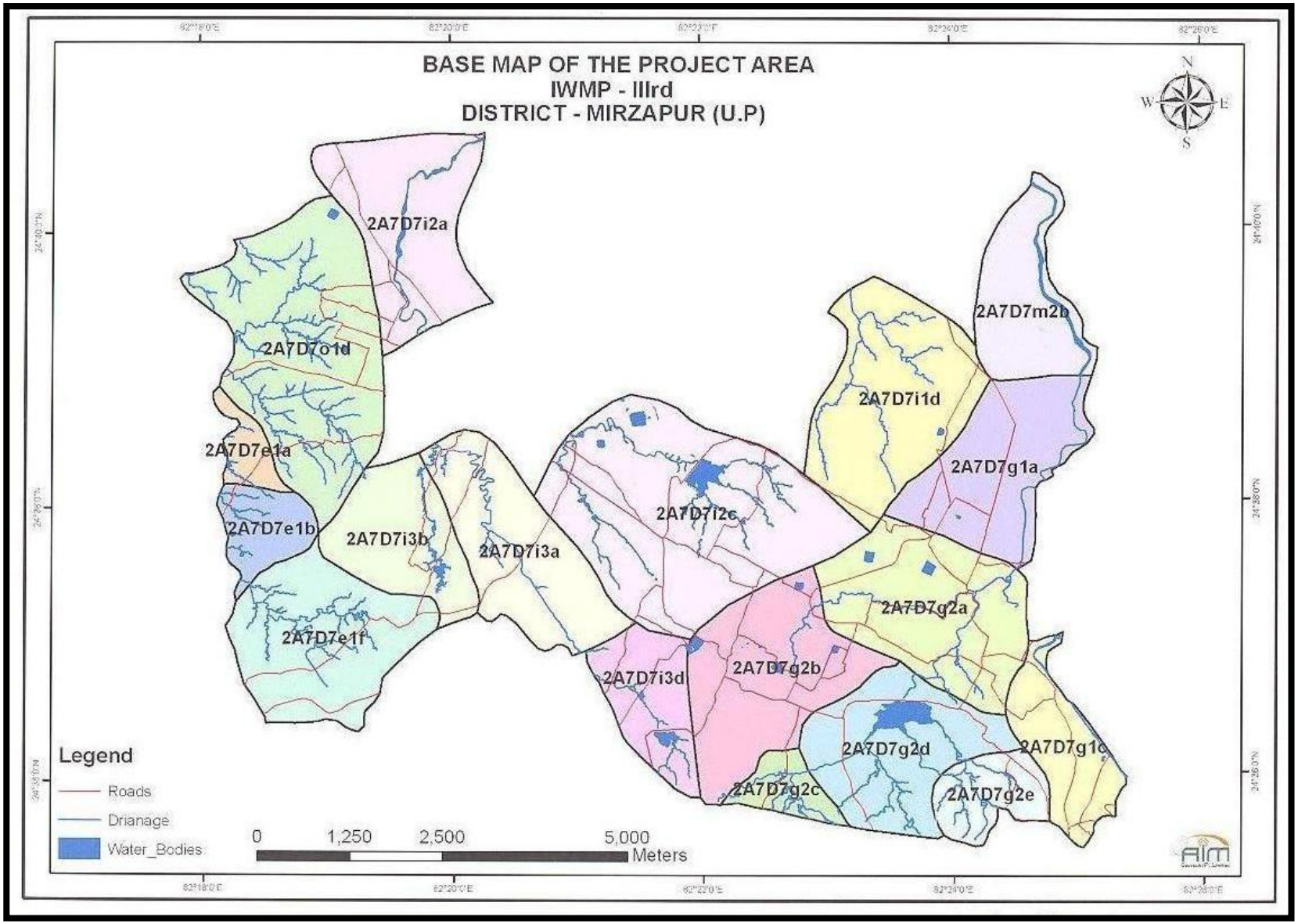
1- Base map

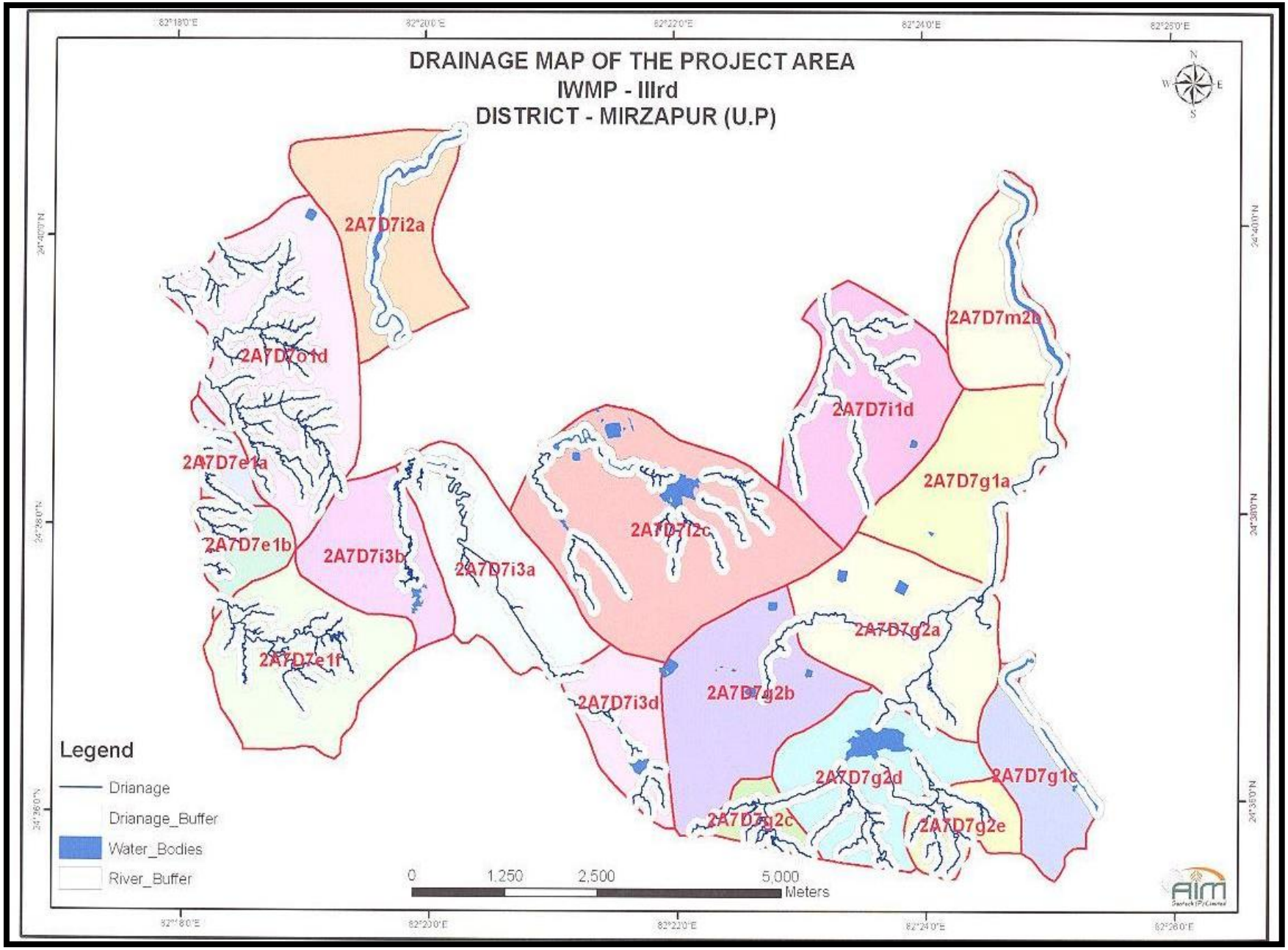
2- Dranage map

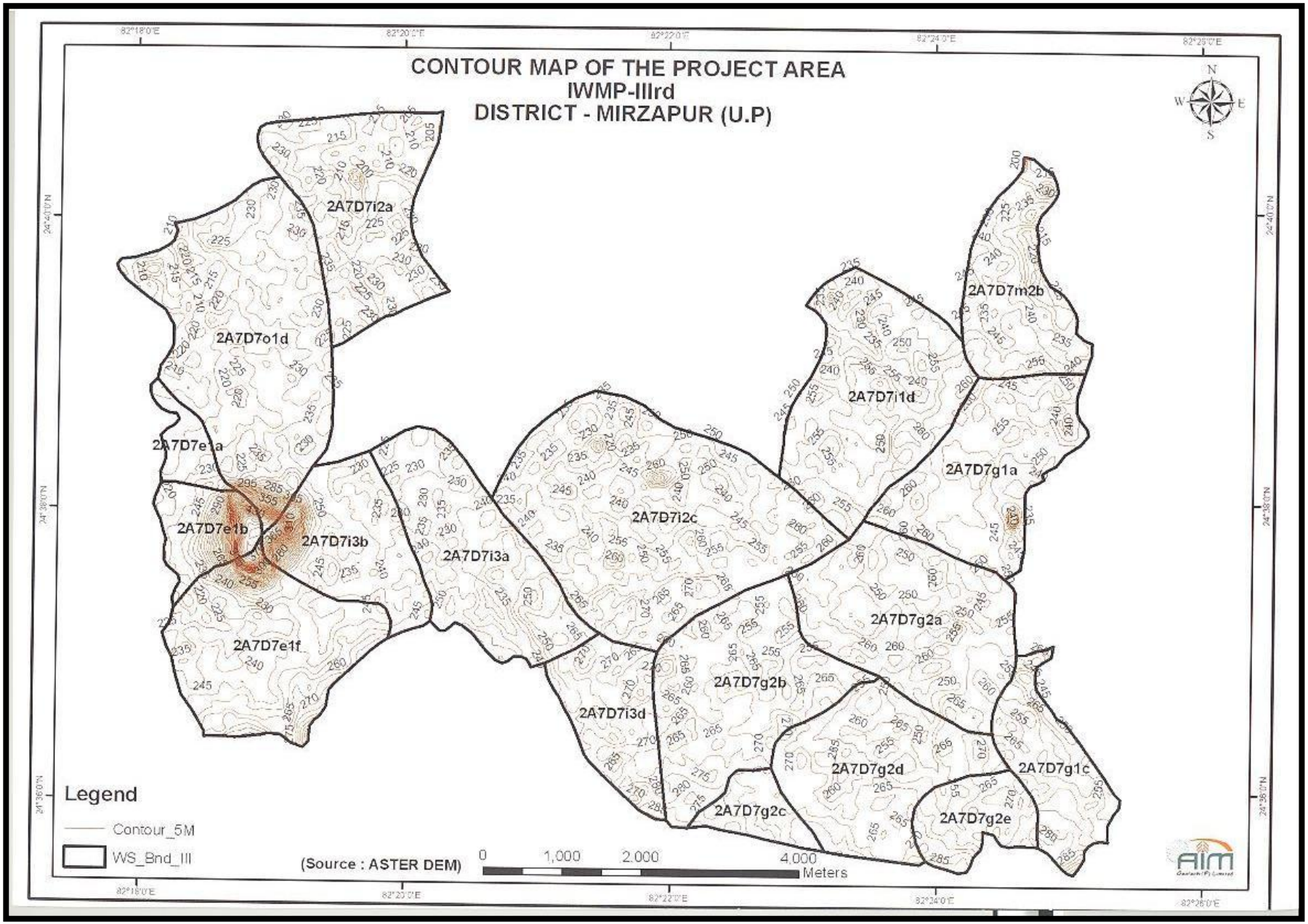
3- Countor map

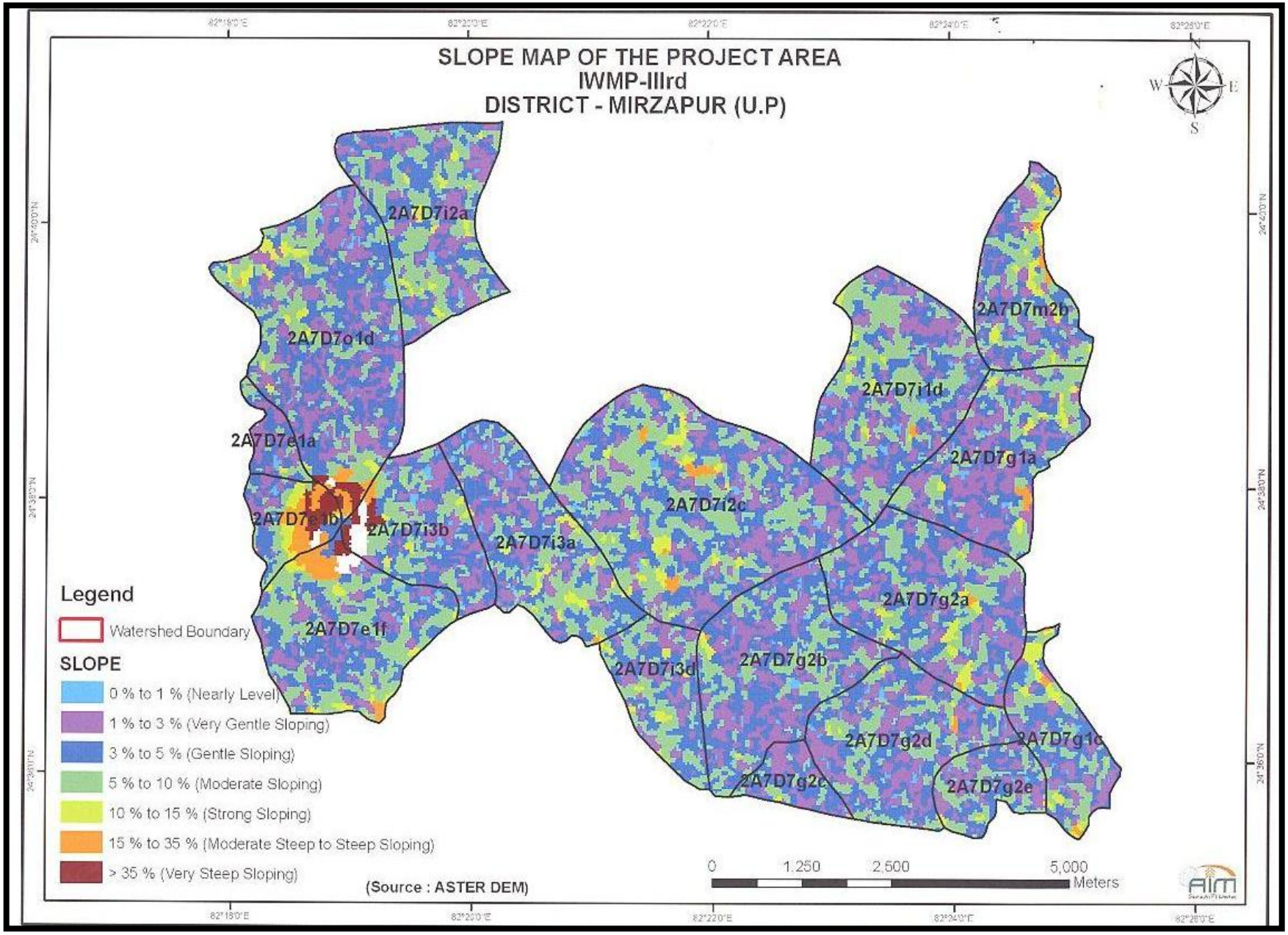
4- Slope map.

These maps were interpreted from the high resolution satellite dada freely available on internet.


BASE MAP OF THE PROJECT AREA
IWMP - IIIrd
DISTRICT - MIRZAPUR (U.P)
N
W
E
S
2A7D7i2a
2A7D7o1d
2A7D7e1a
2A7D7e1b
2A7D7e1f
2A7D7i3b
2A7D7i3a
2A7D7i2c
2A7D7i3d
2A7D7m2b
2A7D7i1d
2A7D7g1a
2A7D7g2a
2A7D7g2b
2A7D7g2d
2A7D7g2c
2A7D7g2e
2A7D7g1c
Legend
Roads
Drianage
Water_Bodies
0
1,250
2,500
5,000
Meters


DRAINAGE MAP OF THE PROJECT AREA
IWMP - IIIrd
DISTRICT - MIRZAPUR (U.P)
82°18'0"E
82°20'0"E
82°22'0"E
82°24'0"E
82°26'0"E
24°40'0"N
24°38'0"N
24°36'0"N
N
W
E
S
2A7D7i2a
2A7D7o1d
2A7D7e1a
2A7D7e1b
2A7D7e1f
2A7D7i3b
2A7D7i3a
2A7D7i2c
2A7D7i3d
2A7D7i1d
2A7D7m2b
2A7D7g1a
2A7D7g2a
2A7D7g2b
2A7D7g2d
2A7D7g2c
2A7D7g2e
2A7D7g1c
Legend
Drianage
Drianage_Buffer
Water_Bodies
River_Buffer
0
1,250
2,500
5,000
Meters


CONTOUR MAP OF THE PROJECT AREA
IWMP-IIIrd
DISTRICT - MIRZAPUR (U.P)
2A7D7i2a
2A7D7o1d
2A7D7e1a
2A7D7e1b
2A7D7i3b
2A7D7e1f
2A7D7i3a
2A7D7i2c
2A7D7i1d
2A7D7m2b
2A7D7g1a
2A7D7g2a
2A7D7g2b
2A7D7i3d
2A7D7g2d
2A7D7g1c
2A7D7g2c
2A7D7g2e
Legend
Contour_5M
WS_Bnd_III
(Source : ASTER DEM)
0
1,000
2,000
4,000
Meters


SLOPE MAP OF THE PROJECT AREA
IWMP-IIIrd
DISTRICT - MIRZAPUR (U.P)
N
W
E
S
2A7D7i2a
2A7D7o1d
2A7D7e1a
2A7D7e1b
2A7D7i3b
2A7D7i3a
2A7D7i2c
2A7D7m2b
2A7D7i1d
2A7D7g1a
2A7D7g2a
2A7D7e1f
2A7D7i3d
2A7D7g2b
2A7D7g2d
2A7D7g1c
2A7D7g2c
2A7D7g2e
Legend
Watershed Boundary
SLOPE
0 % to 1 % (Nearly Level)
1 % to 3 % (Very Gentle Sloping)
3 % to 5 % (Gentle Sloping)
5 % to 10 % (Moderate Sloping)
10 % to 15 % (Strong Sloping)
15 % to 35 % (Moderate Steep to Steep Sloping)
> 35 % (Very Steep Sloping)
(Source : ASTER DEM)
0
1,250
2,500
5,000
Meters

CHAPTER -13
ABBRIVIATIONS/REFERENCES

LIST OF ABBRIVIATIONS/REFERENCES

DOLR	Department of Land Resources
IWMP	Integrated Waterhsed Management Programme
SLNA	State Level Nodal Agency
CGL	Common Guidelines
PIA	Project Implementing Agency
BSA	Bhoomi Sangrakshan Adhikari
WDT	Watershed Development Team
WC	Watershed Committee
UC	User Group
SHG	Self Help Group
CB	Countour Bund
MB	Marginal Bund
PFB	Peripheral Bund

REFERENCES

- Common Guideline of watershed development-2008.
- Jila Sankhikiya Patrika
- Census 2001
- santravidasnagar.nic.in

Preparation of DPR

Detail Project Report of Integrated Watershed Management Programme IWMP-III had been prepared through base line/ bench Mark survey for physiography climate, soil, land use, vegetation, and 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, Mirzapur, Topo sheet (1 : 50000) survey of India- Deheradoon and technical & specific input and health with preparation and drafting of detail project report.

S.No.	Name	Designation
1	Sri A.K. Srivastava	Ex. Scientist, RSAC-UP, Lucknow
2	Sri Laxman Singh	Ex. Project Scientist
3	Sr. R.K. Singh	System-In-Charge
4	Dr. Vinod Kumar Singh	Scientist, K.V.K. (BHU) Barkachha, Mirzapur
5	Dr. Shreeram Singh	Programme Coordinator, K.V.K. (BHU) Barkachha, Mirzapur
6	Dr. Sunil Kumar Goyal	Scientist, K.V.K. (BHU) Barkachha, Mirzapur
7	Sri B.K. Singh	BSA
8	Sri A.K. Srivastava	Junior Engineer
9	Sri Pramod Gupta	Draft Man
10	Sri Afzal Ahmad	Data and Design Compiler
11	Sri Jai Shankar Singh	Member of WDT (B.Sc. Ag. Rtd. Agriculture Extension Personal)
12	Sri Umesh Kumar	A.S.C.I.
13	Sri Amar Singh Chauhan	A.S.C.I.
14	Sri S.P. Yadav	A.S.C.I.
15	Sri Dilip Kumar	Work Incharge
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22	Sri Bachanu Ram	Work Incharge
23	Sri Harikesh Pandey	Work Incharge

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 years (2010-11 to 2014-15).

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

Physically & Financially Approved:

Prepared By:
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Technically Approved
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Dept. of Land Development & Water Resources, IWMP-III
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Project Director
District Rural Development Authority, District – Mirzapur

Chief Development Officer
District – Mirzapur