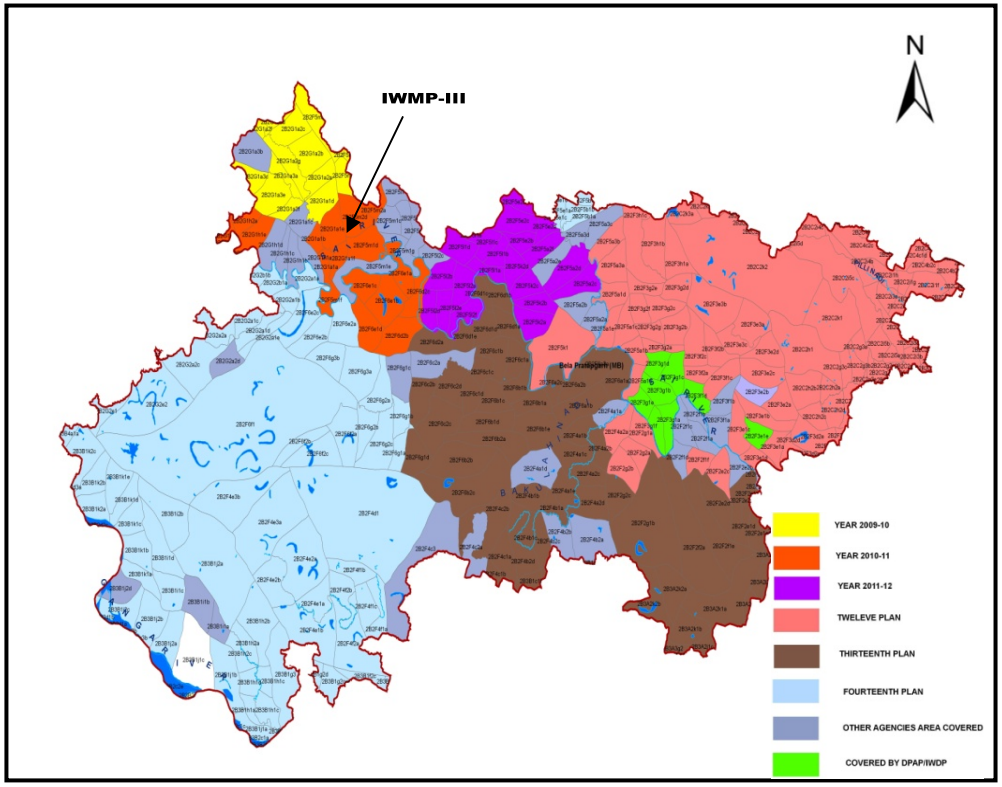
TABLE OF CONTENT

IWMP-III (2010-11) DISTRICT-PRATAPGARH

Name of Project	Weightage	No. of MWS	Geographical Area(ha)	Rainfed Area(ha)	Treatatable area
IWMP-III (2010-11)	70.5	8	5838.00	4907.00	4112.00



PROJECT AT A GLANCE

1.	Name of Block	Sangipur
2.	No. of Gram Panchayats	08
3.	Four reasons for selection of Watershed	i. Small and marginal farmer ii. Ground water status & Drinking water iii. Poverty iv. SC population
4.	Date of approval of watershed Development Plan by DRDA/DPC	19-10-2010
5.	Area proposed to be treated (ha.)	4112.00
6.	Date of sanction of PPR & Date of release of Ist Installment	10-03-2010 & 15-06-2010
7.	Project duration	2010-2011 to 2014-2015
8.	Project Cost (in lac.)	493.44
9.	Proposed mandays	220000

EXECUTIVE SUMMARY

BRIEF ABOUT AREA

Land degradation control is essential if future rural production is to be maintained and improved. Land restoration measures, involving soil erosion control, enhanced vegetative cover and water run-off management will help to preserve the remaining soil and vegetation resources and assist in mitigating the severity of natural disasters. However, much of the land degradation is already irreparable and no amount of effort can overcome the existing damage. Any productive soil which is already lost through erosion has already permanently left the system.

If land degradation is to be checked, there is a need for careful planning in the approach to the development and use of the land. In many countries, the need for planning is urgent because the effects of inappropriate practices of land utilization and its over-exploitation are already irreversible or rapidly approaching that state. Many practices used in the past have contributed to the present degraded state of the environment and should be discontinued if the land is to contribute to the continued prosperity of the individual countries. Any delay in implementing a comprehensive and coordinated system of land management will further exacerbate the situation.

Land management strategies should aim to achieve sustainability of natural resources - land, water, vegetation and fauna - by balancing development and the use of these resources with conservation. To be effective however, land-use management should not be restricted to isolated areas but should be applied to total watersheds. This approach is called “integrated watershed management” and is based on the concept that the components of natural resource systems, such as watersheds, are inter-connected so that changes to one part of the system will influence other parts.

The watershed, with code No. 2B2F5m2a, 2B2F5m2d, 2B2G1a1a, 2B2G1a1b, 2B2G1a1e, 2B2G1a1f, 2B2F5m1f, 2B2E5m1d, having area of 4907.00 Ha, is located in North –West of the Pratapgarh district, U.P. These micro watersheds are situated in the catchment of river Sai River. The watershed is situated about 35 km from District Head Quater of Pratapgarh district It lies between the longitude of 81° 37’ 43’’ to 81^0 43' 43’’ and latitudes 25°57’52’’ to 26°05’23’’. Its altitude ranges from 69 to 106 m above mean sea Level (MSL).

The Project area comprises 55 villages namely, Sangipur,Kalyanpur, Sujakhar, Sarai Lalshah, Badshahpur, Shukulpur, Shreepur, Gadiyan, Nauwanar, Silaudhi, Sarua, Aoripur Naugir, Deum Paschim, Deum Purab, Basuapur, Rampur Kasiha, Bhojpur, Pichura, Kamapursaraiya, Kethola, Kaira, Gondwa, Udharanpur, Baribojh, Dagarara, Medhawan, Gokhari, Katehti, Mahmad Pur, Bhundaha, Bhaisana, Bhagaura, Singhgarh, Pure Naryandas, Jagdishpur, Gobardhanpur, Devigarh, Patti Kachehra, Dewapur, Usmanpur, Lakhanpur Soor, Buboopur, Gopalpur, Juhi, Paharpur, Ridhi, Biliamgarh, Harspur Kotwa, Pure Roop, Kirat Pur, Pure Tilakram, Itauri, Pure Jiwan, Chitari, Bhavram Bojhi, Sagra Sundarpur of Pratapgarh district of Uttar Pradesh. This watershed has been identified by the state department under NWDPRA scheme by proper prioritization of different parameters for watershed selection criteria.

The climate of the region is characterized as sub tropical with an average annual rainfall is 159 mm annually, out of which about 90 percent is received during the monsoon season from July to September. Temperature ranges from very high as 42^oC in the May-June to as low as 5.1^0C during December-January. The year may be divided into four seasons. The cold season from mid November to February is followed by the summer season from March to mid June. The period from mid June to the end of September is the south-west monsoon season and the October and the first half of November constitute the post-monsoon season.

The soil of project area is mainly clay, sandy loam. Middle portion of the project has minor slope. Agriculture is the main occupation of the people of project area. The main crops are Gram, lentil, Arhar, Bajra. Mainly in Kharif season Rice, Til, Bajra, Maize and in Rabi Season Gram. Mustured, Pea, and Lentil are grown in the Watershed area.

Natural vegetation of the watershed area is very poor. Babool, Mahua are the main tree of the area. Occasionally Mango, Neem, Sheesham, ber tree are found in this area. There is no reserve pasture land in watershed area but near about 5 ha pasture land are present in watershed area which is scattered in small patches and not in used to managial practices. Due to Lack of the Irrigation water the rate of mortality of planted trees is very high. P.R.A. exercises conducted in the villages of watershed area revealed that inadequate irrigation facilities, low production of field crops.

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

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

INSTITUTIONAL ARRANGEMENT

The proposed watershed area has been identified by the state department under NWDPRA scheme by proper prioritization of different parameters for watershed selection criteria. The SLNA has nominated Bhoomi Sanrakshan Adhikari, Pratapgarh, as P.I.A for the afforesaid project. The area of watershed is proposed to be taken by Bhoomi Sanrakshan Adhikari, Department of land development & water resources Pratapgarh, for integrated watershed management programme (IWMP) starting from the year 2010-11. The project will be completed by 2014-15.

SALIENT PROJECT ACTIVITIES

Watershed Development works including proposed engineering structures

Component	Total (Lakhs) Amount	% of the bugdet
(a) Construction of bunds (Field Bund,Contour Bund, Submergence Bund, Marginal Bund and Peripheral Bund)	**246.73**	50%
(b)Renovation of Existing bunds for in-situ soil moisture conservation		
(c) New and renovation of Existing Water Harvesting bunds/Gully plug/Check dam		
(d) Afforestation		
(e) Pacca structure		
Total	**246.73**	50%

Livelihood Activities (community Based)

Component	Total (Lakhs) Amount	% of the bugdet
(a) Poultry	**49.34**	10%
(b)Dairy Work		
(c) Tailoring		
(d) Plant Nursery		
(e) Munj Badh		
(f) Handicraft		
(g) Bee keeping		
Total	**49.34**	10%

YEAR WISE PHASING (PHYSICAL & FINANCIAL) OF I.W.M.P. –III WORKS, PRATAPGARH

S. No.	Item	1st Year (2010-11)		IInd Year (2011-12)		IIIrd Year (2012-13)		1Vth Year (2013-14)		Vth Year (2014-15)		Total	
		Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Administrative 10%	-	To meet out the administrative works/charges	9.87	As per column 4	9.87	As per column 4	14.80	As per column 4	14.80	As per column 4	49.34	-
2	Monitoring 1 %	-	Monitoring of the project	0.99	As per column 4	0.98	As per column 4	1.48	As per column 4	1.48	As per column 4	4.93	-
3	Evaluation 1 %	-	Evaluation of the project	1.48	As per column 4	1.48	As per column 4	1.48	As per column 4	0.49	As per column 4	4.93	-

4	Entry Point Activity 4%	19.74	Hand pump, Bathroom, Soak pit etc.	-	-	-	-	-	-	-	-	19.74	-
5	Institutional and Capacity building 5%	4.93	Training and exposure visit	9.87	As per column 4	9.87	As per column 4	-	As per column 4	-	As per column 4	24.67	-
6	D.P.R Preparation 1%	4.93	Preparation of DPR	-	-	-	-	-	-	-	-	4.93	-
7	Watershed Dev. Works 50%	-	Construction of Soil and water recharging structures, Agro forestry, horticulture etc	37.01	614	74.02	1228	74.02	1228	61.68	1042	246.73	4112
	Livelihood & Income Generating 10%	-	Diary, Poultry, Tailoring, Plant Nursery, Munj Badh, Handicraft, Bee Keeping etc.	4.93	As per column 4	19.74	As per column 4	14.80	As per column 4	9.87	As per column 4	49.34	-
8	Production System development 13%	-	Farming system approach, animal husbandry, horticulture, vegetables growing, etc.	4.93	As per column 4	14.81	As per column 4	24.67	As per column 4	19.74	As per column 4	64.15	-
9	Consolidation Phase 5%	-	Consolidation activities	-	-	-	-	-	-	24.68	As per column 4	24.68	-
	Total	**29.60**		**69.08**	**614**	**130.77**	**1228**	**131.25**	**1228**	**132.74**	**1042**	**493.44**	**4112**

TREATMENT AREA AND DETAILS

The main objectives of the project area are : to control damage by run-off, to manage and utilize run-off for useful purpose or soil conservation and to increase infiltration of rain water.

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 Sai river 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.

WATERSHED WISE TREATMENT AREA

S. No.	Watershed Code	Total Area (ha)	Total Treatable Area (ha)
1	2B2F5m1d	1256.06	906.00
2	2B2F5m1f	556.95	357.00
3	2B2F5m2a	510.65	464.00
4	2B2F5m2d	1205.99	836.00
5	2B2G1a1a	417.10	301.00
6	2B2G1a1b	376.18	300.00
7	2B2G1a1e	1033.95	531.00
8	2B2G1a1f	481.12	417.00
	Total	**5838.00**	**4112.00**

FACE SHEET ABOUT BENCH MARK INDICATORS

Area Under Various LCC Classes

LCC class	Area ha
I	297.00
II	3090.00
III	2451.00
Total	**5838.00**

ACTION PLAN AT A GLANCE

The main points , involved in the preparation of detailed project report are: collection of data (spatial- non spatial) from gram panchayat and block lavel office have been done during field survey; Meetings were conducted between gram pradhan,and farmers of the project area ;Different groups for social mobilization like users group, Self help group, have been formed with the consultation of the members of watershed development team ; PRA exercises to be done for the detailed survey of the village assets have been done; A draft of the detailed project report has been prepared for its final approval.

CHAPTER-1

INTRODUCTION & BACKGROUND

PROJECT BACKGROUND

The Indo-gangetic plains of U.P. have undergone stress for natural resources, which are witnessing degradation at an alarming rate. With the growing urge for decentralizing the practice of planning, it has become necessary to have a fresh look and scientific attitude for natural resources management. The watershed approach has conventionally aimed at treating degraded lands with the help of low cost and locality accessed technologies such as in-situ soil and moisture conservation measures, afforestation etc. and through a participatory approach that seeks to secure close involvement of the user communities. 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 (IWMP) 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 being implemented to promote development of cost effective and proven technologies to support watershed management.

The watershed, with code No. 2B2F5m2a, 2B2F5m2d, 2B2G1a1a, 2B2G1a1b, 2B2G1a1e, 2B2G1a1f, 2B2F5m1f, 2B2E5m1d, having area of 4907.00 Ha, is located in North West part of the Pratapgarh district of U.P. The area of watersheds is

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

Most of the land comes under agriculture. The area in the watershed is relatively flat plain with shallow river-valleys. The livelihood of these people is primarily based on rainfed agriculture, animal husbandry, wage labour and goat keeping. The soils are mainly sandy, loamy and clayey.

Basic Project Information

S. No	Name of the project	No. of Watershed	Block	District	Total area of the project (Ha)	Area proposed to be treated (Ha)	Total project cost(Rs in Lac)	PIA
1	I.W.M.P - III	8	Sangipur	Pratapgarh	4907.00	4112.00	493.44	B S A, Pratapgarh

NEED AND SCOPE FOR WATERSHED DEVELOPMENT

The main objectives are

(a) To control damage by run-off

(b) To manage and utilize run-off for useful purpose or soil conservation

(c)To increase infiltration of rain water

Main problem in watershed Area

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. 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 Sai 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 smelly and oily hence irrigation is not possible by this ground water. Farmers depends on the rain water., which flows directly of Sai river. Ther fore it is an urgent need, that rainwater should be harvested for crops and re-charged to improve the quality of the water.

WEIGHTAGE FOR SELECTION OF WATERSHED

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.

Problems identified and prioritized during the transact walk and PRA exercises in all villages Sangipur,Kalyanpur, Sujakhar, Sarai Lalshah, Badshahpur, Shukulpur, Shreepur, Gadiyan, Nauwanar, Silaudhi, Sarua, Aoripur Naugir, Deum Paschim, Deum Purab, Basuapur, Rampur Kasiha, Bhojpur, Pichura, Kamapursaraiya, Kethola, Kaira, Gondwa, Udharanpur, Baribojh, Dagarara, Medhawan, Gokhari, Katehti, Mahmad Pur, Bhundaha, Bhaisana, Bhagaura, Singhgarh, Pure Naryandas, Jagdishpur, Gobardhanpur, Devigarh, Patti Kachehra, Dewapur, Usmanpur, Lakhanpur Soor, Buboopur, Gopalpur, Juhi, Paharpur, Ridhi, Biliamgarh, Harspur Kotwa, Pure Roop, Kirat Pur, Pure Tilakram, Itauri, Pure Jiwan, Chitari, Bhavram Bojhi, Sagra Sundarpur 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.

Problems Identification and Prioritization

S.No.	Problems	Rank
1	Low production of field crops	3
2	Lack of irrigation water	1
3	Lack of drinking water	4
4	Non availability of fuel wood	6

5	Lack of inputs like quality seeds, fertilizers, pesticides etc.	2
6	Medical and health care facilities for milching animals and low productivity	5
7	Lack of fodder availability and low annual productivity	7
8	Lack of medical educational and transportation facilities	8

Strength, Weakness, Opportunity And Threat (Swot) Analysis Is A Useful Decision Support Tool

A SWOT analysis of Sai watershed is presented as below:

Strength (S)	**Weakness(W)**
1- Cooperative work culture is traditional activities 2- Close ethnic tier 3- Road at the top as well as outlet of the watershed 4- Hard working man power 5- Resource pool of crop genetic diversity 6- Awareness of farmers about watershed management program 7- Well established CPR maintaining and sharing system 8- Well maintained seasonal water bodies. 9- Social outlook of the community towards	1- Poor water management 2- Resource poor farmers 3- Out migration of youth 4- Low and erotic rain fall 5- Fragile geography 6- Fragmented land holding. 7- Heavy infestation of wild animals 8- Problem of fuel and fodder
Opportunities(O)	**Threats (T)**
1- Wide range of annual and personal crops 2- Scope of regular employment opportunity to check out migration 3- Strengthening of existing irrigation system 4- Conductive climate for rainfed crop diversification 5- Good scope for agro forestry and dry land horticulture. 6- Potential for collective active action and management of CPRs.	1- Prone to adverse climate like drought 2- High market risk 3- Social conflicts owing to PRI & WSM policies and local policies. 4- Weak coordination among line departments. 5- Lack of expertise of implementing agencies in different aspect of WSM.

Weightage Of The Project

District	Name of the Project	No. of micro-watersheds proposed to be covered	Proposed project area (ha)	Type of project(Hilly/ Desert/ Others)	Proposed cost (Rs. In lakh)	Weightage													
Pratapgarh	IWMP-III	8	4112.00	Others	493.44	I	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv
						7.5	10	5	5	3	0	5	5	10	5	5	10	0	70.5

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	5	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)	-33.3 to -66.6 (10) DPAP Block	0 to -33.2 (0)	

		DDP Block		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

WATERSHED INFORMATION

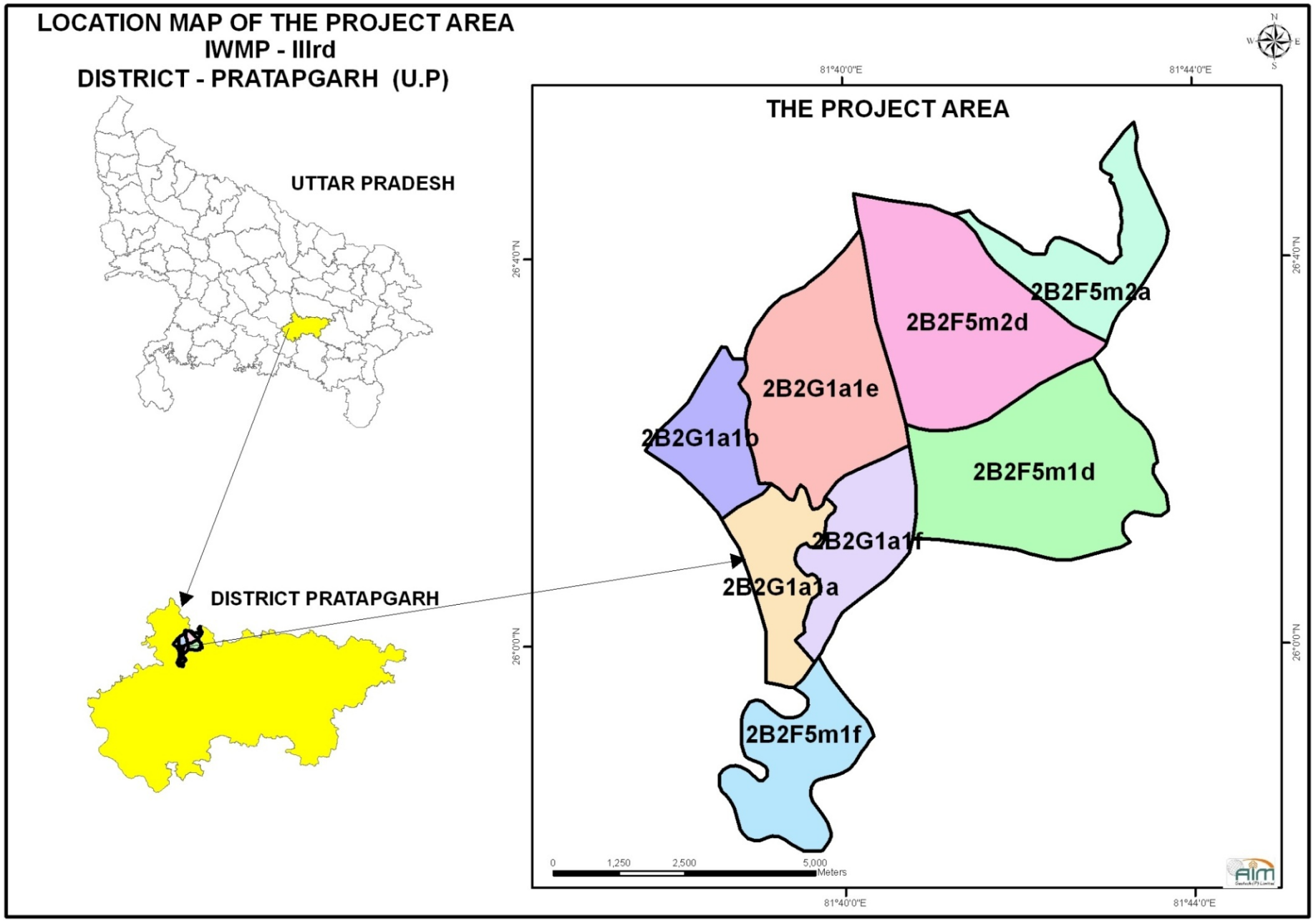
Name Of the Project	No. of water sheds to be treated	Area of Watershed	Watershed Code	Watershed regime/type/order
IWMP-III, Pratapgarh	8	5838.00	2B2F5m2a, 2B2F5m2d, 2B2G1a1a, 2B2G1a1b, 2B2G1a1e, 2B2G1a1f, 2B2F5m1f, 2B2E5m1d	MicroWatershed

OTHER DEVELOPMENTAL PROJECTS/SCHEMES RUNNING IN THE VILLAGES

These villages being very backward 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.

CHAPTER – 2

GENERAL DESCRIPTION OF PROJECT AREA


LOCATION MAP OF THE PROJECT AREA
IWMP - IIIrd
DISTRICT - PRATAPGARH (U.P)
UTTAR PRADESH
DISTRICT PRATAPGARH
THE PROJECT AREA
2B2F5m2a
2B2F5m2d
2B2G1a1e
2B2G1a1b
2B2F5m1d
2B2G1a1f
2B2G1a1a
2B2F5m1f
81°40'0"E
81°44'0"E
26°40'0"N
26°0'0"N
0
1,250
2,500
5,000
Meters

LOCATION

The selected watershed IWMP-III of Pratapgarh district (U.P.) is located along, Rai-bareilly - Pratapgarh road about 3.0 Km from the Sai river, in Sangipur block of Pratapgarh district (U.P). The Block Sangipur is approximately 42 km away from district head quarter and the project area is situated with minimum distance of 7-8 km. from Block head quarter as also 2.0 Kms from Tehsil.

The project is a cluster of eight (8) micro- watersheds with code No. 2B2F5m2a, 2B2F5m2d, 2B2G1a1a, 2B2G1a1b, 2B2G1a1e, 2B2G1a1f, 2B2F5m1f, 2B2E5m1d, having an area of 4907.00 ha of which 4112.00 ha, has been undertaken to be treated under Integrated Watershed Management Programme (IWMP) starting year 2010-2011. It lies between the longitude of 81° 37’ 43’’ to 81^0 43' 43’’ and latitudes 25°57’52’’ to 26°05’23’’. There are 8 gram panchayat and 55 revenue villages in the project.

AREA

LANDUSE PATTERN OF THE PROJECT AREA

S. No	Name of District	No. of Micro-watershed	No. of Villages	Geographical Area	Rainfed Area	Land under agricultural use	Plantation	Wasteland	Fallow Land
1	Pratapgarh	08	55	5838.00	4907.00	4893.79	307.89	313.06	60.97

AGRO-CLIMATE CONDITIONS

The Agro-Climate Condition of the project area including the Agro-Climate Zone of the project I.W.M.P-III, Pratapgarh is briefly describe below.

DETAIL OF AGRO-CLIMATE CONDITIONS, IWMP -III, PRATAPGARH

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, Pratapgarh	Central Plain	4907	55	Sandy Loam	3244	Moderate slope	159 mm	Bajara,Arhar, Wheat, Urad	2102

PHYSIOGRAPHY

The watershed is in the Eastern plain region of Uttar Pradesh, having moderate slopes and drains into river Ganga through Sai River. About 60% of the watershed area has slopes up to 1%, to 3% area and 40% area having 3 to 5% slopes.A number of streams join the main perennial stream of Sai River. The plains form a level tract which slopes gently from north-west to south-east. Most of the agricultural land is dependent on monsoon. The height above mean sea-level ranges from 106 meters in north-west to 69 meters in the south-east. The valleys of the larger rivers are not only depressed well below the general level of the country but are of considerable breadth. Thus there is a wide area of low land which is inundated in years of heavy rainfall.

ELEVATION RANGE, LATITUDE LONGITUDE, RELIEF HEIGHT DIFFERENCE ETC

S. No.	Details of the watershed	Settlement	Location		Elevation of watershed from Mean Sea level		
			Latitude (N)	Longitude (E)	Highest in Meters	Lowest in Meters	Relief Height Difference
1	2B2F5m1d	Kalyanpur, Sujakhar, Sarai Lalshah, Rampur Kasiha, Shukulpur, Shreepur, Gadiyan, Nauwanar and others	26^0 00' 55" to 26^0 02' 55"	81^0 40' 44" to 81^0 43' 43"	102	77	25
2	2B2F5m1f	Bhojpur, Pichura, Kamapursaraiya, Kethola, Kaira, Gondwa, and others	25^0 57' 52" to 25^0 59' 50"	81^0 38' 33" to 81^0 40' 19"	106	69	37
3	2B2F5m2a	Katehti, Mahmad Pur, Bhundaha, Bhaisana, Bhagaura, Singhgarh, Pure Naryandas and others	26^0 03' 10" to 26^0 05' 23"	81^0 41' 19" to 81^0 43' 45"	102	84	18
4	2B2F5m2d	Patti Kachehra, Dewapur, Bhundaha, Usmanpur, Bhagaura, Jagdishpur, Lakhanpur Soor, and others	26^0 02' 14" to 26^0 04' 37"	81^0 40' 09" to 81^0 43' 00"	102	86	16
5	2B2G1a1a	Rajmatipur,Aoripur Naugir,Darra, Bhojpur and others	25^0 59' 35" to 26^0 01' 39"	81^0 38' 36" to 81^0 39' 54"	99	73	26
6	2B2G1a1b	Rajmatipur, Amishankerpur, Salhapur and others	26^0 01' 21" to 26^0 03' 04"	81^0 37' 43" to 81^0 39' 09"	99	70	29
7	2B2G1a1e	Bhundaha, Usmanpur, Lakhahra, Lakhanpur Soor, Buboopur, Rajmatipur, Amishankerpur, and others	26^0 01' 24" to 26^0 04' 15"	81^0 38' 50" to 81^0 40' 45"	100	77	23
8	2B2G1a1f	Gadiyan, Aoripur Naugir, and others	25^0 59' 50" to 26^0 02' 03"	81^0 39' 27" to 81^0 40' 50"	99	77	22

CLIMATE

The climate of the region is characterized as sub tropical. The average annual rainfall is 159 mm. Most of the annual rain fall (about 90%) is received during the rainy season (July to September) accompanied with high intensity storm. The trend of rainfall is highly erratic and maximum (62%) water goes as runoff. Temperature ranges from very high as 42^oC in the May-June

to as low as 5.1^{0}C during December-January. During the monsoon and the post monsoon seasons the relative humidity are high ranging between 70 and 90 per cent. In the winter months humidity decreases and in summer the air is comparatively drier.

RAINFALL

ANNUAL RAINFALL OF THE DISTRICT PRATAPGARH (mm)

Month	Year									
	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
January	5	2	-	-	1	-	9	1	4	-
February	0	4	9	60	7	2	8	-	-	8
March	3	-	-	51	-	-	-	-	5	3
April	NA	5	-	-	3	4	-	7	2	6
May	NA	57	35	17	19	37	20	9	7	23
June	NA	41	231.3	61	37	27	38	70	111	170
July	NA	282	527	176	240	208	380	405	377	432
August	NA	116	202.6	191	140	177	275	380	197	361
September	NA	112	72.9	67	87	90	7	117	79	106
October	NA	69	18	12	7	62	9	58	34	47
November	NA	6	-	-	-	4	1	-	9	-
December	NA	8	-	2	-	4	-	3	1	6
Total	8	702	1095.8	637	541	615	747	1050	826	1162

WIND VELOCITY

The Wind velocity of the Project area ranges from 7-12 Km/hr.

WATERSHED CHARACTERISTICS

Shape and Size

The watershed shape (IWMP - III) is more or less rectangle in shape. The direction of the slope in the project area is north-west to south- east. The maximum length and width of IWMP – III, watershed, are 15312 m and 7760 m, respectively with the length: width ratio 1.97/1

SHAPE AND SIZE OF WATERSHED

S. N.	Micro watershed Code	Area (ha)	Shape	Approximate size in meter		Ratio Length: width
				Length	Width	
1	2B2F5m1d	1256.06	Rectangle	4650	3226	1.44:1
2	2B2F5m1f	556.95	Semi-circular	3276	1768	1.85:1
3	2B2F5m2a	510.65	Elongate	3967	1825	2.17:1
4	2B2F5m2d	1205.99	Rectangle	4333	2707	1.60:1
5	2B2G1a1a	417.10	Elongate	3625	1708	2.12 :1
6	2B2G1a1b	376.18	Square	2275	1840	1.23:1
7	2B2G1a1e	1033.95	Square	3653	2971	1.22:1
8	2B2G1a1f	481.12	Elongate	4039	1890	2.31:1

GEOMORPHOLOGY

The area lies in the Central Part of the District- Pratapgarh of Sai Basin. The soil is mainly sandy loam soil which is easily transportable after detaching causing soil erosion by water erosion and wind erosion. Topography is Moderate and Undulating.

DETAIL OF SOIL EROSION (I.W.M.P-III) PRATAPGARH

S. No.	Name of the Project	Water Erosion (Ha)				Run-Off (mm/year)	Average Soil Loss in tons/ha/yr	Wind Erosion
		Sheet	Rill	Gully	Total			
1	IWMP - III	2894.00	1128.00	885.00	4907.00	400	18	N.A.

SOILS

In the watershed area mainly soil are Balui Domat, Matiyar & Clay soil which are the main soil type of eastern plain region. Main crops are cereals who need more Nitrogen & Phasphorus. Therefore deficiency of Nitrogen & Phosphorous and zinc in this area.

DRAINAGE

Due to moderate to steep slopes and presence of a number of drainage lines, drainage is adequate. The watershed forms part of Ganga basin.

NATURAL VEGETATION

Natural vegetation of the watershed is very poor. The forest vegetation is predominant with vilayati Babool *(Prosopis Juliflora)* followed by babool (Acacia nilotica). There are occasionaly occurance of Neem, Mango, Guava, Lemon, Aonla, Mahua and Shisham. There is no reserve pasture land in the watershed. Grass patches are seen only on the bunds, road sides and other such places. The principal grasses are Doob & Munj.

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

SOCIO-ECONOMIC ANALYSIS OF THE PROJECT

In the proposed watershed management plan of Sai river, 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.

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**.**

HUMAN POPULATION

The I.W.M.P – III, watershed project has a total of 11478 household with a population of 64899 out of which 32249 are male and 32650 are female.

DETAIL OF HUMAN POPULATION (I.W.M.P-III) PRATAPGARH

S.No.	Name of Village	No. of Household	Polulation			SC-Population		
			T-P	Male	Female	Male	Female	Total
1	Katehari	354	1933	901	1032	52	71	123
2	Bhagora	203	1188	582	606	93	81	174
3	Pure Narayan Das	332	1880	946	934	205	201	406
4	Kalyanpur	160	880	395	485	85	100	185
5	Devigarh	65	344	176	168	62	70	132
6	Singhgarh	135	774	364	410	124	137	261
7	Govardhanpur	68	374	174	200	4	4	8
8	Jagdishpur	84	470	218	252	48	56	104
9	Bhaisana	355	2182	1102	1080	141	181	322
10	Bhundus	128	743	370	373	137	132	269
11	Patti Kachetra	230	1097	591	506	104	83	187
12	Devapur	84	485	256	229	86	68	154
13	Usmanpur	208	1053	477	576	127	156	283
14	Lakhanpur Sur	199	952	552	400	104	68	172
15	Babupur	319	1900	949	951	179	174	353
16	Sangipur	314	1752	977	775	203	165	368

17	Sukulpur	324	1856	930	926	95	89	184
18	Sripur	-	-	-	-	-	-	-
19	Sujakhar	419	2514	1279	1235	203	210	413
20	Juhi	55	276	123	153	5	4	9
21	Gopalpur	261	1497	741	756	307	324	631
22	Lakhahara	176	1090	584	506	110	93	203
23	Rajmatipur	494	2726	1385	1341	167	172	339
24	Gadiyan	162	962	482	480	92	107	199
25	Bhojpur	623	3294	1593	1701	298	337	635
26	Kamapur Saraiya	66	454	239	215	77	74	151
27	Pichura	271	1514	759	755	127	131	258
28	Kaira	66	365	187	178	46	50	96
29	Kaithola	378	2045	1013	1032	241	261	502
30	Godwa	354	2121	1065	1056	252	269	521
31	Gokhari	424	2221	1077	1144	224	225	449
32	Maidhwan	375	2379	1203	1176	388	372	760
33	Dhagrara	229	1290	597	693	86	89	175
34	Udranpur	142	803	385	418	99	111	210
35	Selhapur	91	501	234	267	62	63	125

36	Aami Shankarpur	375	2274	1139	1135	378	376	754
37	Samaspur	74	283	141	142	51	46	97
38	Darra	639	3834	1909	1925	225	243	468
39	Auripur Nagor	444	2421	1196	1225	153	171	324
40	Sarailal Shat	149	880	423	457	35	83	118
41	Badshahpur	182	1006	434	572	70	92	162
42	Nauwanar	65	372	163	209	4	6	10
43	Silaudhi	288	1588	780	808	84	86	170
44	Basuapur	199	1119	576	543	138	113	251
45	Rampur Kasia	73	496	259	237	12	18	30
46	Deum Purab	495	2880	1448	1432	252	243	495
47	Deum Paschim	347	1831	875	956	202	215	417
	Total	11478	64899	32249	32650	6237	6420	12657

MIGRATION STATUS

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.

MIGRATION STATUS (I.W.M.P-III) PRATAPGARH

S.No.	No. of the villages	No. of persons migrating	No. of days per year of migration	Main reason for migration	Expected reduction in no. of persons migrating
1	55	787	222	Poverty & Unemployment	509

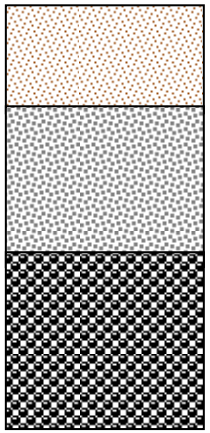
SOIL AND LAND CAPABILITY CLASSIFICATION

Soil and land Capability Classification:

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

1- Plain land
2- Moderate slopy land
3- Strong

Soil Profile: A Representative Soil Profile



1-1.5 (Heavy texture clay-soil Blackish Brown in color)

5 -8m –deep soil

7 –8 m [Bed rock]

MORPHOLOGY OF TYPICAL SOLID PROFILE OF SAI WATERSHED

Horizon	Depth(Cm)	Morphology
A	0-150	Blackish brown in colour, clay content > 80%, soft and easily erodible when moist, hard when dry, high elasticity, Cracks occur when dried.
B	150-800	whitish brown in colour, very hard when dry, clay content > 60%
C	>800	Bedrock(Red and White sand stone)

SOIL CHARACTERISTICS AND FERTILITY STATUS

Four types of soils are in the watershed area. The fertility status is about normal range due to production of major pulses crops. There is scarcity of nitrogan due to continuous growing of cereals crops. The four soil samples of each village, three for nutrients analysis and one for sulphur and micro nutrients analysis have been send to laboratory. After receiving the analysis report effort will be made to motivate the farmers to use nutrients and micronutrients according to the any analysis report. For this demonstration of crop in Kharif and Rabi both seasons have been proposed under agriculture production activity.

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 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 Land capability classification is an interpretative grouping of lands made to show their relative suitability's 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 Sai watershed brought out the prevailing LCC classes as I,II,III .

CONCLUSION

The land capability classification of the Sai watershed provides reasonable good information with regard to capability of soil, that could be used for agriculture, agri-horticulture, silvi-culture and pasture development. The majority of land form is coming under class II, which give an insight of good agriculture production potential of these watershed. 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 III 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.

SLOPE ANALYSIS

The Project area has an uneven terrain with higher elevations on the north- 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.

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 LAND UNDER DIFFERENT CATEGORIES WITHIN WATERSHED

S. N.	Watershed Code	Name of villages falling in the watershed	Built-Up Land	Wasteland all types	Agriculture	Fallow Land	Water Bodies	Plantation	Total
1	2B2F5m1d	Kalyanpur, Sujakhar, Sarai Lalshah, Rampur Kasiha, Shukulpur, Shreepur, Gadiyan, Nauwanar, Silaudhi, Sarua, Aoripur Naugir, Deum Paschim, Deum Purab, Basuapur, Badshahpur	50.98	6.93	1078.72	-	2.48	116.95	1256.06
2	2B2F5m1f	Bhojpur, Pichura, Kamapursaraiya, Kethola, Kaira, Gondwa, Udharanpur, Baribojh, Gokhari, Medhawan, Dagarara	16.06	152.29	345.13	-	-	43.47	556.95
3	2B2F5m2a	Katehti, Mahmad Pur, Bhundaha, Bhaisana, Bhagaura, Singhgarh, Pure Naryandas, Jagdishpur, Gobardhanpur, Devigarh, Kalyanpur	18.40	14.69	468.09	0.82	-	8.65	510.65
4	2B2F5m2d	Patti Kachehra, Dewapur, Bhundaha, Usmanpur, Bhagaura, Jagdishpur, Lakhanpur Soor, Gobardhanpur, Devigarh, Buboopur, Kalyanpur, Gopalpur, Sujakhar, Sangipur, Juhi, Shukulpur, Shreepur, Gadiyan	48.85	20.53	1076.30	4.66	2.42	53.23	1205.99
5	2B2G1a1a	Rajmatipur, Aoripur Naugir, Darra, Bhojpur, Kamapursaraiya	24.00	43.05	314.53	16.42	0.05	19.05	417.10
6	2B2G1a1b	Rajmatipur, Amishankerpur, Salhapur, Samaspur, Darra	19.64	5.1	305.78	24.23	-	21.43	376.18
7	2B2G1a1e	Bhundaha, Usmanpur, Lakhahra, Lakhanpur Soor, Buboopur, Rajmatipur, Amishankerpur, Sangipur, Gadiyan, Aoripur Naugir, Darra	50.06	60.91	880.26	11.14	-	31.58	1033.95
8	2B2G1a1f	Gadiyan, Aoripur Naugir, Darra, Bhojpur	29.35	9.56	424.98	3.70	-	13.53	481.12
		Total 5838.19	257.34	313.06	4893.79	60.97	4.95	307.89	5838.00

PRESENT LANDUSE/LANDCOVER OF THE PROJECT AREA

S. No	Landuse	Area (ha)	%
1	Built-up land	257.34	4.40
2	Waste Land	313.06	5.36
3	Water Bodies	4.95	0.08
4	Plantation	307.89	5.27
5	Agricultural Land	4893.79	83.82
6	Fallow Land	60.97	1.07
Total		**5838.00**	**100**

DESCRIPTION

The present LU/LC map has been depicted through the satellite data of January, 2010 (Google). A total no. of 6 major categories of LU/LC has been mapped.

BUILT-UP LAND

All the major settlement areas have been mapped under this category such as Kalyanpur, Sujakhar, Sarai Bhojpur, Pichura,Katehti, Patti Kachehra, Rajmatipur, Bhundaha and the total area under category is 257.34 Hectare which is 4.40 % of the total mapped area. Under this category road network and other built-up area has also been included.

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. 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 4893.79 Hectare which is 83.82 % of the total mapped area.

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 313.06 Hectare which is 5.36 % 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 4.95 Hectare which is 0.08 % 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 307.89 Hectare which is 5.27% of the total mapped area.

AGRICULTURE

Various agriculture land uses in the watershed are extended to diversified land capabilities starting from marginal to good class IInd lands. The watershed distinctly has three types of land i.e. leveled, sloping and degraded and undulating. The agriculture is practiced on all these soil types though the productivity considerably varies. The total area in agriculture in the watershed is about 9171.0 ha out of which 1000 is irrigated while 7429.00 ha is under rainfed agriculture. 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 soil *Balui Domat, Matiyar, and having soil* are the main soil of district-Pratapgarh. 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: Fallow-Lentil, Fallow-gram, Fallow-wheat, arhar.

Double Cropping: Bajra - Lentil, Arhar + Jowar, Paddy-Gram Paddy-Lentil, Mazie-Potato.

Irrigated Agriculture:

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

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 (9-19 gm/ha) and rice (14.5-31 gm/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 bajra and jowar+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, wed mulching, agro-forestry, vegetative barriers etc also completely lack in the watershed.

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.

FOREST AND OTHER VEGETATION

Forests: The selected watershed has no resource forest area.

HORTICULTURE / AGRO-FORESTRY

Agro-Forestry

The agro forestry practices are highly lacking in the watershed though it has good potential under existing dispositions and may play a vital role particularly with respect to minimization of cropping risk, built up soil fertility and productivity soil conservation, partly meeting out the fire wood demand of rural community and moreover, optimizing the watershed the other agro-forestry systems like agri-silvi, silvi-pastoral, band and boundary plantations also have good potential to cater the firewood and fodder demands of the rural community it the watershed. The existing area under agro Forestry is almost negligible. *Prosopis juliflora* may be planted as block or sole plantation especially on marginal and degraded lands in the watershed. The agro-forestry interventions comprising of ber, bel, amla, guava, teak etc may be applied for benefit of farmers under rainfed to irrigated production systems on leveled to slopy and marginal agricultural using proper planting techniques and termite control measures. The multipurpose trees may also help in supplementing fire wood and fodder demands of the rural community in the watershed and may be planted as hedge rows on rain-fed, marginal and degraded lands.

Horticulture:

The watershed does not have organized orchards, however, farmers have fruit plants (mango, ber, bel, guava, mahua, amla etc.) near the homesteads and kitchen gardens. The climate and soil of the area is favorable for fruit growing for sub tropical fruits in the lower reaches. Organized orchards, commercial vegetable cultivation, agro horticulture, and other system of agro forestry etc. are lacking but have good potential in the watershed. The watershed is located near the national highway and North Central railway line and has scope to transport the produce to the nearest market Pratapgarh to Delhi.

LIVESTOCK POPULATION

The Total Livestock Population of the watershed is **13895.** The majority of the peoples are depended on Buffaloes and Goats. The micro-watershed wise detail of the Livestock is given below.

DETAIL OF LIVE STOCK (I.W.M.P-III) PRATAPGARH

S.No.	Name of Village	Buffaloes	Cows	Bullocks	Goat	Others	Total
1	Katehari	101	161	10	150	-	422
2	Bhagora	98	150	-	200	75	523
3	Pure Narayan Das	106	82	-	76	20	284
4	Kalyanpur	21	36	4	46	30	137
5	Devigarh	40	50	-	20	-	110
6	Singhgarh	26	87	2	36	11	162
7	Govardhanpur	60	51	-	30	-	141
8	Jagdishpur	100	40	-	90	16	246
9	Bhaisana	109	147	12	136	21	425
10	Bhundus	23	33	5	39	-	100

11	Patti Kachetra	27	39	7	47	19	139
12	Devapur	29	10	-	28	16	83
13	Usmanpur	35	17	-	20	13	85
14	Lakhanpur Sur	26	41	6	45	11	129
15	Babupur	107	157	18	65	57	404
16	Sangipur	102	152	16	64	17	334
17	Sukulpur	107	161	18	47	21	354
18	Sripur	-	-	-	-	-	-
19	Sujakhar	111	174	28	67	19	399
20	Juhi	10	8	2	18	-	38
21	Gopalpur	90	71	-	51	29	241
22	Lakhahara	22	36	6	46	32	142
23	Rajmatipur	98	46	-	92	18	254
24	Gadiyan	28	41	8	49	21	147
25	Bhojpur	141	79	12	69	37	338
26	Kamapur Saraiya	101	46	-	78	19	244
27	Pichura	103	76	-	76	21	276
28	Kaira	41	52	-	19	-	112
29	Kaithola	102	162	12	155	-	431
30	Godwa	104	169	14	161	19	467
31	Gokhari	106	168	18	160	-	452
32	Maidhwan	108	170	20	148	-	446
33	Dhagrara	96	147	-	178	68	489

34	Udranpur	20	34	2	44	28	128
35	Selhapur	100	200	35	250	35	620
36	Aami Shankarpur	135	150	40	50	20	395
37	Samaspur	250	200	42	400	200	1092
38	Darra	209	246	22	296	-	773
39	Auripur Nagor	111	158	20	69	61	419
40	Sarailal Shat	21	36	4	46	30	137
41	Badshahpur	35	17	-	20	13	85
42	Nauwanar	60	51	-	30	-	141
43	Silaudhi	98	78	-	74	18	268
44	Basuapur	98	150	200	75	-	523
45	Rampur Kasia	60	51	-	30	-	141
46	Deum Purab	112	96	-	92	18	318
47	Deum Paschim	106	82	-	76	20	284
Total		**3793**	**4408**	**583**	**4058**	**1053**	**13895**

LIVELIHOOD PATTERN

People earn their livelihood from animal husbandry and agriculture and during lean seasons they migrate for daily wage labourers as well as agricultural labourers in neighbouring district and in other parts of the State. Another major occupation of the people is as industrial workers. The detail of livelihood pattern is given below.

SUMMARY OF LIVLIHOOD

No. of Villages	Existing livelihood activities	Possible livelihood intervation under the project	Current status of migration (No. of people)	Main reason of migration
78	Agriculture Works	Agriculture, Labour, Fisheries, Horticulture, Animal Husbandry	776	Poverty, Unemployment

LAND HOLDINGS

Lack of surface water source of ground water has limited the sufficient base for irrigation as well as for drinking purpose. Lack of irrigation source causes the majority of the farmers to migrate to ensure their livelood. This affects directly the demographic profile of the watershed. The major crops cultivated by the farmers are Wheat and Paddy. The detail of Land Holding Capacity is given below

Detail of Land Holding Capacity (I.W.M.P-III) Pratapgarh

S. No.	Name of Villages	Land Holding Classification				Percentage		
		Marginal	Small	Others	Total	Marginal	Small	Others
1	Katehari	161	23	46	230	70	10	20
2	Bhagora	122	18	40	180	68	10	22
3	Pure Narayan Das	300	35	100	435	69	8	22
4	Kalyanpur	203	29	58	290	70	10	20
5	Devigarh	85	12	28	125	68	10	22
6	Singhgarh	152	18	50	220	69	8	23

S. No.	Name of Villages	Land Holding Classification				Percentage		
		Marginal	Small	Others	Total	Marginal	Small	Others
7	Govardhanpur	273	39	78	390	70	10	20
8	Jagdishpur	116	14	40	170	68	8	24
9	Bhaisana	152	20	49	221	69	9	22
10	Bhundus	112	16	32	160	70	10	20
11	Patti Kachetra	258	38	84	380	68	10	22
12	Devapur	135	16	44	195	69	8	23
13	Usmanpur	58	8	19	85	68	9	23
14	Lakhanpur Sur	91	13	26	130	70	10	20
15	Babupur	135	19	39	193	70	10	20
16	Sangipur	126	19	35	180	69	11	20
17	Sukulpur	104	16	33	153	68	11	21
18	Sripur	78	10	47	135	58	8	34
19	Sujakhar	149	21	40	210	71	10	19
20	Juhi	120	16	49	185	65	8	27
21	Gopalpur	174	24	44	242	72	10	18

S. No.	Name of Villages	Land Holding Classification				Percentage		
		Marginal	Small	Others	Total	Marginal	Small	Others
22	Lakhahara	126	16	38	180	70	9	21
23	Rajmatipur	255	37	78	370	69	10	21
24	Gadiyan	250	28	79	357	70	8	22
25	Bhojpur	131	16	38	185	71	9	20
26	Kamapur Saraiya	88	10	32	130	68	8	24
27	Pichura	147	21	43	211	70	10	20
28	Kaira	96	12	30	138	70	9	21
29	Kaithola	129	19	42	190	68	10	22
30	Godwa	153	17	52	222	69	8	24
31	Gokhari	131	18	36	185	71	10	19
32	Maidhwan	74	10	26	110	68	9	23
33	Dhagrara	147	16	47	210	70	8	22
34	Udranpur	85	9	26	120	71	8	21
35	Selhapur	154	22	44	220	70	10	20
36	Aami Shankarpur	310	41	104	455	68	9	23

S. No.	Name of Villages	Land Holding Classification				Percentage		
		Marginal	Small	Others	Total	Marginal	Small	Others
37	Samaspur	220	31	59	310	71	10	19
38	Darra	557	82	181	820	68	10	22
39	Auripur Nagor	158	18	54	230	69	8	23
40	Sarailal Shat	91	13	26	130	70	10	20
41	Badshahpur	156	23	51	230	68	10	22
42	Nauwanar	77	9	24	110	70	8	22
43	Silaudhi	177	22	51	250	71	9	20
44	Basuapur	127	18	40	185	69	10	21
45	Rampur Kasia	218	25	78	321	68	8	24
46	Deum Purab	357	51	102	510	70	10	20
47	Deum Paschim	197	29	64	290	68	10	22

INFRASTRUCTURE SOCIAL FEATURES

The watershed has moderate communication facilities and all 55 villages are approachable through motorable road. Literacy rate in the watershed is very low because except some village all villages are having education facilities up to Junior High School. All the villages are electrified and have telephonic connection. Nearest market is in Sangipur and district

headquarter is at Pratapgarh. Small land holdings with large family size and more than 50% of the labour force of the total population living below poverty line indicate poor socio-economic status of the watershed community, however a strong community spirit among the village show a positive indication for the success of any programme implemented 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.

DETAIL OF VILLAGE WISE UTILITIES (I.W.M.P-III) PRATAPGARH

S. No.	Name of Village	Pakka Road	Electric Station	Primary School	Jun. School	Inter. College	Post Office	PHC	Vet. Hosp.	Bank	Co-op. Society	Market	Agri. Market
		Distance in Km.											
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Katehari	0.0	3.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2	Bhagora	0.0	4.0	0.0	1.0	1.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
3	Pure Narayan Das	0.0	2.0	0.0	2.0	2.0	2.0	7.0	7.0	1.5	2.0	3.0	7.0
4	Kalyanpur	0.0	0.50	0.0	1.50	2.50	2.0	7.0	7.0	7.0	2.5	7.0	7.0
5	Devigarh	0.0	5.0	0.0	2.0	2.0	4.0	5.0	5.0	5.0	5.0	2.0	2.0
6	Singhgarh	0.0	2.50	0.0	2.50	2.50	2.0	5.0	5.0	2.0	5.0	5.0	5.0
7	Govardhanpur	1.0	4.0	1.0	2.0	2.0	4.0	5.0	5.0	5.0	5.0	2.0	2.0

S. No.	Name of Village	Pakka Road	Electric Station	Primary School	Jun. School	Inter. College	Post Office	PHC	Vet. Hosp.	Bank	Co-op. Society	Market	Agri. Market
		Distance in Km.											
1	2	3	4	5	6	7	8	9	10	11	12	13	14
8	Jagdishpur	0.0	4.0	0.0	1.0	1.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
9	Bhaisana	0.0	2.0	0.0	2.0	2.0	2.0	7.0	7.0	7.0	7.0	7.0	7.0
10	Bhundus	0.0	3.0	0.0	3.0	3.0	3.0	8.0	8.0	8.0	8.0	8.0	8.0
11	Patti Kachetra	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
12	Devapur	0.0	6.0	0.0	0.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
13	Usmanpur	0.0	3.0	0.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
14	Lakhanpur Sur	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
15	Babupur	0.0	0.50	0.0	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
16	Sangipur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	Sukulpur	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
18	Sripur	1.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
19	Sujakhar	0.0	2.5	0.0	0.0	3.0	2.0	5.0	5.0	5.0	5.0	5.0	5.0
20	Juhi	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

S. No.	Name of Village	Pakka Road	Electric Station	Primary School	Jun. School	Inter. College	Post Office	PHC	Vet. Hosp.	Bank	Co-op. Society	Market	Agri. Market
		Distance in Km.											
1	2	3	4	5	6	7	8	9	10	11	12	13	14
21	Gopalpur	0.0	4.0	0.0	1.0	1.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
22	Lakhahara	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
23	Rajmatipur	1.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
24	Gadiyan	0.50	3.0	0.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25	Bhojpur	0.39	3.0	0.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
26	Kamapur Saraiya	0.0	6.0	0.0	2.0	3.0	6.0	6.0	6.0	3.0	6.0	6.0	6.0
27	Pichura	0.0	5.0	0.0	1.0	2.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
28	Kaira	0.0	5.0	0.0	1.0	2.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
29	Kaithola	0.0	0.0	0.0	0.0	0.0	0.0	10	10	0.0	10.0	10.0	10.0
30	Godwa	0.0	8.0	0.0	3.0	3.0	3.0	8.0	8.0	3.0	8.0	8.0	8.0
31	Gokhari	0.0	8.0	0.0	3.0	3.0	3.0	8.0	8.0	3.0	8.0	8.0	8.0
32	Maidhwan	0.0	6.0	0.0	1.0	1.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0
33	Dhagrara	0.0	6.0	0.0	3.0	3.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

S. No.	Name of Village	Pakka Road	Electric Station	Primary School	Jun. School	Inter. College	Post Office	PHC	Vet. Hosp.	Bank	Co-op. Society	Market	Agri. Market
		Distance in Km.											
1	2	3	4	5	6	7	8	9	10	11	12	13	14
34	Udranpur	0.0	6.0	0.0	2.0	3.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0
35	Selhapur	0.0	5.0	0.0	1.0	3.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
36	Aami Shankarpur	3.0	5.0	0.0	0.100	4.0	4.0	4.0	4.0	3.0	3.0	3.0	5.0
37	Samaspur	3.0	5.0	0.0	0.100	4.0	4.0	4.0	4.0	3.0	3.0	5.0	5.0
38	Darra	0.0	6.0	0.0	0.5	2.0	5.0	5.0	5.0	5.0	2.0	4.0	5.0
39	Auripur Nagor	0.0	1.50	0.0	0.0	3.0	4.0	4.0	4.0	4.0	2.0	3.0	4.0
40	Sarailal Shat	0.0	3.50	0.0	0.0	2.0	2.0	4.0	4.0	4.0	4.0	4.0	3.0
41	Badshahpur	0.0	3.50	0.0	0.50	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0
42	Nauwanar	0.0	3.0	0.0	0.60	0.6	0.60	1.0	3.0	3.0	3.0	3.0	3.0
43	Silaudhi	0.0	3.0	0.0	0.0	0.0	0.0	1.0	3.0	3.0	3.0	3.0	3.0
44	Basuapur	0.0	6.0	0.0	1.0	2.0	0.0	7.0	7.0	7.0	7.0	7.0	7.0
45	Rampur Kasia	0.0	6.50	0.20	0.50	8.0	0.80	8.0	8.0	8.0	8.0	8.0	8.0
46	Deum Purab	0.0	5.0	0.0	0.0	5.0	1.0	7.0	7.0	7.0	7.0	7.0	7.0

S. No.	Name of Village	Pakka Road	Electric Station	Primary School	Jun. School	Inter. College	Post Office	PHC	Vet. Hosp.	Bank	Co-op. Society	Market	Agri. Market
		Distance in Km.											
1	2	3	4	5	6	7	8	9	10	11	12	13	14
47	Deum Paschim	0.0	4.50	0.0	2.0	2.0	4.50	6.0	6.0	6.0	6.0	6.0	6.0

IMPORTANCE OF DEVELOPMENT INSTITUTION

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.

DEPENDENCY ON FOREST FOR FUEL WOOD AND FODDER

a) Fuel wood

Some villagers of the selected village are using LPG to meet their cooking energy requirements. The main source of fuel is form cow dung cake, woody stem of Arhar crop. About 65 to 70 percent of the domestic energy requirement is met from the Agro By-Product and cow dung cake.

b)Fodder:

Farmers also do not have any preferred fodder tree in the watershed in spite of fact that watershed falls in semi arid tract. The 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.

LACK OF ADEQUATE FARM MACHINERY

Even today a large number of farmers in water shade area use wooden ploughs and bullocks. They don't have adequate machinery like seed drill. So, old machineries take more time in tillage practices.

LACK OF GOOD QUALITY SEEDS AND FERTILIZERS

Good quality seed, fertilizer and pesticide are important factor in agriculture productivity. The use of good quality leads to higher land productivity. In watershed, however, there are two limitations in the use of fertilizer. First these fertilizers are most useful in irrigated condition. But in watershed 100 per cent of land depend on rainfall. mostly farmers use nitrogenous fertilizers especially urea. This has resulted in disproportionate use of fertilizer depleting the quality of land.

LACK OF OTHER FACILITIES SUCH AS STORAGE AND MARKETING

5-10% of agriculture product damage after harvesting due to scarcity of proper storage and proper market for sale. So he sells to local traders at the low prices. Farmers mainly face proper means of transportation and roads. And second problem is farmers don't have proper storage facilities.

HYDROLOGY AND WATER RESOURCES

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.

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.

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 Sai river 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

Participatory Rural Appraisal (PRA)

The past experience of watershed has given tremendous input to focus on creating accountability of the stakeholders towards the program. This has created an emphasis to include all the stakeholder communities and their local and Indigenous Technological Knowledge (ITK) while planning for any activity. Participatory approach provides a new path for planning, implementing, and monitoring and post- withdrawal activities with a complete accountability of the stakeholders. Various PRA techniques like resource mapping, social mapping, and season calendars were used to understand the physical and social orientation of the village in general and watershed in specific. These tools put the villagers in ease than the complicated questionnaires. Various tools like matrix ranking, venn diagram were used to identify various local vegetations (apt for afforestation), fodders crops.

Project Implementing Agency (PIA)

U.P. Government, Land Development And Water Resources Department section -1 Lucknow has nominated as PIA to Bhoomi Sanrakshan Unit, Land development and water resources Department Dist - Pratapgarh for IWMP.

DETAIL OF PIA STAFF

S.No.	Name	Designation	Qualification	Experience (Year)
1	Sri Rajendra Singh	B.S.A.	Diploma in Ag. Engg.	32
2	Sri H.N. Singh	Jr. Er.	Diploma Civil Engg	30
3	Sri R.S. Yadav	Jr. Er.	Diploma Civil Engg	28
4	Sri I.S. Singh	Jr. Er.	Diploma Ag. Engg.	28
5	Sri S.H. Srivastava	Accountant	M.com L.L.B.	30
6	Sri V.S. Kanaujiya	Draftt Man	Diploma in Draft man	30
7	Jangbahadur Singh	Ziledar	B.A.	30
8	Parasuram Singh	"	Intermediate	29
9	Ramsuchit Yadav	Sinch Parvechak	Intermediate	29
10	Lalbahadur Singh	"	B.A.	29
11	Asharfi Lal Maurya	"	Intermediate	25
12	Ramdeen Yadav	"	B.A.	27
13	Laxmishankar Maurya	J.C.	Intermediate	30
14	Rammurti Tiwari	J.C.	B.A.	29
15	Anil Kimar Mishra	J.C.	B.A.	11
16	Rakesh Kumar	J.C.	B.A.	7
17	Ramsajeevan Chaudhari	Tressar	Intermediate	31
18	Smt. Rambeti	''	Intermediate	07
19	Om Prakash Srivastava	Munshi	"	29
20	Abdul Samad	Munshi	B.A.	26
21	Rajkumar Singh	Sinchpal	Intermediate	26
22	Harsupati	"	B.Sc. (A.g)	25
23	Mohd. Tayyab	"	B.A.	26
24	Ravindra Pratap	"	B.A.	26
25	Rajitram	A.S.C.I.	M.Sc. (A.g)	08
26	Rajesh Kumar	A.S.C.I.	B.Sc. (A.g)	08

27	Lallan Prasad Mishra	Driver	J.H.School	30
28	Ramadhar Yadav	Group D	Intermediate	29
29	Rammani Pandey	"	Sakshar	30
30	Jagdish Prasad	"	Jr. H. School	25
31	Ram Bahadur Singh	"	Sakshar	28
32	Ram Prasad Maurya	"	"	26
33	Sunil Kumar Paswan	"	Intermediate	07
34	Lalti Devi	"	Saksha	09

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

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 in table below:

DETAILS OF WATERSHED DEVELOPMENT TEAMS (WDTS) IN IWMP, PRATAPGARH

S.No.	Name of the member	Qualification	Experience year
1	Sri H.N. Singh	Diploma Civil Engg.	30
2	Sri I.S. Singh	Diploma Ag.Engg	28
3	Sri Rajit Ram	M.Sc. (Ag)	8

4	Sri Rajesh Kumar	B.Sc.(Ag)	8
5	Sri Sarvesh Kumar	M.Sc. Soil Scince	5
6	Smt Uttama Singh	B.A. Sociology	3
7	Sri Radhe Shyam Yadav	Diploma Civil Engg.	28

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.

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, Pratapgarh. The watershed include 55 villages has 08 separate micro-watershed committee was formed in the village. Capacity building training to the watershed committee is given by WDT.

The watershed committee has a pivotal role to play during and after the project implementation period.

DETAILS OF WATERSHED COMMITTEE, I.W.M.P-III, PRATAPGARH

S.N.	Name of Micro-Watershed	Micro-Watershed Code	Date of Constitution	Name Of President	Name Of Secretary	Member Of User Group	Member Of SHG	Female Member	Member SC	Land Less Member	Work Incharge	WDT Member
1	Devigarh	2B2F5m2a	3.1.2011	Uma Kant Kori	Sohan Lal	Ram Ajor	Ramkaran Saroj	Smt. Karmavati	Ram Bahadur	Kallu Verma	Rajesh Kumar	H.N. Singh
2	Bhagora	2B2F5m2d	9.1.2011	Ran Vijay Singh	Sanjay Yadav	Sitla Prasad	Bhagauti	Smt. Shyama Devi	Nathu Saroj	Ram Raji Saroj	Ramdheen Yadav	Indra Sen Singh
3	Darra	2B2G1a1a	30.1.2011	Ashok Kumar Pandey	Rajpati Singh	Ramangar Neri	Santosh Kumar	Usha Rani Pandey	Ram Lal	Rehan Khan	Rakesh Kumar	H.N. Singh
4	Aami Shankarpur	2B2G1a1b	9.1.2011	Rajesh Singh	Anuj Kumar Singh	Ram Lakhan	Moh. Sattar	Kevala Devi	Harinath Saroj	Ram Bahadur	Moh. Taiyyab	H.N. Singh

5	Rajmatipur	2B2G1a1e	6.1.2011	Sanjay Singh	Dinesh Kumar Singh	Mata Prasad Verma	Renu Singh	Gayatri Devi	Sanjay Kiri	Babu Lal Saroj	Rajesh Kumar	H.N. Singh
6	Auripur Naugir	2B2G1a1f	14.1.2011	Smt. Badama Devi	Anil Kumar Singh	Vimla Devi Vishkarma	Subash Vishkarma	Santi Vishkarma	Sidhnath Mori	Sidhnath Verma	Raj Kumar Singh	Kuldeep Srivastava
7	Godwa	2B2F5m1f	8.1.2011	Smt. Anar Kali	Anil Kumar Mauraya	Ram Kishan Saroj	Satish Kumar	Smt. Sunita Saroj	Pullu Saroj	Harishankar Gaur	Abdul Samad	Indra Sen Singh
8	Silaudi	2B2E5m1d	13.1.2011	Smt Meeta Singh	Vijay Singh	Shivmurti Singh	Brij Narain Singh	Smt. Raj Kumari	Manoj Kumar Saroj	Chedi Lal Yadav	Harsh Patti	Indra Sen Singh

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.

It was planned to have some capacity building training regarding SHGs activities. It was also proposed to have some livelihood activities which will promote women empowerment.

DETAILS OF SELF HELP GROUP IN PROJECT AREA IWMP-III, PRATAPGARH

S. No.	Name of Micro-Watershed	Name of SHG Group	President	Secretary	Work
1	Devi Garh	Ambedkar SHG	Ram Karan Saroj	Ram Ganesh	Pig Keeping
2	Rajmatipur	Maa Durga SHG	Smt. Phula Saroj	Renu Singh	Sewing & Tailoring
3	Bhagora	Jai Maa Ambe SHG	Arvind Kumar	Pawan Kumar	Diary Udyog
4	Godwa	Jai Maa Kali SHG	Rajpati Saroj	Guddi Saroj	Manju Badh
5	Aami Shankarpur	Jai Durga SHG	Rajendra Singh	Rajesh Singh	Buffallo Keeping
6	Darra	Shiv SHG	Manju Singh	Nagendra Bahadur Singh	Poultry
7	Aauripur Naugir	Bam Bhole SHG	Lal Bahadur Verma	Ramchandra Singh	Goat Keeping
8	Sidhauli	Jai Maa Kali SHG	Smt. Chandra Kali	Smt. Sangeeta	Manju Badh

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.

USERS GROUP DETAILS IN PROJECT AREA – IWMP-III, PRATAPGARH

S. No.	Name of Micro-Watershed	Name of President	Name of President
1	Devi Garh	Shambu Saran Singh	Shiv Pratap Singh
2	Rajmatipur	Shiv Bahadur Singh S/0 Jung Bahadur Singh	Mata Prasad Verma S/o Bhagwati Prasad Verma
3	Bhagora	Sitla Prasad S/o Gir Dhari	Arvind Kumar S/o Ram Narayan
4	Godwa	Ayodhya Prasad	Satish Kumar Pathak
5	Aami Shankarpur	Girdhari S/o Mohan	Ram Lakhan S/o Chandrika
6	Darra	Dharam Raj Singh S/o Baijnath Singh	Harimesh Singh S/o Sher Bahadur Singh
7	Aauripur Naugir	Ramavati W/o Radhya Shyam Vishkarma	Rajdev Verma S/o Ram Sunder
8	Sidhauli	Shivbhuti Singh S/o Ram Naresh Singh	Sant Kumar Mishra S/o Bharav Prasad Mishra

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:

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.

CHAPTER – 5

MANAGEMENT / ACTION PLAN

PROBLEM AND NEED OF THE AREA

Integrated Watershed Development Programme is aimed at the socio-economic upliftment of the dwellers of watershed area and to create trust about the programme to be 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 chabootra will be constructed, to increase the irrigation water availability, older Bund which already exists but 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 water by supplying sport goods to the schools. For environmental purpose in the villages, tree planting will be done. Construction of bathrooms, renovation of ponds as well as hand pump will be completed. Total estimated cost for these activities is Rs. 19.74 Lakh.

ENTRY POINT ACTIVITY (EPA)

EPA activities are taken up under watershed projects to build a rapport with the village community at the beginning of the project; generally, certain important works which are in urgent demand of the local community are taken up. A group Discussion was conducted with watershed Development Committee regarding the EPA activity, It was conveyed to the WC that an amount of Rs. 19.74 Lakh was allotted for EPA activity, which was 4 per cent of total allocated budget. The villagers discussed various activities which they felt is important but after a brief discussion it was conveyed to them that only those activities can be taken, which revive the common natural resources. It was also taken into priority that there should be an instrument of convergence which will result in sustainability of activities.

ENTRY POINT ACTIVITIES (EPA) I.W.M.P-III (2010-2011) PRATAPGARH

S. No	Watershed Code	Amount earmarked for EPA (In lakhs)	Entry point activities Planned	Treatable Area (Ha)	Expected month & year of completion
1	2B2F5m2a	2.2272	1. Bathroom cum cloth changing room 2. Chabutara 3. Hand Pipe 4.Tree Planting with Tree Gaurd	464.00	May' 2011
2	2B2F5m2d	4.0128		836.00	May' 2011
3	2B2G1a1e	2.5488		531.00	May' 2011
4	2B2F5m1f	1.7136		357.00	May' 2011
5	2B2G1a1b	1.6176		300.00	May' 2011
6	2B2G1a1a	1.4448		301.00	May' 2011
7	2B2G1a1f	1.8264		417.00	May' 2011
8	2B2E5m1d	4.3488		906.00	May' 2011
	Total	**19.74**		**4112.00**	

WATER HARVESTING STRUCTURES•WATER, ENERGY AND RESOURCE CONSERVATION

For soil and moisture conservation, water resource developments, horticulture, besides agro-forestry vegetation/plantation work, engineering structure have also 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.

CONTOUR , MARGINAL AND PERIPHERAL BUND

Contour bunding is effective for erosion control and moisture conservation measures in dry areas having less than 2% slope to reduce the length of slope. Contour bund will be constructed against the slope in the treatment area. Marginal bund is the engineering structure to reduce the volume and speed of runoff. Those locations where their is a change in slope and soil texture. Peripheral bund will constructed along with the nala bank.

WATER HARVESTING STRUCTURE/CHECK DAM

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.

AGRO FORESTRY

Land will be taken from the waste land falling in the class-VII category in the watershed. The Eucalyptus and Sagon plants planted by the farmers.

DRY LAND HORTICULTURE

Lawn will be taken for the plantation of fruit trees like Guava, Mango will be planted at suitable spacing in the watershed.

AREA TREATMENT PLAN

Integrated watershed development program envisage treatment of proposed area with soil & water conservation works along with development of Horticulture, Afforestation & development of silvi pastoral system in denuded land unfit for cultivation, following works are proposed under watershed Development works.

1. Constructions of bunds (Field bund, contour bund, submergence bund, Marginal & peripheral).
2. Renovation of Existing Bund for in-situ moisture conservation.
3. Rain fed Horticulture with and without fencing.
4. Construction of recharge Filter.
5. Construction of new & renovation of Existing structures/ gully plugs/Check dams.
6. Afforestation and development of silvi– pastoral system.
7. Drainage line treatment (pucca structures, gully plug, check dams).

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 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.

HORTICULTURE DEVELOPMENT FOR WATERSHED MANAGEMENT

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).

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.

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**

ESTIMATE FOR SILVI-PASTORAL SYSTEM (RS. ha^{-1}) PLANTATIONS (800 PLANTS ha^{1})

Sl. No.	Particulars of work	Rate (Rs.)	Cost (Rs.)	Remarks
1-	Clear felling or bush clearance of area protected Infected with *Lantana* etc. including Cost of burning	LS	550.00	The area is to be through biofencing
2-	Soil working –earth work, digging of Pits/holes 60 cm deep, 30cm dia -800 Nos. Including cost of refilling and trenching (400 trenches/ha)	LS	6085.00	
3-	Cost of seedlings for 900 nos. and grass /legumes seeds and planning/sowing	-	2050.00	Rs.2.00 per seeding
4-	Weeding and hoeing (2 Nos.)	LS	300.00	
	Total		**8985**	
	Maintenance 2^{nd} year 15% of the 1^{st} year expenditure including being up of 1^{st} year failure			
	Grand total		**10,335.00**	
	Say		**10,350.00**	

Estimate of Orchard Development in the Watersheds Per Hectare (With Fencing)

S.No.	Particulars	Quantity	Rate	Amount	Remarks
A. Horticulture					
1.	Soil working 1m x 1m x 1m size pits (270nos.) including cost of refilling	270.00 cum	36.66/cum	9898.20	Since, the project is to be operated in a participatory mode, contribution in the form of labour input for pit digging, FYM and its applications, weeding and hoeing are to be provided by the participating farmers, hence the costs are not included in the estimates.
2.	Application of Farmyard Manure, including cost		L.S.	450.00	
3.	Cost of NPK mixture, neemicide @ 250 gm/plant		L.S.	400.00	
4.	Cost of plants (including 15% etc. for mortality) including transportation and planting	310 nos.	15.00/Plant	4650.00	
5.	Casualty replacement @ 10% of item No. 4 & 5			465.00	
6.	Cost of 2 weedings and hoeing		1.00/Plant	540	
7.	Contingency and unforeseen (3%)			492.00	
	Total			**Rs. 6,007.00**	
	Say			**Rs. 6,000.00**	
	Maintenance cost 2nd year onwards – 15 % of 1st year cost			900.00	
	For next 5 years i.e., Rs. 900 x 5			4500.00	
	Total Cost			**Rs. 10,500.00**	
	Say			**Rs. 10,500.00**	
B. Agro-Horticulture (cost per ha)					
1.	Cost of raising 270 plants up to 5 years @ Rs. 10,000.00			10500.00	The remarks mentioned under Horticulture are also applicable for Agro-Horticulture.
2.	Cost of raising agricultural crops @ Rs. 5,000 per hectare per year			5000.00	
3.	Fencing			45300.00	
	Total			**Rs. 60,800.00**	

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

S.No.	Particulars	Quantity	Rate	Amount	Remarks
A. Horticulture					
1.	Soil working 1m x 1m x 1m size pits (270nos.) including cost of refilling	270.00 cum	36.66/cum	9898.20	Since, the project is to be operated in a participatory mode, contribution in the form of labour input for pit digging, FYM and its applications, weeding and hoeing are to be provided by the participating farmers, hence the costs are not included in the estimates.
2.	Application of Farmyard Manure, including cost		L.S.	450.00	
3.	Cost of NPK mixture, neemicide @ 250 gm/plant		L.S.	400.00	
4.	Cost of plants (including 15% etc. for mortality) including transportation and planting	310 nos.	15.00/Plant	4650.00	
5.	Casualty replacement @ 10% of item No. 4 & 5			465.00	
6.	Cost of 2 weedings and hoeing		1.00/Plant	540	
7.	Contingency and unforeseen (3%)			492.00	
	Total			**Rs. 6,007.00**	
	Say			**Rs. 6,000.00**	
	Maintenance cost 2nd year onwards – 15 % of 1st year cost			900.00	
	For next 5 years i.e., Rs. 900 x 5			4500.00	
	Total Cost			**Rs. 10,500.00**	
	Say			**Rs. 10,500.00**	
B. Agro-Horticulture (cost per ha)					
1.	Cost of raising 270 plants up to 5 years @ Rs. 10,000.00			10500.00	The remarks mentioned under Horticulture are also applicable for Agro-Horticulture.
2.	Cost of raising agricultural crops @ Rs. 5,000 per hectare per year			5000.00	
	Total			**Rs. 15,500.00**	

DAIRYING AND LIVESTOCK DEVELOPMENT

In income generating activities through Self Help Group, landless and marginal farmers are advised to use three or four cows of *JURSEE* 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 Pratapgarh is situated in Eastern plain 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

Eastern plain region, due to the Agro-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.

40 Goat Units are proposed in I.W.M.P. III, 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.

Financial Component

S.No.	Component	Amount
1.	Cost of 10 goats of improved breed (not less than 6 months of age) @ Rs. 3200.00 each	32000.00
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. 45,930.40**
		Say Rs. 46,000.00

Estimate of Livestock Development Activities

Total number of female animals: Buffalo - 3793

Cow - 4408

Total - 8,201

1. Artificial Insemination (A.I.): 33% of total animals per year, i.e., 4125 (say 3400 nos.)

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

Total Amount - Rs. 4,12,500

2. Vaccination: Total number of animals in I.W.M.P. III - 20530 nos.

1. H.S. + B.Q.	@ 5.50	112915.00
2. F.M.D.	@10.50	2,15,565.00
	(Twice in a year)	

Total Amount - Rs. 3,28,480.00

3. Deworming: Adult animals - 19500

Child animals - 2000

Albendazole for	19500 animals	@ 40.56	7,90,920.00
	2000 child animals	@20.28	40,560.00

Total Amount - Rs. 8,31,480.00

4. Mineral Mixture: Agrimine Forte Chelated for 15700 animals @ 115.00 Rs. 18,05,500.00

GRAND TOTAL - Rs. 25,45,500.00

DEVELOPMENT OF MICRO-ENTERPRISES

DEMONSTRATION OF WHEAT

1- Variety recommended for District-Pratapgarh

Irrigated-W.H-52

Unirrigated –K-8027, K-5351(Mandakini)

Kathia Raj 1555

2- Seed rate -100 -125 Kg/hectare

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

ESTIMATE OF DEMONSTRATION OF WHEAT IN 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 GRAM IN WATERSHED AREA (per ha)

1- Variety - irrigated-vdai, KWR-108
Rainfed – J.G-315, Avrodhi

2- Seed rate/ha -50-55kg

3- Fertilizer requirement/ha N-25.0 kg, P-80 kg, K-30 kg

ESTIMATE FOR DEMONSTRATION OF GRAM (PER ha)

S.No.	Particulars	Quantity	Rate	Amount	Remark
1	Tillage operation in preparation of field and seed sowing	1.0ha (twice)	1000.00/ha	2000.00	Since the project is to be operated in participatory Mode, contribution by the farmer in the form of tillage, sowing operation, sowing and harvesting is not included in the estimates.
2	Cost of seed	55kg	90/kg	4950.00	
3	D.A.P	175kg	573.00/ 50 kg	2005.50	
4	M.O.P.	65kg	300.00/50kg	390.00	
5	Medicine	1.00ha	Lump sum	1250.00	
6	Harvesting	1.00ha	700.00/ha	700	
Total				**8595.50**	
Say				**Rs. 8600.00**	

Hence per hectare of demonstration –Rs. 8600.00

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

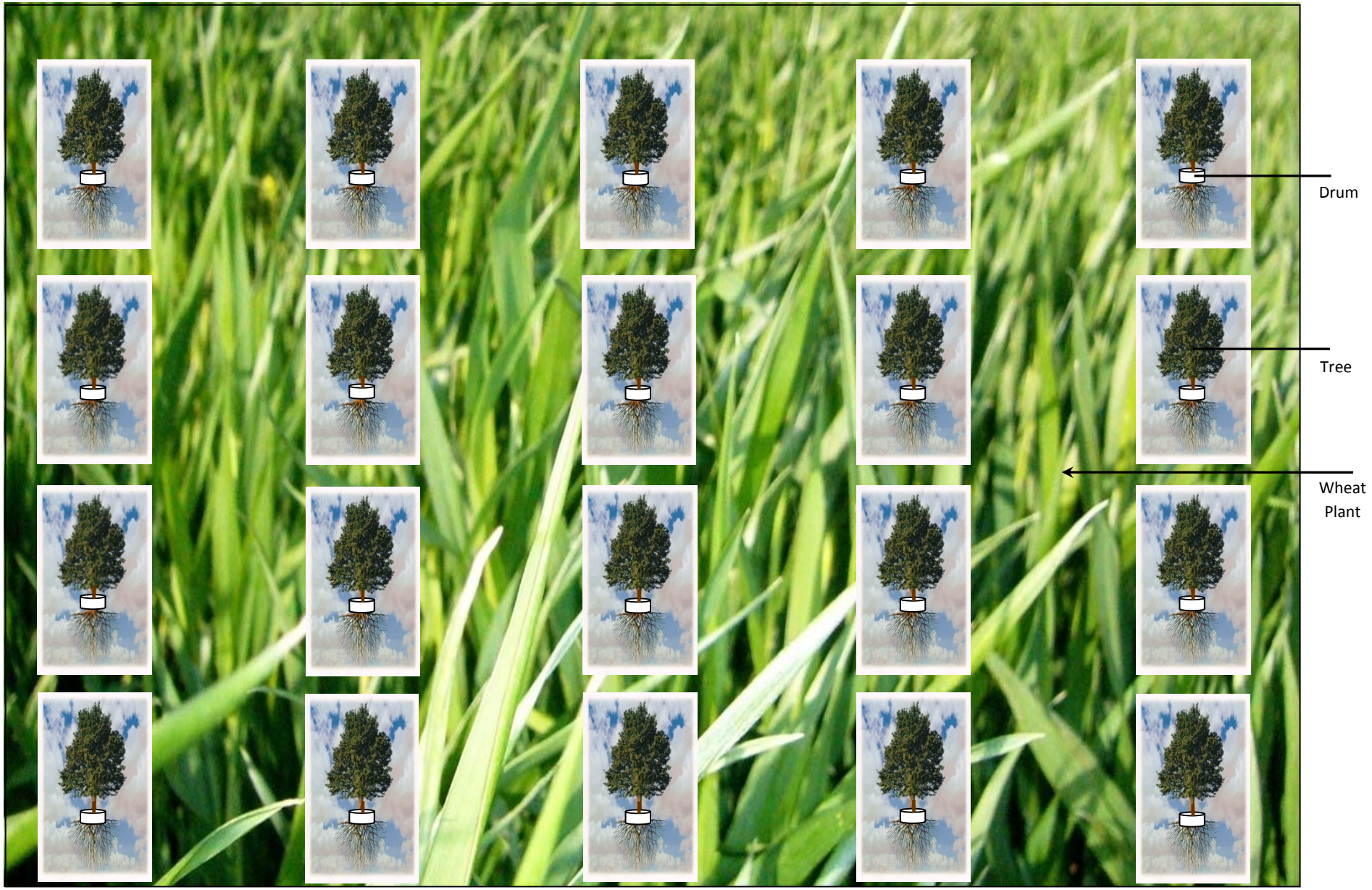
3-

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 Pratapgarh 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. III 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

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.

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

INSTITUTIONAL ARRANGEMENT & CAPACITY BUILDING IN THE PROJECTS

S.No.	Dsitrict	Project Stakeholders	Total no. of Persons	No. of Persons trained so far	No. of persons to be trained during current financial year	No. of person trained during current financial year	Sources of funding for training		Funds utilised	
							a) DoLR	b) Anyother (pl. specify)	a)DoLR	Name & address of Training school
1	Pratapgarh	D.W.D.U. -1	2	-	-	-	-	-	-	SIRD Bakshi ka Talab Lucknow
2		PIAs - 1	18	6	12	6	DoLR	BSA Unit	-	-do-
3		WDTs - 1	7	2	5	2	DoLR	"	-	-do-
4		GPs – 26	2600	-	2600	-	-	"	-	R.R.D.I. Pratapgarh
5		UGs – 35	525	-	525	-	-	"	-	-do-
6		SHGs – 55	520	-	520	-	-	"	-	-do-
7		WCs – 11	125	-	125	-	-	"	-	-do-
8		Others	-	-	-	-	-	-	-	-

CHAPTER -7
PHASING OF PROGRAMME, BUDGETING & PROJECT ACTIVITIES

WATERSHED ACTIVITIES

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.

SCIENTIFIC PLANNING

Cluster Approach

This envisages integrated development of Geo-hydrological unit i.e. Treatment of cluster of micro –watershed. The IWMP –III, Pratapgarh Project consist of 8 micro watersheds

Base line Survey

To access the impact of any watershed development programmed a detailed baseline survey has to be conducted. This acts a benchmark for any intervention during and post implementation of any development programme. A detailed baseline survey was undertaken which involved household census survey, Bio-physical survey and Village level data collection from 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

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.

Participatory Rural Appraisal (PRA)

Various PRA techniques like resource mapping, social mapping, and season calendars were used to understand the physical and social orientation of the village in general and watershed in specific. These tools put the villagers in ease than the complicated questionnaires. Various tools like matrix ranking, venn diagram were used to identify various local vegetations (apt for afforestation), fodders crops.

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 1.0 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.

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

PHASING OF WORK- (PHYSICAL & FINANCIAL) I.W.M.P- III, PRATAPGARH

Phasing of various works/activities during different years of the project period for treatable area 4112.00 ha out of total area 4907.00 ha is presented in Table Component wise & Year wise Phasing of Physical & Financial Outlay

Financial (Lakhs Rs.) Physical (ha)

Particulars	% of Budget	1st Year (2010-2011)		2nd Year (2011-2012)		3rd Year (2012-2013)		4th Year (2013-2014)		5th Year (2014-2015)		Total	
		F	P	F	P	F	P	F	P	F	F	F	P
A- ADMINISTRATIVE Cost TD & DA, POL/ Hiring of vehicles/ Office and payment of electricity and phone bill, etc. computer, stationary and office consumable and contingency etc.	**10%**	-	-	9.87	-	9.87	-	14.80	-	14.80	-	49.34	-
Monitoring Activities	**1%**	-	-	0.99	-	0.98	-	1.48	-	1.48	-	4.93	-
Evaluation	**1%**	-	-	1.48	-	1.48	-	1.48	-	0.49	-	4.93	-
Sub Total	**12%**	**-**	**-**	**12.34**		**12.33**		**17.76**		**16.77**		**59.20**	
B-PREPARATORY PHASES **(1) Entry point Activities(E.P.A)** Hand pump, Bathroom, Soaking pit etc.	**4%**	19.74	-	-	-	-	-	-	-	-	-	19.74	-
(2.) Capacity Building (a) Training of farmers & SHG & UG (b) Exposervisiting of formers SHG & UG	**5%**	4.93	-	9.87	-	9.87	-	-	-	-	-	24.67	-
(3.) Detail Project Report	**1%**	4.93	-	-	-	-	-	-	-	-	-	4.93	-
Sub Total	**10%**	**29.60**	**-**	**9.87**	**-**	**9.87**	**-**	**-**	**-**	**-**	**-**	**49.34**	**-**
C-WATERSHED WORKS													
(1)Physical work in Watershed													
a. Construction of Bunds (Field Bund, Contour Bund, PB/ MB)		-	-	37.01	614	74.02	1228	74.02	1228	61.68	1042	246.73	**4112.00**
b. Renovation of the Existing Bunds for insitu soil moistures conservation													

c. New and renovation of Existing Water Harvesting bunds/Gully plug/Check dam													
d. Afforestation													
e. Pacca structure													
Sub Total		**-**	**-**	**37.01**	**614**	**74.02**	**1228**	**74.02**	**1228**	**61.68**	**1042**	**246.73**	**4112.00**
(2)Livelihood Programme (Community Based) Income Generating Activities through S.H.G.'s for Landless and Marginal farmers Diary, Poultry, Tailoring, Plant Nursery, Munj Badh,Handicraft, Bee keeping etc.		-	-	4.93	-	19.74	-	14.80	-	9.87	-	49.34	-
Sub Total		**-**	**-**	**4.93**	**-**	**19.74**	**-**	**14.80**	**-**	**9.87**	**-**	**49.34**	**-**
(3)Production System and Micro-Enterprises Farming system approach, Animal husbandry activities, horticulture, vegetables growing, etc.		-	-	4.93	-	14.81	-	24.67	-	19.74	-	64.15	-
Sub Total		**-**	**-**	**4.93**	**-**	**14.81**	**-**	**24.67**	**-**	**19.74**	**-**	**64.15**	**-**
D-CONSOLIDATION PHASE		-	-	-	-	-	-	-	-	24.68	-	24.68	-
Sub Total		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**24.68**	**-**	**24.68**	**-**
GRAND TOTAL		**29.60**		**69.08**	**614**	**130.77**	**1228**	**131.25**	**1228**	**132.74**	**1042**	**493.44**	**4112**

ACTIVITY RELATED TO LIVELIHOOD BY SELF HELP GROUPS (SHGS) IN THE PROJECT AREA

S.N.	Name of watershed	No. Of Groups							Proposed outlay (Rs. In lakh)	Expected annual income per SHG (Rs. In lakh)	Remark
		Stiching & Knitting	Goat Keeping	Diary	Poultry	Pigry	Bee keeping	Total Groups			
1.	Devigarh	-	-	-	-	1	-	1	49.34	0.35 to 0.45	From Project Period
2.	Bhagawa	1	2	1	1	-	1	6			

3.	Rajmatipur	1	1	-	1	-	-	3			
4.	Gondawa	-	1	-	1	-	1	3			
5.	Aami Shankarpur	1	-	1	1	-	1	4			
6	Darra	-	1	1	1	-	1	4			
7	Auripur Naugar	1	1	1	1	-	1	5			
8	Silaudhi	1	1	1	1	-	1	5			
	Total	**5**	**7**	**5**	**7**	**1**	**6**	**31**	**49.34**		

CHAPTER - 8

CONSOLIDATION/ EXIT STRATEGY

PLANS FOR MONITORING AND EVALUATION

A Web-based GIS system is being developed for monitoring and evaluating the project in its planning & implementation phases. The system would be available on a public domain and can be accessed by all the 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.

Yet another component of the Web-based GIS system is the Mobile based Monitoring & Evaluation System, which will help the ground staff alias WDTs (Watershed Development Team) to transmit information from the ground level to the central server. Also, any higher-up official in charge of the project can obtain information regarding the project area on the project area on their mobile phone by means of an SMS. The system works in the following manner. The WDT equipped with a GPS instrument marks the latitude-longitude information of various treatment areas during the DPR. The probable sites are then

transferred onto the central server. During the works phase, any progress in the treatment areas is reported to the server by means of an SMS by the WDT. Similarly, any nodal officer or higher-up official can view the progress in a project by means of summarized reports generated over frequent periods of time.

PLANS AND 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.

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 IWMP-III 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

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

FOREST/ FUEL WOOD PLANTATION

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

FOOD SUFFICIENCY

Achieving self sufficiency in food production is one of the prime objectives of the project.

CHAPTER -9
EXPECTED OUTCOME

EMPLOYMENT GENERATION

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

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

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	55	0.744	-	1.430	0.098	2.204	740	-	1430	78	2170	128	-	138	30	266

MIGRATION

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

DETAILS OF MIGRATION (I.W.M.P-III) PRATAPGARH

S.No.	No. of the villages	No. of persons migrating	No. of days per year of migration	Main reason for migration	Expected reduction in no. of persons migrating
1	55	787	222	Poverty & Unemployment	509

WATER RELATED OUTCOMES

As a result of the watershed activities, it is expected that the quantity and quality of drinking water would 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 15.5 to 16.0 metre. The drinking water facilities available in the district are as follows.

STATUS OF DRINKING WATER

S. N.	No. of the villages	Availabilty of drinking water (no. of months in a year)		Quality of drinking water	
		Pre-project	Expected Post-Project	Pre-project	Expected Post-Project
1	55	10 months	12 months	Poor	Soft water

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	55	Open wells	16.00 mtr.	14.00 mtr.	-
		Bore wells	-	-	-

VEGETATION/ CROP RELATED OUTCOMES

It is expected that after compilation of the project, the crop productivity of Rice-Wheat will certainly enhance, It would be around Paddy (22.50 qt/ha),Wheat (35.00 qt/ha). There will be an improvement in soil health of the study area after conservation measures.

MAJOR CROPS GROWN AND THEIR PRODUCTIVITY IN THE PROJECT AREA

S. No.	Names of the crop	Current status		Expected Post-Project Status	
		Area (ha)	Productivity (kg/ha)	Area(ha)	Productivity (kg/ha)
1	Kharif (Bazara, Arhar, Paddy)	2000.00	1400.00	3150.00	2250.00
2	Rabi (Arhar, Wheat)	1500.00	2250.00	4580.00	3500.00
3	Zaid/Other season	250.00	350.00	350.00	550.00

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.

STATUS OF FOOD REQUIREMENT AND AVAILABILITY PER ANNUM IN SAI WATERSHED

S.No.	Item	Requirement Q / yr. By I.C.M.R.A	Before Project		Proposed	
			Availability Q / yr.	Deficit or Surplus Q / yr.	Availability Q / yr.	Deficit or Surplus Q / yr.
1.	Cereals	143297	107473	- 35823	150462	+ 7165
2.	Pulses	30450	14329	- 16120	30808	+ 358
3.	Oil Seeds	10747	7164	- 3583	12538	+ 1791
4.	Vegetables	107473	71648	-35825	111055	+ 3582

LIVESTOCK RELATED OUTCOMES

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.

FOREST/VEGETATIVE COVER RELATED OUTCOMES

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

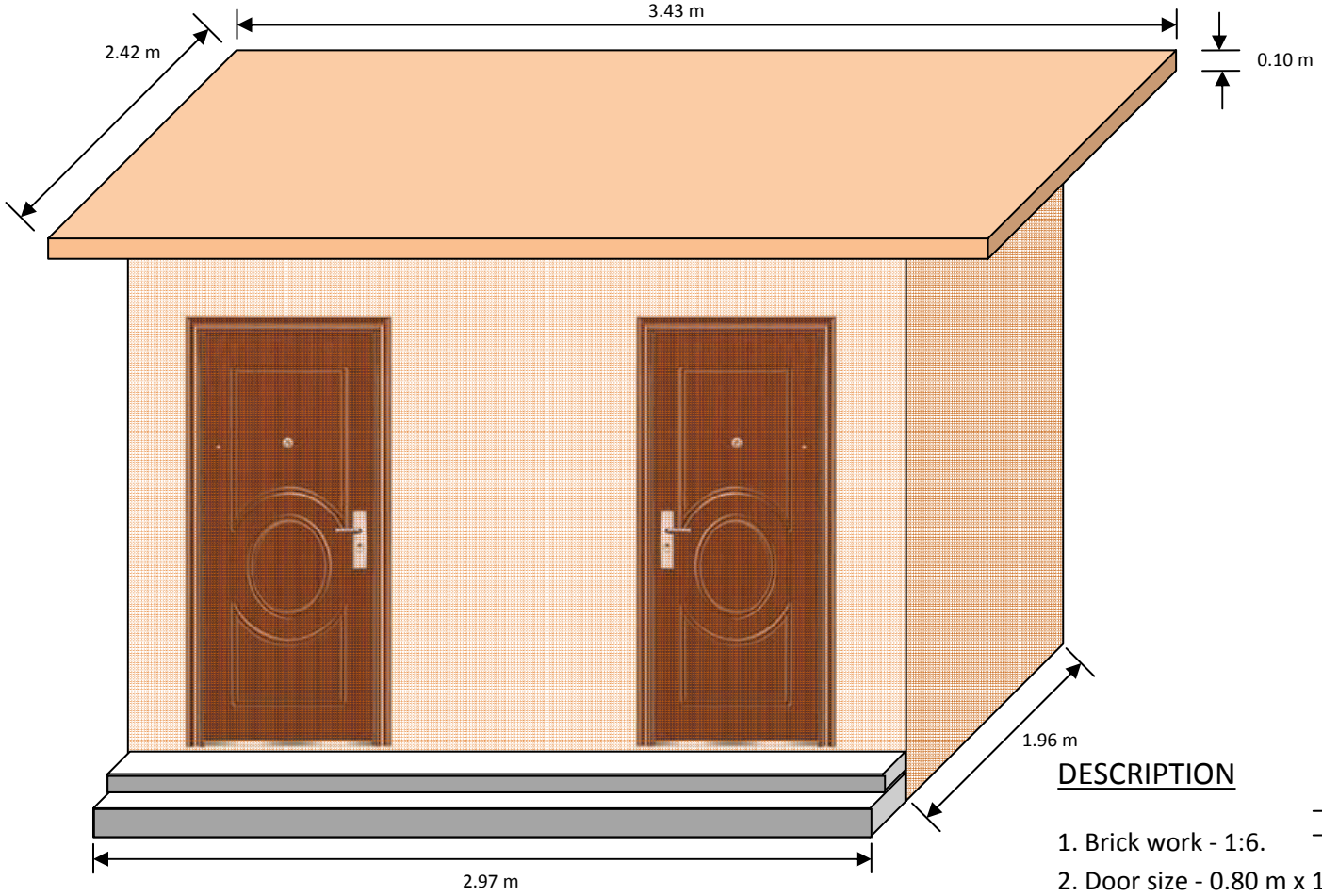
SUMMARY OF EXPECTED/ESTIMATED OUTCOMES OF IWMP-III (2010-11) PRATAPGARH

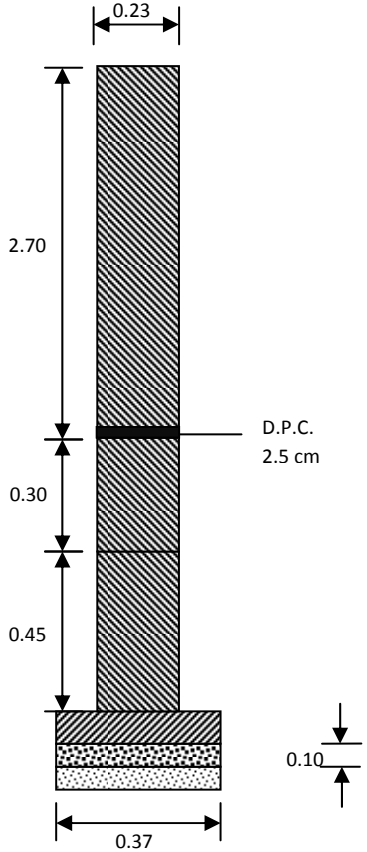
Sr. No.	Item	Unit	Pre Project	Post Project Status
1	**2**	**3**	**4**	**5**
1	Status of the water table	Mtr.	16	14.5
2	Ground water Structures repaired/rejuvenated	Nos.	-	501
3	Quality of Drinking water	Quality	Normal	Improve
4	Availablity of drinking water	No of days	275	365
5	Increased in irrigated area	Ha.	1000	1250
6	Changing in cropping / Land use pattern	-	-	-
	A- Area under agriculture crop	Ha	4894	5231
	i- Area under single crop	Ha.	3981	3691
	ii- Area under double crop	Ha.	1000	1250
	iii- Area under multipile croping	Ha.	-	290
	iv- Cropping intensity	%	120	132
7	Increased in area under vegetation cover	Ha.	50	120
8	Increased in area under horticulture	Ha.	-	335
9	Area under fuel & fodder	Ha.	5	37

10	Increased in milk production	Per Capita per day per Ltr.	0.15 - 0.20	0.20 – 0.30
11	No. of SHG	Nos	0	90
12	Increased in livelihood	Rs./- Capita /- Annum	approximate < 10000	Approximate 17000
13	Migration	Nos.	787	509
14	SHG Federation Formed	Nos.	-	2
15	Credit linkage with bank	Nos	-	35

CHAPTER -10
COST NORMS & DESIGN OF STRUCTURE PROPOSED

DRAWING OF BATHROOM FOR MEN/WOMEN





DESCRIPTION

1. Brick work - 1:6.
2. Door size - 0.80 m x 1.80 m
3. D.P.C. –2.5 cm- 1:2:4.
4. C.C.W. – 1:4:8.
5. R.C.C. of roof - 1:2:4.
6. Window size - 0.75 m x 0.60 m.
7. Plastering work – 1:4.
8. Lintel – 1:2:4. R.C.C.

DETAIL ESTIMATE OF BATHROOM FOR MEN/WOMEN

S. No.	Description of work	No.	Length (M)	Width (M)	Height/Depth (M)	Quantity
1	**Earth work in digging**	2	3.30	0.60	0.80	3.168
		2	1.33	0.60	0.80	1.276
		1	1.33	0.30	0.80	0.319
					Total	**4.763 cum**
2	**Laying of sand in foundation**	2	3.11	0.37	0.10	0.230
		2	1.36	0.37	0.10	0.100
		1	1.36	0.15	0.10	0.020
					Total	**0.350 cum**
3	**C.C.W. 1:4:8 in foundation**	2	3.11	0.37	0.10	0.230
		2	1.36	0.37	0.10	0.100
		1	1.36	0.15	0.10	0.020
					Total	**0.350 cum**
4	**Brick work 1:6 in foundation up to plingth**	2	3.11	0.37	0.15	0.345
		2	1.36	0.37	0.15	0.150
		1	1.36	0.11	0.15	0.022
		2	2.97	0.23	0.75	1.024
		2	1.50	0.23	0.75	0.517
		1	1.50	0.11	0.75	0.123
	Super Structure	2	2.97	0.23	2.70	3.688
		2	1.50	0.23	2.70	1.863
		1	1.50	0.11	2.70	0.445
					Total	**8.177 cum**

5	**D.P.C. 1:2:4**	2	2.97	0.23	0.025	0.034
		2	1.50	0.23	0.025	0.017
		1	1.50	0.11	0.025	0.004
					Total	**0.005 cum**
6	**Lintel 1:2:4 for door**	2	1.00	0.23	0.10	0.046
	R.C.C. for window	2	0.75	0.23	0.10	0.034
					Total	**0.080 cum**
7	**Deduction from Brick work**					
	door	2	0.80	0.23	1.80	0.662
	window	2	0.80	0.23	0.60	0.220
					Total	**0.882 cum**
	Net brick masonary work	**8.177 - 0.882**				**7.295 cum**
8	**Plastering 1:4**	2	3.11	-	3.00	18.66
		2	1.96	-	3.00	11.76
		4	1.20	-	2.70	12.96
		4	1.50	-	2.70	16.20
		2	1.20	1.50	-	3.60
					Total	**63.18**
	Deduction for doors	2	0.80	-	1.80	2.88 sq.m
	Net plastering work	63.18 – 2.88				**60.30** sq.m
9	**Flooring C.C.W. 1:4:8**	2	1.50	1.20	0.075	0.270 cum
	C.C.W. 1:2:4	2	1.50	1.20	0.025	0.090 cum
10	**white washing**	**2**	**3.11**	**-**	**3.00**	**18.66**
		2	**1.96**	**-**	**3.00**	**11.76**

		4	**1.20**	**-**	**2.70**	**12.96**
		4	**1.50**	**-**	**2.70**	**16.20**
		2	**1.20**	**1.50**	**-**	**3.60**
	Total					**63.18 sq.m**
	Deduction for doors	2	0.80	-	1.80	2.88 sq.m
	Net white washing	**63.18 - 2.88**				**60.30 sq.m**
11	**Roof R.C.C. 1:2:4**	1	3.57	1.96	0.10	0.699 cum

CONSUMPTION OF MATERIALS

S. No.	Particulars	Quantity	Cement (Bags)	Coarse sand (cum)	Brick (Nos)	G.S.B (m^3)	M.S. Bar 8 mm	10-20 m.m. Grit	Door No.	Lime (kg.)
1	sand laying	0.350 cum	-	0.350	-	-	-	-	-	-
2	C.C.W. 1:4:8	0.620 cum	2.10	0.279	-	0.576	-	-	-	-
3	C.C.W. 1:2:4	0.095 cum	0.57	0.039	-	-	-	0.080	-	-
4	R.C.C. 1:2:4	0.779 cum	4.75	0.327	-	-	0.0079/61.15 kg	0.662	-	-
5	Brick work 1:4	7.295 cum	13.13	1.969	3356	-	-	-	-	-
6	Plastering 1:4	60.300 m^2	6.63	0.904	-	-	-	-	-	-
7	White washing	60.300 m^2	-	-	-	-	-	-	-	6.00
8	Doors	2 Nos	-	-	-	-	-	0.742	2	-
Total			**27.18**	**3.868**	**3356**	**0.576**	**0.0079/61.15 kg**	**0.742**	**2 Nos.**	**6.00**
Say			**27**	**3.870**	**3360**	**0.576**	**0.0079/61.15 kg**	**0.742**	**2 Nos.**	**6.00**

COST OF MATERIALS

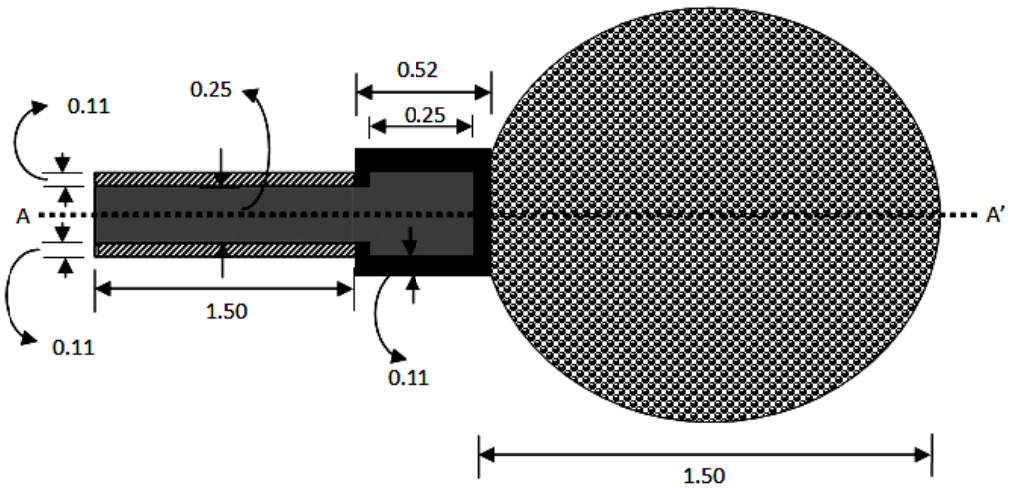
S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	27 bags	285.00/bag	7695.00
2.	Coarse sand	1.375 cum	2500.00/cum	3437.50
3.	Bricks	2450 Nos.	4500.00/thousand	11025.00
4.	M.S. Bar 8 mm ø	61.15 Kg.	345.00/qtl	2109.67
5.	G.S.B 25-40 m	0.576 cum	855/cum	492.48
6.	G.S. Grit 10-20 mm	0.742 cum	1250/cum	927.50
7.	Doors with frame	2 Nos.	3850.00 each	7700.00
8.	White lime	6 Kg.	8.00/kg	48.00
Total				**Rs. 33435.15**

LABOUR CHARGES

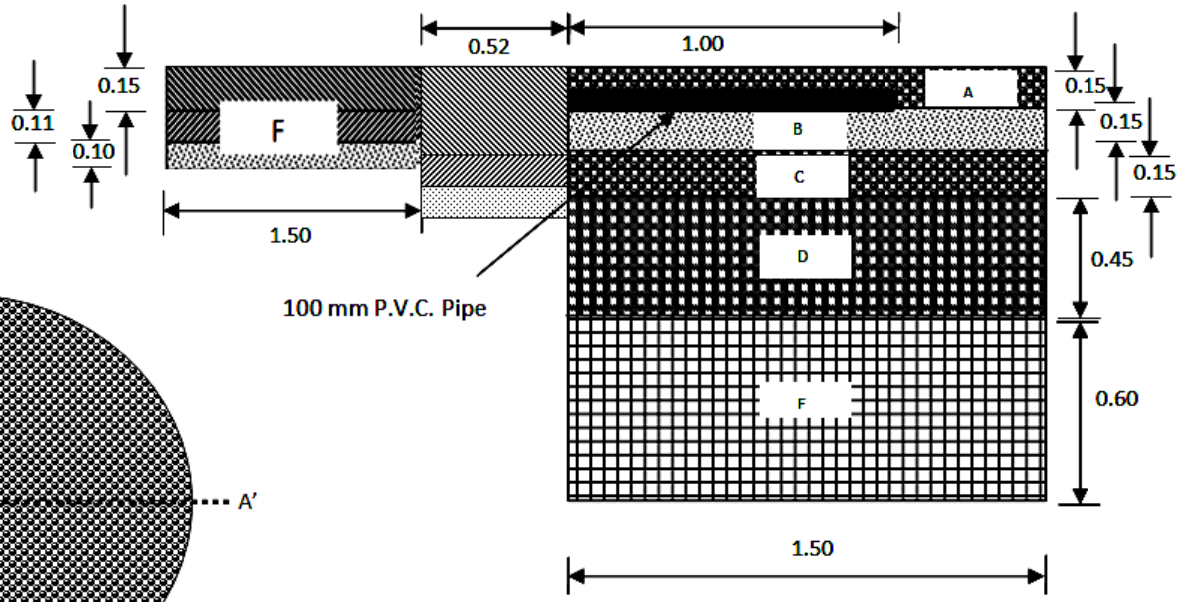
Total Cost	
1. Cost of materials	33435.15
2. Labour charges	9064.66
Total	**Rs. 42499.00**
	Say Rs. 42500 only.

DRAWING OF SOAKING PITS WITH SILTING TANK

All Dimensions Are in Metre



PLAN OF SOAKING PITS WITH SILTING TANKS



SECTION A-A'

DESCRIPTION.

A – 0.10 x 0.20 Grit.
B – Coarse Sand.
C - 0.10 x 0.20 Grit
D – 025 x 0.50 Grit.
E – Coal / Random Rubble.
F – Brick wall 0.11 m x 0.25 m Width channel

DETAIL ESTIMATE OF SOAKING PIT & CHANNEL OF LENGTH 1.50 M

S.No.	Description of Work	No.	L.	B.	D./H.	Quantity
1.	Earth work in cutting	1	3.14 x 0.75 x 0.75	-	1.50	2.64 cum
2.	Laying of G.S.B. 40 to 60mm	1	3.14 x 0.75 x 0.75	-	0.60	1.059 cum
3.	Laying G.S.B. 25-50 mm	1	3.14 x 0.75 x 0.75	-	0.45	0.794 cum
4.	Laying of G.S.Grit 10-20 mm	1	3.14 x 0.75 x 0.75	-	0.15	0.264 cum
5.	Laying of Coarse sand	1	3.14 x 0.75 x 0.75	-	0.15	0.264 cum
6.	Laying of G.S.B. 25-50 mm	1	3.14 x 0.75 x 0.75	-	0.15	0.264 cum
7.	Earth work	1	1.50	0.50	0.40	0.30 cum
8.	Laying of sand	1	1.50	0.47	0.10	0.070 cum
9.	Brick work 1:4	1	1.50	0.47	0.11	**0.077 cum**
10.	Brick work 1:4	1 x 2	1.50	0.11	0.15	**0.049 cum**
	Total of (9.) + (10.) Brick work 1:4.					**0.126 cum**
11.	Plastering 1:4	1 x 2	1.50	0.56	-	1.680 m^2

ABSTRACT OF MEASUREMENT

1.	Earth work	2.64 + 0.30	2.94 cum
2.	Laying of G.S.B. 40 to 60mm		1.059 cum
3.	Laying of G.S.B. 25-50 mm	0.794 + 0.264	1.058 cum
4.	Laying of G.S.Grit 10-20 mm		0.264 cum
5.	Laying of coarse sand	0.264 + 0.070	0.334 cum
6.	Brick work 11cm 1:4		0.126 cum
7.	Plastering 1:4		1.680 m^2

CONSUMPTION OF MATERIAL

S.No.	Description of work	Quantity	Cement (bag)	Brick (nos)	G.S.B. 40 to 60mm (cum)	G.S.B. 25-50 mm (cum)	G.S.Grit 10-20 mm (cum)	Coarse Sand
1.	Laying of G.S.B. 40 to 60 mm	1.059 cum	-	-	1.059	-	-	-
2.	Laying of G.S.B.	1.058 cum	-	-	-	1.058	-	-
3.	Laying of G.S.Grit	0.264 cum	-	-	-	-	0.264	-
4.	Laying of coarse sand	0.334 cum	-	-	-	-	-	0.334
5.	Brick work 1:4	0.126 cum	0.17	60	-	-	-	0.030
6.	Plastering 1:4	1.680 m^2	0.18	-	-	-	-	0.025
Total			**0.35**	**60**	**1.059**	**1.058**	**0.264**	**0.389**

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	0.35 Bags	300.00/Bag	105.00
2.	Brick	60 nos	4000.00/Thousand	240.00
4.	Coarse Sand	0.389 cum	910.00/cum	253.99
5.	G.S.B. 25-50 mm + 40 to 60mm	2.117 cum	900.00/cum	1905.30
6.	G.S.Grit	0.264 cum	1250.00/cum	330.00
	Total			**Rs. 2934.**
				Say-3000.00

LABOUR CHARGES

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth work	2.94 cum	36.66/cum	107.78
2.	laying of G.S.B.	1.059 cum	33.33/cum	35.29
3.	G.S.B. laying	1.058 cum	33.33/cum	35.26
4.	G.S.Grit laying	0.264 cum	33.33/cum	8.79
5.	Laying of sand	0.334 cum	33.33/cum	11.13
6.	Brick work 1:4	0.126 cum	370.00/cum	46.62
7.	Plastering 1:4	1.680 m^2	40.00/m^2	67.20
8.	Curing	0.126 cum	25.00/cum	3.15
	Total			**Rs. 315.22**

Total Expenditure	
1. Cost of materials	3000.00
2. Labour Charges	315.22
Total	**Rs. 3315.22**
Say	**Rs. 3300.00 only**

DETAIL ESTIMATE OF SILTING TANK

S.No.	Description of Work	No.	L.	B.	D./H.	Quantity
1.	Earth Work	1	0.70	0.70	0.50	0.24 cum
2.	Sand Laying	1	0.52	0.52	0.10	0.027 cum
3.	Brick Work	1 2 2	0.52 0.52 0.30	0.52 0.11 0.11	0.11 0.30 0.30	**0.029** **0.034** **0.019**
	Total					**0.082 cum**
4.	Plastering	4 2 2 1	0.30 0.52 0.30 0.30	- - - 0.30	0.30 0.11 0.11 -	**0.360** **0.114** **0.066** **0.090**
	Total					**0.630 m^2**
5.	Steel Filter 4" Ø	1				1 nos.
6.	P.V.C. Pipe 110 mm Ø	1	1.00	-	-	1.00 m

CONSUMPTION OF MATERIALS

S.No.	Description of Work	Quantity	Cement (bags)	Coarse Sand (cum)	Brick (nos.)	P.V.C. Pipe 110 mm Ø	Steel Filter
1.	Sand Laying	0.027 cum	-	0.027	-	-	-
2.	Brick Work 1:4	0.082 cum	0.11	0.019	39	-	-
3.	Steel Filter 4"	1 nos.	-	-	-	-	1 nos.
4.	P.V.C. Pipe 110 mm Ø	1.0 m	-	-	-	1.00 m	-
5.	Plastering	0.63 m^2	0.06	0.009	-	-	-
Total			**0.17**	**0.055**	**39**	**1.00 m**	**1 nos.**

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Coarse Sand	0.055 cum	910.00/cum	50.05
2.	Cement	0.17 bags	300.00/Bag	51.00
3.	Brick	39 nos.	4000.00/Thousand	156.00
4.	Steel Filter 4" Ø	1 nos.	25.00 each	25.00

5.	P.V.C. Pipe 110 mm Ø	1.00 m	150.00/m	150.00
Total				**Rs. 432.00**

LABOUR CHARGE

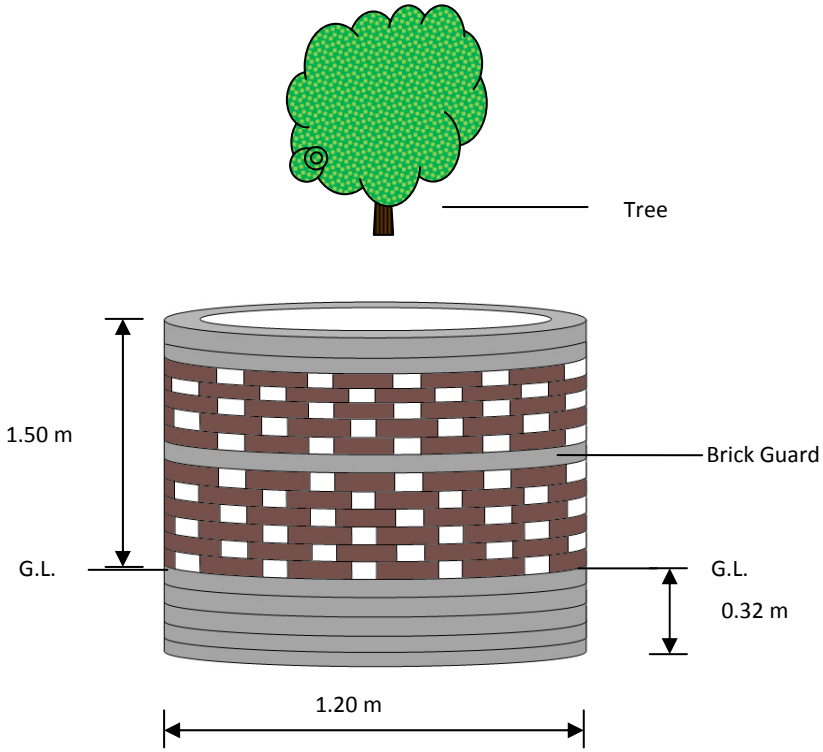
S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	0.24 cum	36.66/cum	8.79
2.	Sand Laying	0.027 cum	33.33/cum	0.89
3.	Brick Work	0.082 cum	370.00/cum	30.34
4.	Plastering	0.63 m^2	40.00/m^2	25.20
5.	Fixing of pipe & filter	-	-	25.00
	Total			**Rs. 90.22**

Total Expenditure	
1. Cost of materials	432.00
2. Labour Charge	90.22
Total	**Rs. 522..00**
	Say Rs. 500.00 only
TOTAL EXPENDITURE OF SOAKING PIT & SILTING TANK	
1. Soaking Pits	3300.00
2. Silting Tank	500.00
Total	**Rs. 3800.00**

DETAIL ESTIMATE OF INDIA MARKA II HAND PUMP FOR PRATAPGARH DISTT.

1	Transportation of 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 and lowering of P.V.C. assembling	meter	50	225.00	11250.00
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	2665.00	2665.00
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. 34,165.00**

DRAWING OF BRICK GUARD



DESCRIPTION.

1. Brick work = 1:4.
2. Plastering = 1:4.
3. Thickness of wall = 0.11 m.
4. Total height of brick guard = 0.32 + 1.50 = 1.82 m.
5. Diameter = 1.2 m.

DETAIL ESTIMATE OF BRICK GUARD

S.No.	Description of work	No.	L	B	D/H	Quantity	
1.	Earthwork for tree	1	0.60	0.60	0.60	0.216	
	In foundation	1	3.14x1.09	0.20	0.30	0.205	
Total						**0.421**	
2.	Brick work 1:4					Solid	Glazed
	In foundation	1	3.14x1.09	0.11	0.40	0.151	-
	In super structure with glazed	1	3.14x1.09	0.11	0.48	-	0.181
	Solid	1	3.14x1.09	0.11	0.08	-	0.030
	Glazed	1	3.14x1.09	0.11	0.40	-	0.151
	Solid	1	3.14x1.09	0.11	0.16	0.060	-
Total						**0.211**	**0.362**
3.	Plastering 1:4	1	3.14x1.20	-	0.07	0.264	
		1	3.14x1.20	-	0.15	0.565	
		1	3.14x1.09	-	0.07	0.239	
Total						**1.068 m^2**	

CONSUMPTION OF MATERIALS

S.No.	Description of work	Quantity	Brick Nos.	Cement Bags	Coarse Sand
1.	Brick work 11 cm thick 1:4 Brick work glazed	0.211 cum 0.362 cum	100 86	0.29 0.25	0.050 0.043
2.	Plastering 1:4	1.068 m^2	-	0.11	0.016
Total			**186**	**0.65**	**0.109**
Say			**190**	**0.65**	**0.110 cum**

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Brick II^{nd} class	190 nos.	3650.00	693.50
2.	Cement	0.65 Bags	300.00	195.00
3.	Coarse sand	0.110 cum	910.00	100.10
Total				**Rs. 988.60**

LABOUR CHARGES

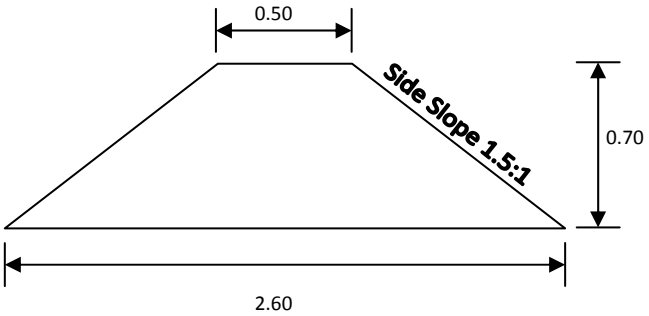
S.No.	Particulars	Quantity	Rate	Amount
1.	Earth work	0.421 cum	39.16/cum	16.48
2.	Brick work	0.391 cum	370.00/cum	144.67
3.	Plastering	1.068 m^2	40.00/m^2	42.72
Total				**Rs. 203.87**

Head load and transportation 20% of material cost - Rs. 191.87

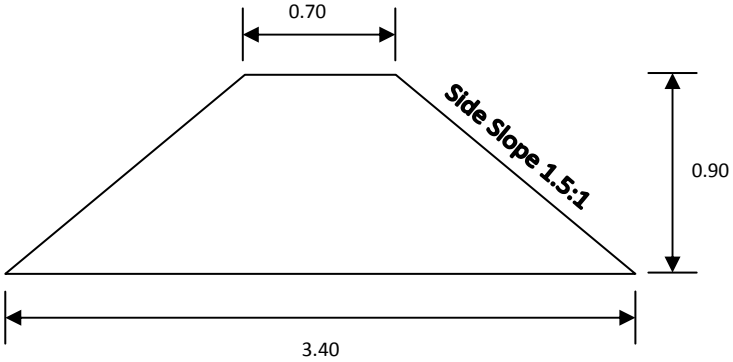
Total Expenditure		
1.	Material	988.60
2.	Labour	203.87
3.	Head load and transportation	191.87
Total		**Rs. 1384.34**
		Say Rs. 1355.00 only.

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

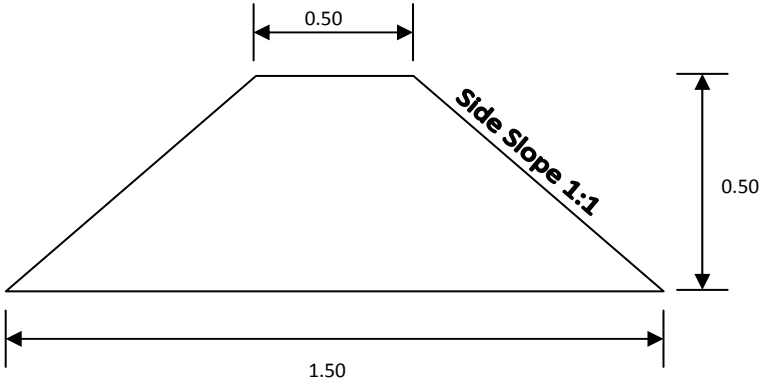
(Not to Scale)



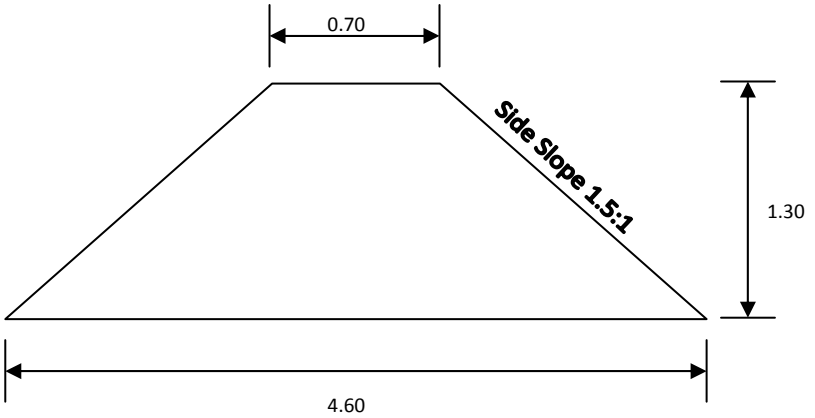
(C.B., Cross-Section – 1.085 m^2)



(S.B., Cross-Section – 1.845m^2)



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

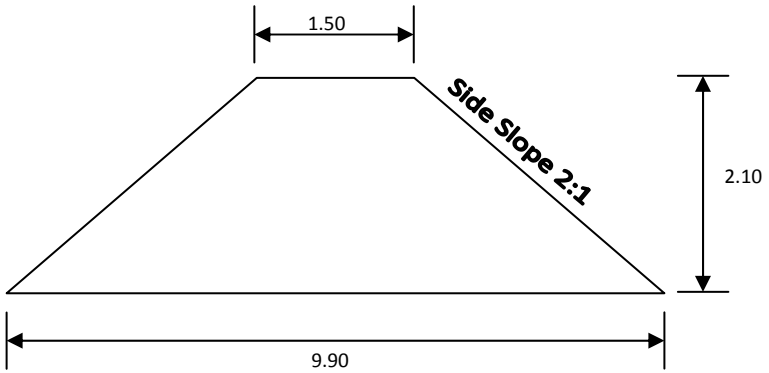


(S.B. /P.B. /M.B., Cross-Section – 3.445 m^2)

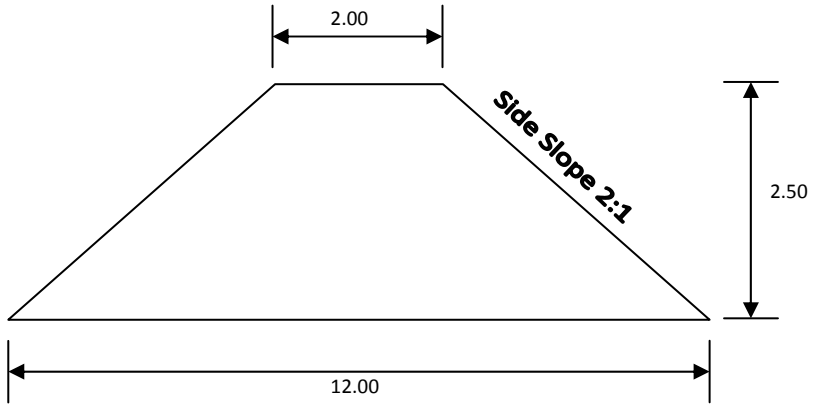
(All dimensions in Metre)

DRAWING OF EARTHEN CHEKDAM / GULLY PLUG

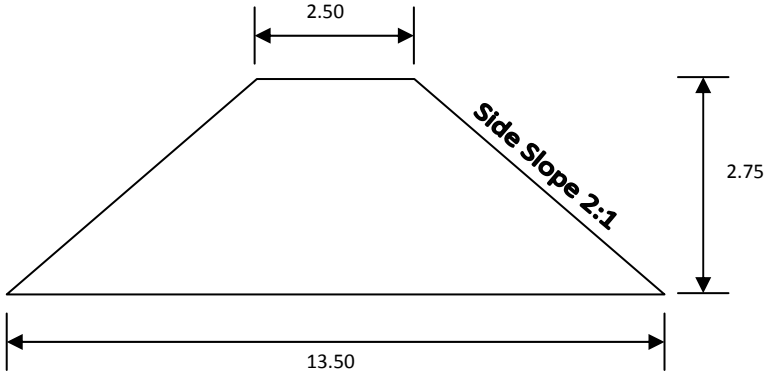
(Not to Scale)



(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 $h=\sqrt{(\mathrm{Re\ x\ V.I.})/50}$ $=\sqrt{(25 \times 0.90)/50}$ $=\sqrt{0.45}$ = 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

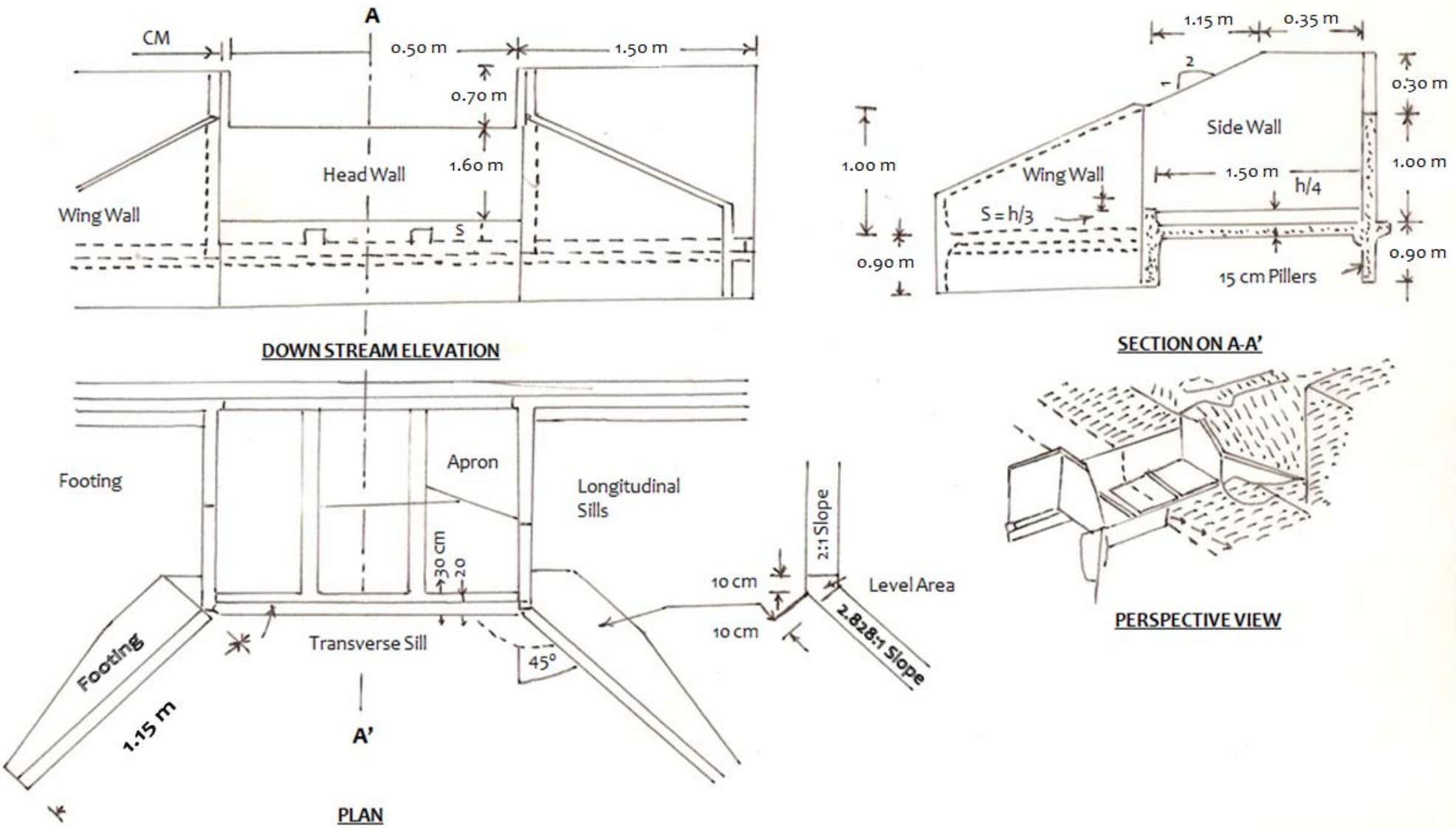
Top width	= 2.00m
Side slope	= 2:1
Height	= 2.50 m
Bottom Width	= 12.00 m
Cross Section	= (2.00 + 12.00) x 2.50 / 2
	= 17.50 m^2
Cost /meter	= Rs. 839.12

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

DRAWING OF SPILLWAY OF CREST LENGTH 0.5 m

Not to Scale



All Dimensions in Metre

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 x $\frac{0.5}{}$ + 0.54)- 0.5

= 0.50 x 2.74 = 1.37 m says 1.40 m

3- Height of end sill , S = $\frac{h}{}$ = $\frac{0.50}{}$ = 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 or 0.425 (adopt J = 1.00 m)

5- M = 2 (f + 1.33 h - J) = 2 (0.50 + 1.33 x 0.25 – 1.00)= 2 x (- 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 x $(Q/f)^{1/3}$ = 0.473 x $(0.1/1)^{1/3}$= 0.473 x 0.464 = 0.219

Maximum Scour depth (M S D) = 1.5x N S D= 1.5 x 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

DETAIL ESTIMATE OF DROP SPILLWAY OF CREST LENGTH 0.5 METRE

1. Earth work in cutting in foundation

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

2. Laying of sand in the bed of foundation

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

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

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	4.7	0.80	0.15	0.564
2	Head wall	1	0.50	0.40	0.15	0.030
3	Side wall	2	1.50	1.00	0.15	0.450
4	Wing wall	2	1.15	0.80	0.15	0.276
5	Toe wall	1	0.50	0.80	0.15	0.060
6	Apron	1	0.50	1.50	0.15	0.112
Total						1.492 cum

4. Brick masonry 1:4

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1 1	4.70 4.70	0.80 0.60	0.45 0.45	1.692 1.269

2	Head wall	1 1 1	0.50 0.50 0.50	1.10 1.00 (0.40 + 1.00) /2	0.45 0.45 0.60	0.247 0.225 0.180
3	Head wall extension	2 2 2 2	2.10 2.10 2.10 2.10	0.80 0.60 0.60 0.40	0.45 0.45 0.60 0.70	1.512 1.134 1.512 1.176
4	Side wall	2 2 2 2 2	1.50 1.50 1.50 1.50 (0.35 + 1.50) /2	1.00 0.80 0.80 0.60 0.40	0.45 0.45 0.60 0.40 0.30	1.350 1.080 1.440 0.720 0.222
5	Wing wall	2 2 2	1.15 1.15 1.15	0.80 0.60 0.40	0.45 0.45 (1.00 + 0) /2	0.828 0.621 0.460
6	Toe wall	1 1 1	0.50 0.50 0.50	0.80 0.60 0.40	0.45 0.45 0.20	0.180 0.135 0.040
7	Apron	1	0.50	1.50	0.45	0.337
	Total					16.360 cum

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

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1	0.50	0.40	0.025	0.005
2	Side wall	2 2	0.35 1.18	0.40 0.40	0.025 0.025	0.007 0.023
3	Head wall extension	2	2.10	0.40	0.025	0.042
4	Wing wall	2	1.52	0.40	0.025	0.030
5	Toe Wall	1	0.50	0.40	0.025	0.005
6	Apron	1	0.50	1.50	0.025	0.018
Total						0.130 cum

6.Tuck Pointing 1:3

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1 1	0.50 0.50	- -	0.60 0.84	0.30 0.42
2	Side wall	2 2	1.50 (0.35 + 1.50) /2	- -	1.00 0.30	3.00 0.55
3	Head wall extension	2	2.10	-	1.00	4.20
4	Wing wall	2	1.15	-	(1.00 + 0) /2	1.15
Total						9.62 m^2

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Coarse Sand (cum)	Brick (No)	G.S.B 25-40 mm (cum)	G.S. Grit 10-20 mm (cum)
1.	Sand laying	0.995 cum	-	0.995	-	-	-
2.	C.C.W. 1:3:6	1.492 cum	6.41	0.671	-	1.342-	-
3.	Brick Masonry	16.360 cum	39.26	5.562	8180	-	-
4.	C.C.W. 1:2:4	0.130 cum	0.79	0.054	-	-	0.110
5.	Tuck Pointing 1:3	9.62 m^2	0.44	0.045	-	-	-
Total			**46.90**	**7.327**	**8180**	**1.342**	**0.110**
Say			**47 Bags**				

COST OF MATERIALS

S.N0	Name of materials	Quantity	Rate	Amount
1.	Cement	47 Bags	255.00/bag	11985.00
2.	Coarse sand	7.327 cum	910.00/cum	6667.57
3.	Brick	8180	4500.00/th	36810.00
4.	G.S.B. 25-40 mm	1.342 cum	855.00/cum	1147.41
5.	Grit 10-20 mm	0.110 cum	1250.00/cum	137.50
Total				**Rs. 56747.48**

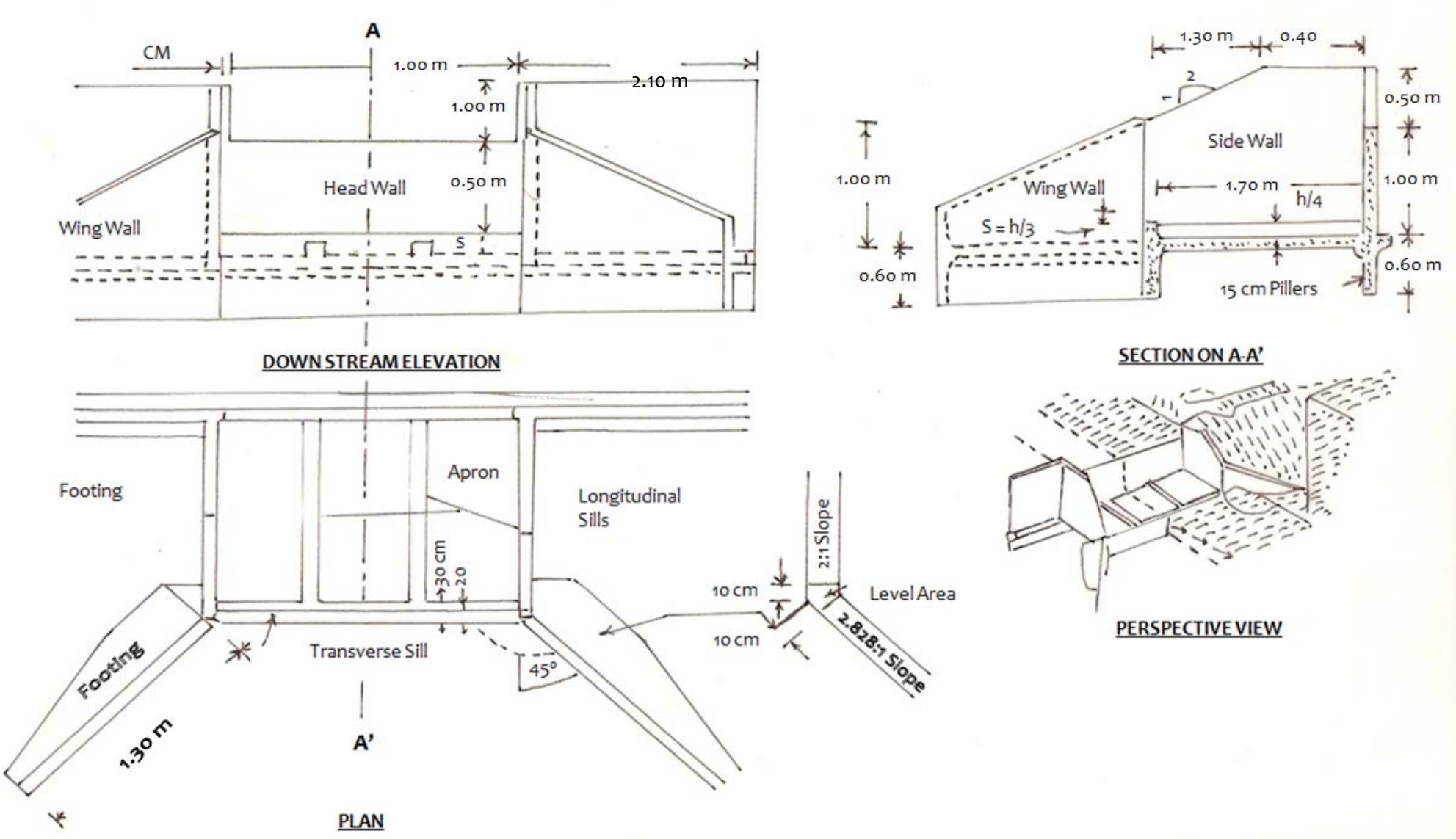
LABOUR CHARGE

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	13.23 cum	36.66/cum	485.01
2.	Sand Laying	0.995 cum	33.33/cum	33.16
3.	C.C.W. 1:3:6	1.492 cum	494/cum	737.04
4.	Brick masonry	16.36 cum	400/cum	6544.00
5.	C.C.W. 1:2:4	0.130 cum	494/cum	64.22
6.	Tuck Pointing	9.62 m^2	51.61/m^2	496.48
7.	Curing	16.36 cum	25.00/cum	409.00
8.	Chowkidar	6 Man Days	100.00/Man Day	600.00
9.	Head load & local transportation cost 10% cost of material	-	-	3670.64
	Total			**Rs. 13039.55**

Total Expenditure	
1. Cost of materials	56747.48
2. Labour Charges	13039.55
Total	**Rs. 69787.03**
	Say Rs. 69800.00 only

DRAWING OF SPILLWAY OF CREST LENGTH 1.0 m

Not to Scale



DESIGN OF DROP SPILLWAY FOR 5.00 HA CATCHMENT AREA

Design of Spillway to be constructed at a place in a gully having width of 2.0 m and catchment area 5.0 ha net drop 1.0m. 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:

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

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 = 1.0 m (since width of gulley is 2.00 m)

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

$$L\ H^{3/2} = \frac{1.20 \times 0.5}{1.711} = 0.350$$

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

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

Test: $L / h = \frac{1.00}{0.50} = 2.00 \geq 2.0$ hence O.K.

$h / f = \frac{0.50}{1.00} = 0.5 \leq 5$ hence O.K.

Hence the designed hydraulic dimensions of the Spillway are:

Crest Length (L) = 1.00 m

Weir depth (h) = 0.50 m

3. Structural design –

1- Minimum headwall extension , E = (3h + 0.6) or 1.5 f whichever is greater; E = 3 x 0.50+0.6 or 1.5x 1

E = (1.5 + 0.60) or 21.50 m

= 2.10 or 1.50 Adopted = 2.10 m

2- Length of apron basin L_B = f (2.28 h/f +0.54) = 1 (2.28 x $\frac{0.50}{}$ + 0.54)=1.0= 1.14 + 0.54 = 1.68 m

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

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

J = 2h or [f + h + S – (L_B + 0.10)/2] whichever is greater = 2 x 0.50 or [1.0+0.50+0.16 – (1.68+0.10)/2]

= 1.0 or [1.66 – 0.89]; = 1.00 or 0.77; adopt J = 1.00 m

5- M = 2 (f + 1.33 h - J) = 2 (1.0 + 1.33 x 0.50 – 1.00) = 2 (1.665 – 1.00) = 1.33 m

6- K = (L_B + 0.1) - M = (1.68 + 0.1) – 1.33 = 0.45 m

Toe and cut off walls

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

= 0.473 x $(0.5)^{1/3}$ = 0.473 x 0.793 = 0.375 m

Maximum Scour depth (M S D) = 1.5x N S D = 1.5 x 0.375 = 0.56 m

Depth of cutoff /Toe wall = 0.56 m **Say 0.60 M**

Apron thickness: For an over fall of 1.0 m. The Apron thickness in concrete construction is 0.30 m since the structure is constructed in masonry, the Apron thickness will be 0.30 x 1.50 = 0.45 m

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

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

DETAIL ESTIMATE OF DROP SPILLWAY CREST LENGTH 1.00 metre

1. Earth work in cutting

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	1.70	1.00	1.15	3.91
2	Head wall	1	0.80	1.20	1.15	1.10
3	Head wall extension	2	2.20	0.80	1.15	4.04
4	Toe wall	1	0.80	0.70	0.80	0.44
5	Cut off wall	1	5.20	0.80	0.70	2.91
6	Apron	1	1.70	0.80	0.60	0.81
7	Wing wall	2	1.30	0.80	1.15	2.39
Total						15.60 cum

2. Laying of sand in the bed & foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	1.70	1.00	0.10	0.340
2	Head wall	1	1.00	0.40	0.10	0.040
3	Head wall extension	2	2.10	0.80	0.10	0.336
4	Toe wall	1	1.00	0.80	0.10	0.080
5	Cut off wall	1	5.20	0.80	0.10	0.416
6	Apron	1	1.60	1.00	0.10	0.160
7	Wing wall	2	1.30	0.80	0.10	0.208
Total						1.580 cum

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

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	1.70	1.00	0.15	0.510
2	Head wall	1	1.00	0.40	0.15	0.060

3	Head wall extension	2	2.10	0.80	0.15	0.378
4	Toe wall	1	1.00	0.80	0.15	0.120
5	Cut off wall	1	5.20	0.80	0.15	0.624
6	Apron	1	1.60	1.00	0.10	0.160
7	Wing wall	2	1.30	0.80	0.15	0.312
Total						2.164 cum

4. Brick masonry

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	5.20	0.60	0.60	1.872
2	Head wall	1	1.00	1.00	0.90	0.900
		1	1.00	(0.40+1.00)/2	1.00	0.700
3	Side wall	2	1.70	1.00	0.45	1.530
		2	1.70	0.80	0.45	0.918
		2	1.70	0.80	0.60	1.020
		2	1.70	0.60	0.40	0.544
		2	(1.70+0.45)/2	0.40	0.50	0.430
4	Head wall extension	2	2.10	0.80	0.65	2.184
		2	2.10	0.60	0.45	1.134
		2	2.10	0.40	1.30	2.184
5	Wing wall	2	1.30	0.80	0.45	0.936
		2	1.30	0.60	0.45	0.702
		2	1.30	0.40	(1.00+0)/2	0.520
6	Toe wall	1	1.00	0.80	0.45	0.360
		1	1.00	0.60	0.45	0.270
7	Apron	1	1.70	1.00	0.45	0.765

8	Longitudinal sill	2	1.70	0.20	0.20	0.136
9	Transverse sill	1	1.00	0.20	0.20	0.040
Total						17.145 cum

5. C.C.W. 1:2:4 on the wall and Apron

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

6. Tuck Pointing 1:3

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

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Sand (cum)	Brick (No)	G.S. Grit 25-40 mm (cum)	Grit 10-20 mm (cum)
1	Sand laying	1.580 cum	-	1.580	-	-	-
2	C.C.W. 1:3:6	2.164 cum	9.95	0.973	-	1.947	-
3	Brick masonry	17.145 cum	41.14	5.829	8755	-	-
4	C.C.W. 1:2:4	0.166 cum	1.01	0.069	-	-	0.141
5	Tuck Pointing 1:3	12.13 m^2	0.55	0.057	-	-	-
	Total		**52.65**	**8.508**	**8755**	**1.947**	**0.141**
	Say		**53 Bags**	**8.51 cum**	**8755**	**1.95 cum**	**0.14 cum**

COST OF MATERIALS

S.N0	Name of materials	Quantity	Rate	Amount
1	Cement	53 Bags	255.00	13515.00
2	Course sand	8.51 cum	910.00	7744.10
3	Brick	8755	4500/th	39397.50
4	G.S.B. 25-40 mm	1.95 cum	855.00	1667.25
5	G.S.Grit 10-20 mm	0.14 cum	1250.00	175.00
Total				**Rs. 62498.85**

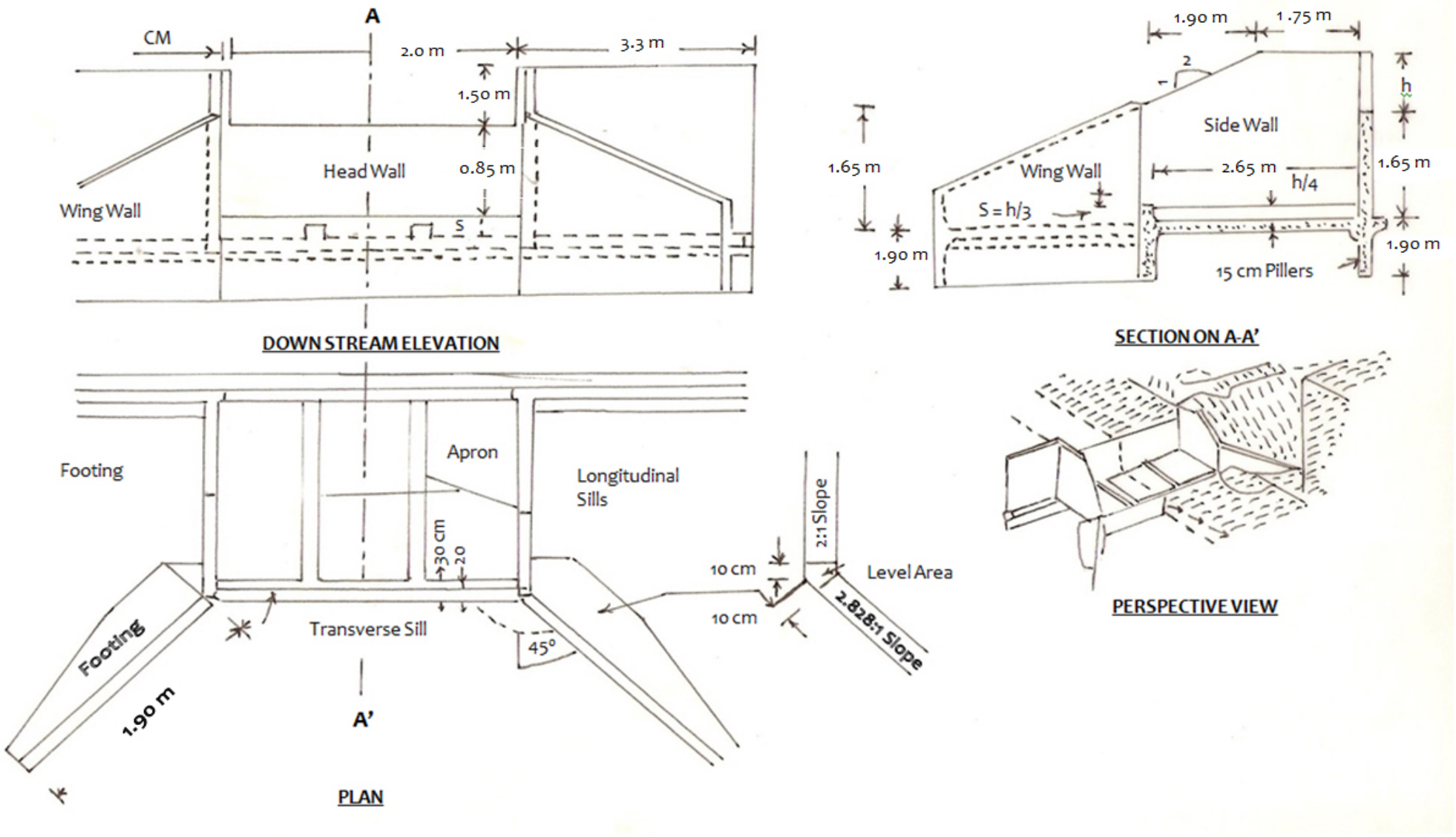
LABOUR CHARGE

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth work	15.60 cum	36.66/cum	571.89
2.	Sand Laying	1.580 cum	33.33/cum	52.66
3.	C.C.W. 1:3:6	2.164 cum	494/ cum	1069.01
4.	C.C.W. 1:2:4	0.166 cum	494/ cum	82.00
5.	Brick Masonry	17.145 cum	400/cum	6858.00
6.	Tuck Pointing	12.13 m^2	51.61/m^2	626.02
7.	Curing	17.145 cum	25.00/ cum	428.62
8.	Chowkidar	6 Man Days	100.00/Man Day	600.00
9.	Head Load & local transportation 10% cost of materials			4068.00
	Total			**Rs. 14356.20**

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

DRAWING OF SPILLWAY OF CREST LENGTH 2.0 m

Not to Scale



All Dimensions in Metre

DESIGN OF DROP SPILLWAY FOR 20.00 HA CATCHMENT AREA

Design of Drop Spillway to be constructed at a place in a gully having width of 3.0 m and catchment area 20.00 ha net drop 1.5 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:

$$Q = \frac{C.I.A.}{360} = \frac{0.3x120x20.0}{360} = 2.0 \ m^3/second$$

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 = 2.0 m (since width of gulley is 3.00 m)

$$2.00 = \frac{1.711 \ L \ H^{3/2}}{(1.1+0.1x0.5)} = \frac{1.711 \ L \ H^{3/2}}{(1.10 + 1.15)}$$

$$L \ H^{3/2} = \frac{2.0 \ x \ 1.115}{1.711}$$

$$H^{3/2} = \frac{2.23}{1.711 \ x \ 2.0} = 0.65$$

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

Test: $L / h = \frac{2.00}{0.75} = 2.666 \geq 2.0$ hence O.K.

$h / f = \frac{0.75}{1.50} = 0.50 \leq 0.50$ hence O.K.

Hence the designed hydraulic dimensions of the Spillway are:

Crest Length (L) = 2.00 m

Weir depth (h) = 0.81 m

3. Structural design –

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

E = 3x0.81+0.6 or 1.5x1.50

E = 3.03 m or 2.25 m

Adopted 3.03 m

2- Length of apron basin L_B = f (2.28 h/f +0.54) = 1.5 (2.28 x $\frac{0.8}{1.5}$ + 0.54)

= 1.50 (1.20 + 0.54) = 2.61 m

3- Height of end sill , S = $\frac{h}{}$ = $\frac{0.81}{}$ = 0.27 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 0.81 or [1.50+0.81+0.27 – (2.61+0.10)/2]

= 1.62 or [2.58 – 1.35] = 1.62 or 0.123

adopt J = 1.62 m

5- M = 2 (f + 1.33 h - J) = 2 (1.50 + 1.33 x 0.81 – 1.62) = 1.90 m

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

Toe and cut off walls

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

Maximum Scour depth (M S D) = 1.5x N S D = 1.5 x 0.595 = 0.89 m

Depth of cutoff /Toe wall = 0.89 m

Apron thickness: For as over fall of 1.50 m is concrete construction is 0.30 m since the structure is constructed in masonry, the Apron thickness will be 0.30 x 1.50 = 0.45 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	0.45	1.33
Side wall	0.30	1.10
Wing wall and head wall extension	0.30	0.80

DETAIL ESTIMATE OF DROP SPILLWAY OF CREST LENGTH 2.00 METRE

1. Earth work in cutting in foundation

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

2. Laying of sand in the bed of foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1.	Cut off wall	1	8.10	0.90	0.10	0.729
2.	Side wall	2	2.65	1.20	0.10	0.636
3.	Head wall	1	2.00	0.70	0.10	0.140
4.	Head Wall Extension	2	3.05	0.10	0.10	0.061
5.	Wing wall	2	1.95	0.90	0.10	0.351
6.	Toe wall	1	2.00	0.90	0.10	0.180
7.	Apron	1	2.00	2.65	0.10	0.530
Total						2.627 cum

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

S.No.	Description of work	No.	L	B	D/H	Quantity
1.	Cut-off Wall	1	8.10	0.90	0.15	1.093

2.	Side Wall	2	2.65	1.20	0.15	0.954
3.	Head Wall	1	2.00	0.70	0.15	0.210
4.	Head Wall Extension	2	3.05	0.10	0.15	0.091
5.	Wing Wall	2	1.95	0.90	0.15	0.526
6.	Toe Wall	1	2.00	0.90	0.15	0.270
7.	Apron	1	2.00	2.65	0.15	0.795
Total						3.939 cum

4. Brick masonry 1:4

S.No.	Description of work	No.	L	B	D/H	Quantity
1.	Cut off wall	1	8.10	0.90	0.90	6.561
2.	Head wall	1	2.00	1.60	0.45	1.440
		1	2.00	1.50	0.45	1.350
		1	2.00	(0.45 + 1.40) /2	0.85	1.527
3.	Head wall extension	2	3.30	0.90	0.45	2.673
		2	3.30	0.80	0.45	2.376
		2	3.30	0.60	0.60	2.376
		2	3.30	0.50	0.60	1.980
		2	3.30	0.40	1.15	3.036
4.	Side wall	2	2.65	1.10	0.90	5.247
		2	2.65	1.10	0.45	2.623
		2	2.65	1.00	0.65	3.789
		2	2.65	0.80	0.60	2.544
		2	2.65	0.60	0.45	1.431
		2	(0.80 + 2.65) /2	0.50	0.70	1.207
5.	Wing wall	2	1.90	0.90	0.45	1.539

		2	1.90	0.80	0.45	1.368
		2	1.90	0.60	(1.65 + 0) /2	1.881
6.	Toe wall	1	2.00	0.90	0.45	0.810
		1	2.00	0.80	0.45	0.720
		1	2.00	0.40	0.30	0.240
7.	Longitudinal sill	2	2.65	0.20	0.30	0.318
8.	Apron	2	2.65	2.00	0.45	4.770
	Total					51.806 cum

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

S.No.	Description of work	No.	L	B	D/H	Quantity
1.	Head wall	1	2.00	0.45	0.025	0.0225
2.	Side wall	2	0.80	0.50	0.025	0.0200
		2	1.32	0.50	0.025	0.0330
3.	Head wall extension	2	3.05	0.40	0.025	0.0610
4.	Wing wall	2	2.52	0.60	0.025	0.0765
5.	Longitudinal sill	2	2.65	0.20	0.025	0.0265
6.	Apron	1	2.65	1.60/3	0.025	0.0353
7.	Toe Wall	1	2.00	0.40	0.025	0.0200
Total						0.2939 cum

6. Tuck Pointing 1:3

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1	2.00	-	0.85	1.70
		1	2.00	-	1.27	2.54

2	Side wall	1 1	2.65 (0.80 + 2.65) /2	- -	1.65 0.70	4.37 1.20
3	Head wall extension	2	3.30	-	1.50	9.90
4	Wing wall	2	1.90	-	(1.665 + 0) /2	3.13
Total						22.84 m^2

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Coarse Sand (cum)	Brick (N0.)	G.S.B 25-40 mm (cum)	G.S. Grit 10-20 mm (cum)
1.	Sand laying	2.627 cum	-	2.627	-	-	-
2.	C.C.W. 1:3:6	3.939 cum	16.93	1.772	-	3.545	-
3.	Brick Masonry 1:4	51.806 cum	124.33	17.614	25903	-	-
4.	C.C.W. 1:2:4	0.294 cum	1.79	0.123	-	-	0.249
5.	Tuck Pointing 1:3	22.84 m^2	1.05	0.107	-	-	-
Total			**144.10**	**22.243**	**25903**	**3.545**	**0.249**
Say			**144 Bags**	**22.243 cum**	**25903**	**3.55 cum**	**0.250 cum**

COST OF MATERIALS

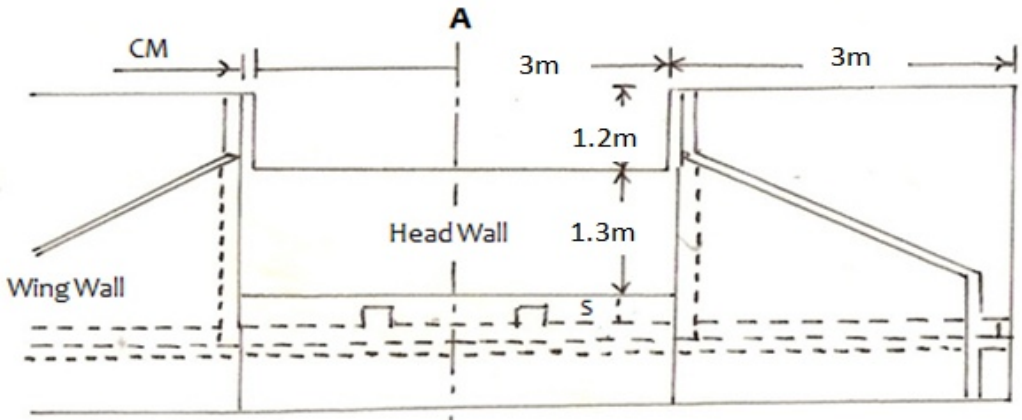
S.N0	Name of materials	Quantity	Rate	Amount
1.	Cement	144 Bags	255.00/bag	36720.00
2.	Coarse sand	22.243 cum	910.00/cum	20241.13
3.	Brick	25903	4500/th	116563.50
4.	G.S.B. 25-40 mm	3.55 cum	855.00/cum	3035.25
5.	G.S.Grit 10-20 mm	0.250 cum	1250.00/cum	312.50
Total				**Rs. 176872.38**

LABOUR CHARGE

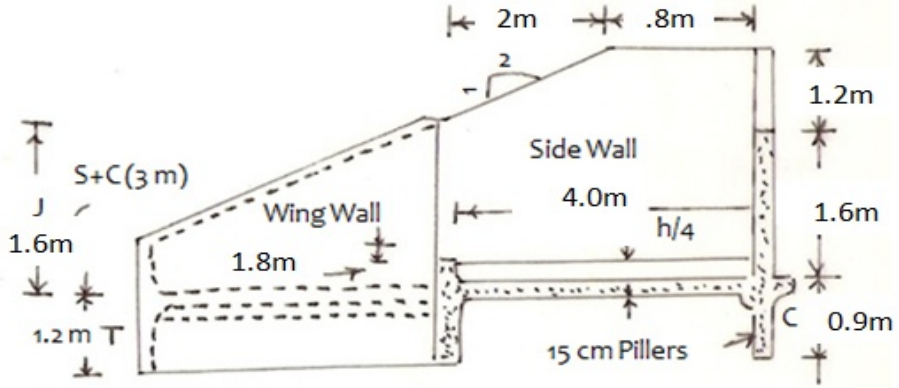
S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	38.95 cum	36.66/cum	1427.90
2.	Sand Laying	2.627 cum	33.33/cum	87.55
3.	C.C.W. 1:3:6	3.939 cum	494/cum	1945.86
4.	C.C.W. 1:2:4	0.2939 cum	494/cum	145.18
5.	Brick masonry	51.806 cum	400/th	20722.40
6.	Tuckinting	22.84 m^2	51.61/m^2	1178.77
7.	Curing	51.806 cum	25.00/cum	1295.15
8.	Chowkidar	13 Man Days	100.00/Man Day	1300.00
9.	Head load & local transportation cost 10% cost of material	-	-	11340.03
	Total			**Rs. 39442.84**

Total Expenditure	
1. Cost of materials	176872.38
2. Labour Charges	39442.84
Total	**Rs. 216315.22**
	Say Rs. 216315.00

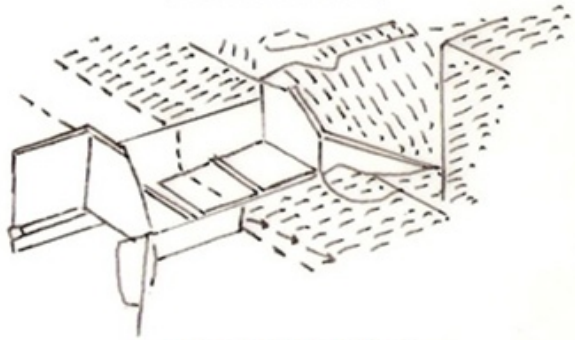
DRAWING OF SPILLWAY OF CREST LENGTH 3.0 m



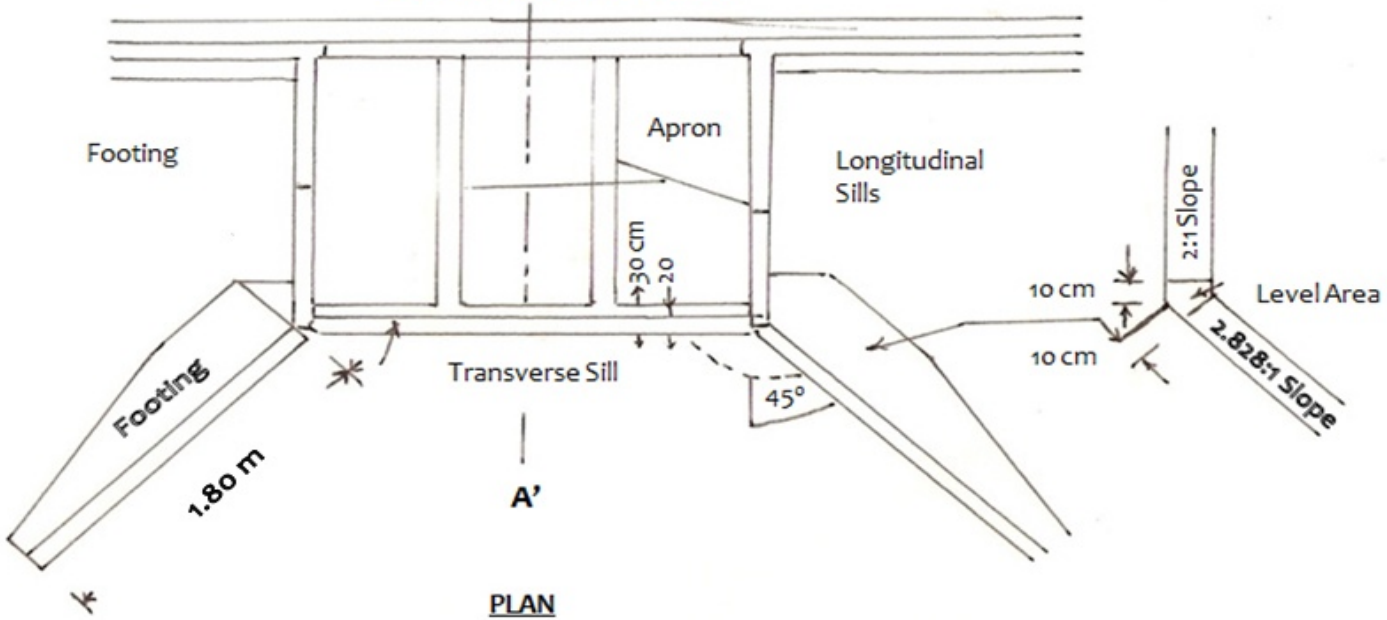
DOWN STREAM ELEVATION



SECTION ON A-A'



PERSPECTIVE VIEW



PLAN

DESIGN OF DROP SPILLWAY FOR 30.00 HA CATCHMENT AREA

Design of Drop Spillway to be constructed at a place in a gully having width of 4.0 m and catchment area 30 ha net drop 1.5 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:

$$Q = \frac{C.I.A.}{360} = \frac{0.3 \times 120 \times 30.0}{360} = 3.0 \ m^3/s$$

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 = 3.0 m (since width of gulley is 4.00 m)

$$3.0 = \frac{1.711 \ L \ H^{3/2}}{(1.1+0.01 \times 1.5)} = \frac{1.711 \ L \ H^{3/2}}{(1.1+0.15)}$$

$$L \ H^{3/2} = \frac{3.00 \times 1.25}{1.711}$$

$$H^{3/2} = \frac{3.75}{1.711 \times 3} = 0.73$$

$$H = (0.73)^{2/3} = 0.80 \ m$$

Test: $L / h = 3.00/0.80 = 3.75 \geq 2.0$ hence O.K.

$h / f = \frac{0.80}{1.50} = 0.53 \leq$ which is approximately 0.50. Hence, O.K.

Hence the designed hydraulic dimensions of the Spillway are:

Crest Length (L) = 3.00 m

Weir depth (h) = 0.80 m

3. Structural design –

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

E = 3x0.80+0.6 or 1.5x1.50 ; E = 3.0 m or 2.25 m

Head wall extension = 3.0 m

2- Length of apron basin L_B = f (2.28 h/f +0.54) = 1.5 (2.28 x $\frac{0.8}{}$ + 0.54)1.5

= 1.50 (1.216 + 0.54) = 1.5 x 1.756 = 2.634 m says 2.63 m

3- Height of end sill , S = $\frac{h}{3}$ = $\frac{0.80}{3}$ = 0.26 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 0.80 or [1.50+0.80+0.26 – (2.63+0.10)/2]= 1.6 or [2.56 – 1.365] = 1.6 or 1.195 adopt J = 1.60 m

5- M = 2 (f + 1.33 h - J) = 2 (1.50 + 1.33 x 0.80 – 1.60) = 2 (2.564 – 1.60)= 1.928 m

6- K = (L_B + 0.1) - M = (2.63 + 0.1) – 1.93 = 0.80 m

Toe and cut off walls

Normal scour depth (N S D) = 0.473 x $(Q/f)^{1/3}$= 0.473 x $(3/1)^{1/3}$ = 0.473 x 1.442 = 0.68 m

Maximum Scour depth (M S D) = 1.5x N S D = 1.5 x 0.68 = 1.02 m

Depth of cutoff /Toe wall = 1.02 m

Apron thickness: For an over fall of 1.50 m. The Apron thickness in concrete construction is 0.30 m since the structure is constructed in masonry, the Apron thickness will be 0.30 x 1.50 = 0.45 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	0.45	1.33
Side wall	0.30	1.10
Wing wall and head wall extension	0.30	0.80

DETAIL ESTIMATE OF DROP SPILLWAY OF CREST LENGTH 3.00 METRE

1. Earth work in cutting in foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	3.40	1.20	1.15	9.38
2	Head wall	1	3.00	1.60	1.15	5.52
3	Head wall extension	2	3.00	1.00	1.15	6.90
4	Wing wall	2	1.80	1.20	1.15	4.96
5	Toe wall	1	3.00	1.00	1.15	3.45
6	Cut off wall	1	9.00	1.00	1.15	10.35
7	Apron	1	3.00	2.65	0.70	5.56
Total						46.12 cum

2. Laying of sand in the bed of foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	3.40	1.00	0.10	0.680
2	Head wall	1	3.00	0.60	0.10	0.180
3	Wing wall	2	1.80	1.00	0.10	0.360
4	Toe wall	1	3.00	0.80	0.10	0.240
5	Cut off wall	1	9.00	1.00	0.10	0.900
6	Apron	1	3.00	2.65	0.10	0.795
Total						3.155 cum

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

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	9.00	1.00	0.15	1.35
2	Head wall	1	3.00	0.60	0.15	0.27
3	Side wall	2	3.40	1.00	0.15	1.02
4	Wing wall	2	1.80	1.00	0.15	0.54
5	Toe wall	1	3.00	0.80	0.15	0.36
6	Apron	1	3.00	2.65	0.15	1.192
Total						4.732 cum

4. Brick masonry 1:4

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	9.00	1.00	0.90	8.100
2	Head wall	1	3.00	1.50	0.90	4.050
		1	3.00	(1.50+0.50) /2	1.50	4.500
3	Head wall extension	2	3.00	0.80	0.45	2.160
		2	3.00	0.60	0.45	1.620
		2	3.00	0.60	0.60	2.160
		2	3.00	0.50	0.60	1.800
		2	3.00	0.40	1.30	3.120
4	Side wall	2	3.40	1.00	0.45	3.060
		2	3.60	0.80	0.45	2.592
		2	3.80	0.60	0.60	2.736
		2	3.90	0.50	1.00	3.900
		2	(4.00+1.40) /2	0.40	1.50	3.240
5	Wing wall	2	1.80	1.00	0.45	1.620
		2	1.80	0.80	0.45	1.296
		2	1.80	0.50	(1.60+0) /2	1.440
6	Toe wall	1	3.00	0.80	0.45	1.080
		1	3.00	0.60	0.45	0.810
		1	3.00	0.40	0.30	0.360
7	Apron	1	3.00	2.65	0.45	3.577
8	Longitudinal sill	2	2.60	0.20	0.45	0.468
				Total		53.689 cum

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

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1	3.00	0.50	0.025	0.037
2	Side wall	2	1.40	0.40	0.025	0.028
		2	3.00	0.40	0.025	0.060
3	Head wall extension	2	3.00	0.40	0.025	0.060

4	Wing wall	2	2.40	0.50	0.025	0.060
5	Longitudinal sill	2	2.65	0.20	0.025	0.026
6	Apron	3	2.65	0.86	0.025	0.170
Total						0.441 cum

6. Tuck Pointing 1:3

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

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Sand (cum)	Brick (NO)	G.S.B 25-40 mm (cum)	G.S. Grit 10-20 mm (cum)
1	Sand laying	3.155 cum	-	3.155	-	-	-
2	C.C.W. 1:3:6	4.732 cum	20.34	2.129	-	4.258	-
3	C.C.W. 1:2:4	0.441 cum	2.69	0.185	-	-	0.374
4	B/W 1:4	53.689 cum	128.85	18.254	26845	-	-
5	Raised Pointing 1:3	39.86 m^2	1.83	0.187	-	-	-
Total			**153.71**	**23.910**	**26845**	**4.258**	**0.374**
Say			**154**	**23.910**	**26845**	**4.26**	**0.374**

COST OF MATERIALS

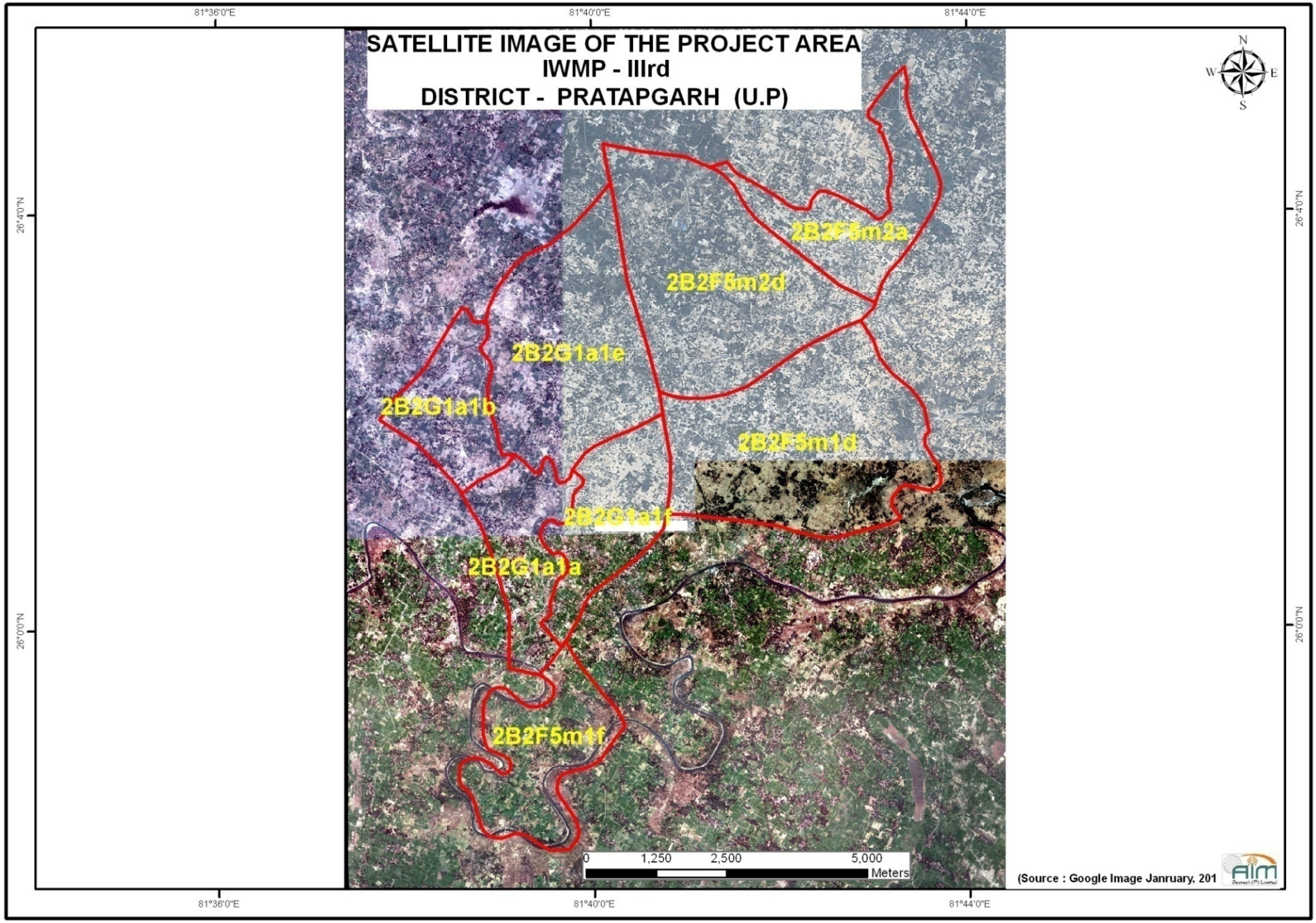
S.N0	Name of materials	Quantity	Rate	Amount
1	Cement	154 Bags	255.00	39270.00
2	Coarse sand	23.91	910.00	21758.10
3	Brick	26845	4500.00	129802.00
4	G.S.B. 25-40 mm	4.26	855.00	3633.75
5	Grit 10-20 mm	0.374	1250.00	467.50
Total				**192931.35**

LABOUR CHARGE

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	46.12 cum	36.66/cum	1690.75
2.	Sand Laying	3.155 cum	33.33/cum	105.15
3.	C.C.W. 1:3:6	4.732 cum	494/cum	2337.60
4.	C.C.W. 1:2:4	1.441 cum	494/cum	217.85
5.	B/w 1:4	53.689 cum	400/cum	21475.60
6.	Raised Pointing	39.86 m^2	51.61/m^2	2057.17
7.	Curing	53.689 cum	25.00/cum	1342.22
8.	Chowkidar	13 Man Days	100.00/Man Day	1300.00
9.	Head load & local transportation cost 10% cost of material	-	-	12015.12
	Total			**Rs. 42541.34**

Total Expenditure	
1. Cost of materials	192931.35
2. Labour Charges	42541.34
Total	**Rs. 235472.69**
	Say Rs. 235500.00 only

MAPS


SATELLITE IMAGE OF THE PROJECT AREA
IWMP - IIIrd
DISTRICT - PRATAPGARH (U.P)
81°36'0"E
81°40'0"E
81°44'0"E
26°40'0"N
26°0'0"N
N
S
E
W
2B2F5m2a
2B2F5m2d
2B2G1a1e
2B2G1a1b
2B2F5m1d
2B2G1a1f
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2,500
5,000
Meters
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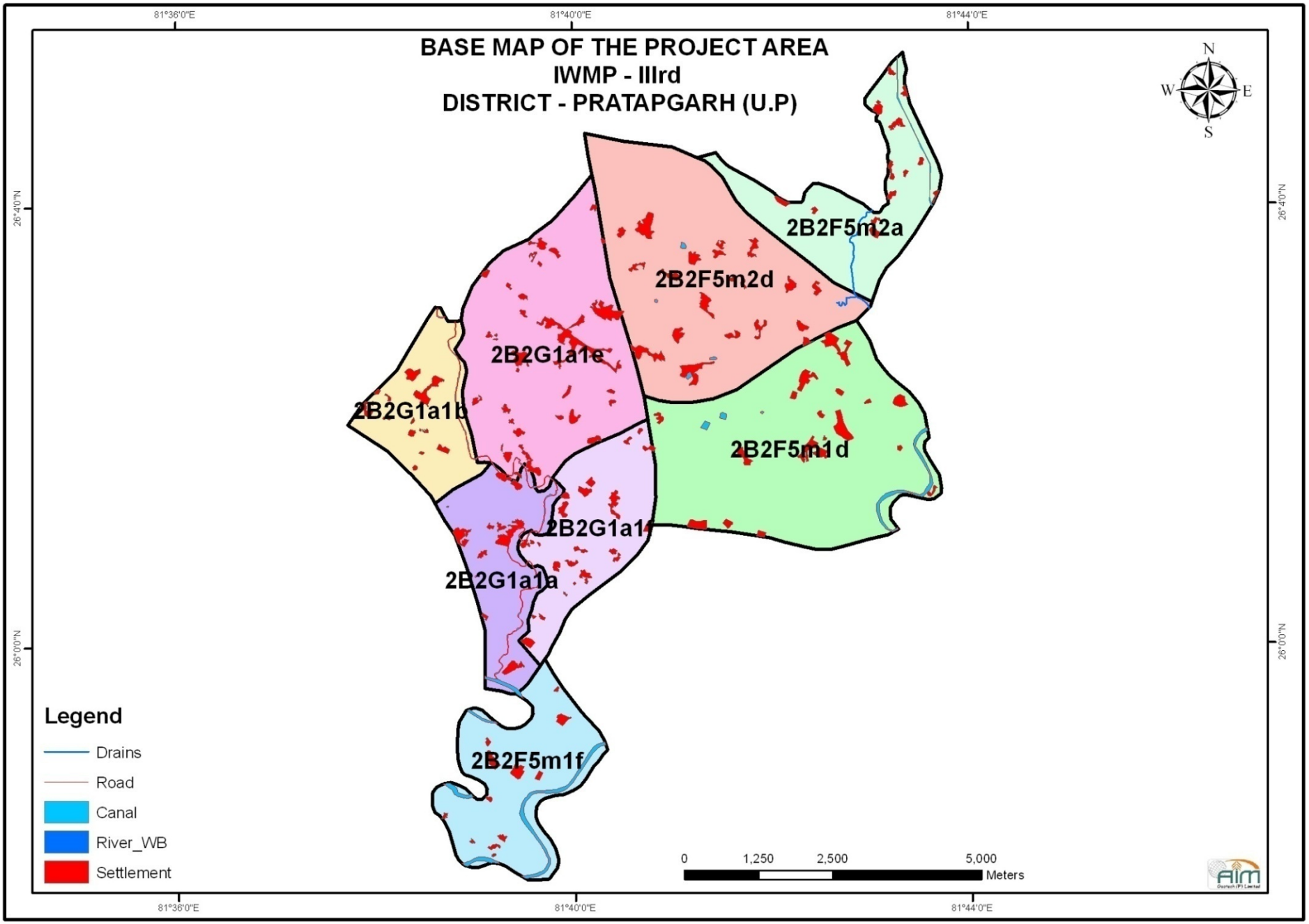
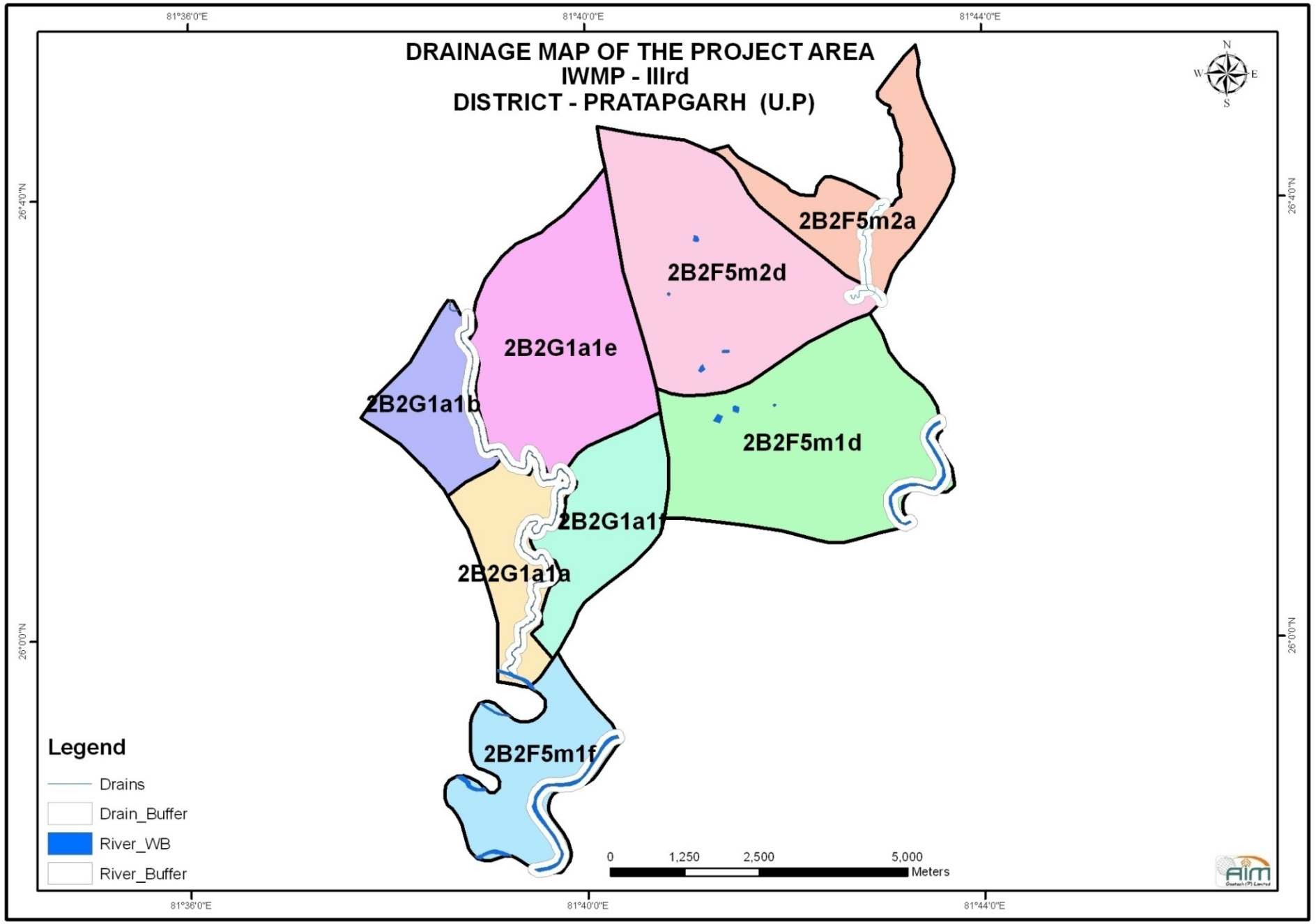
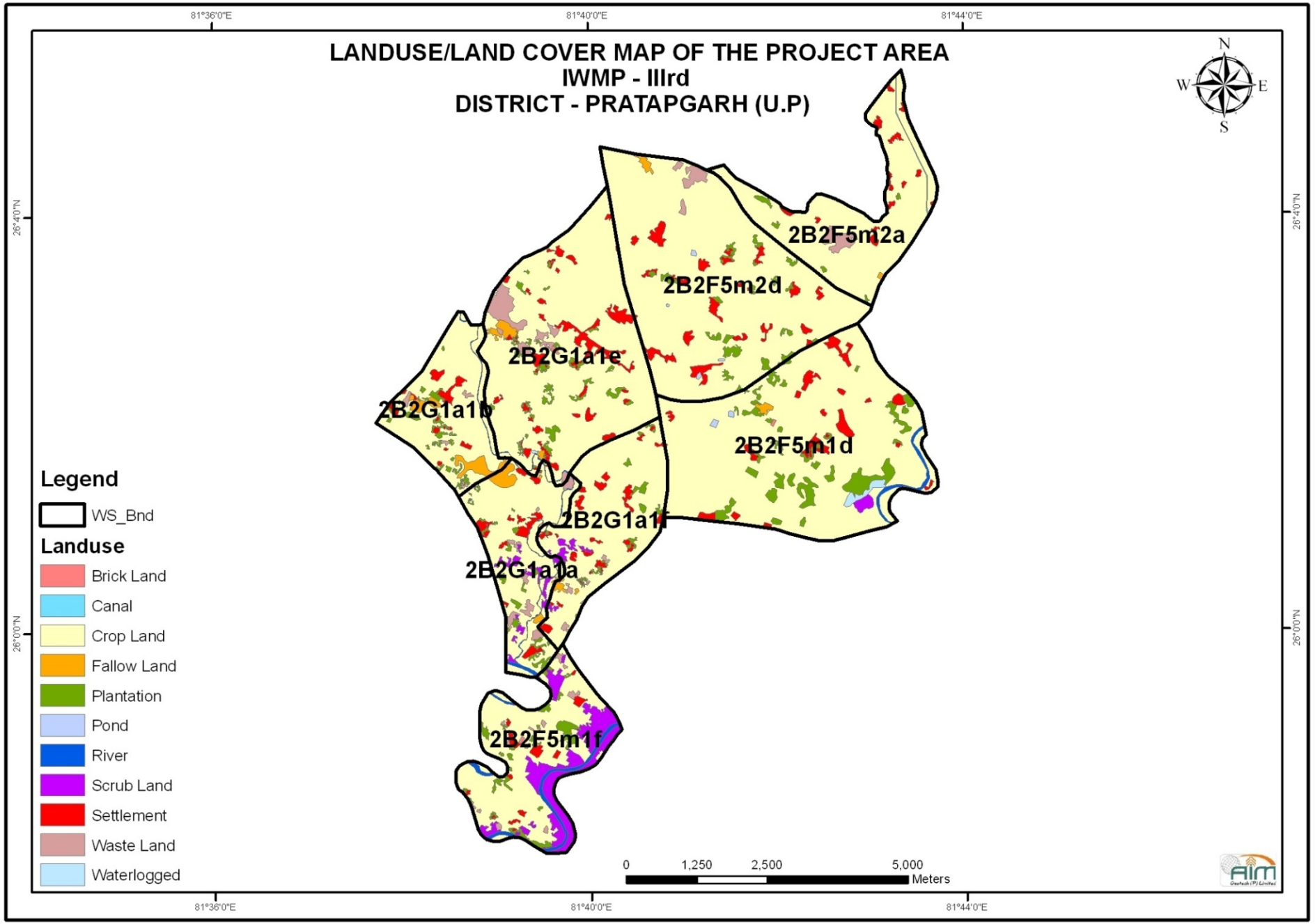
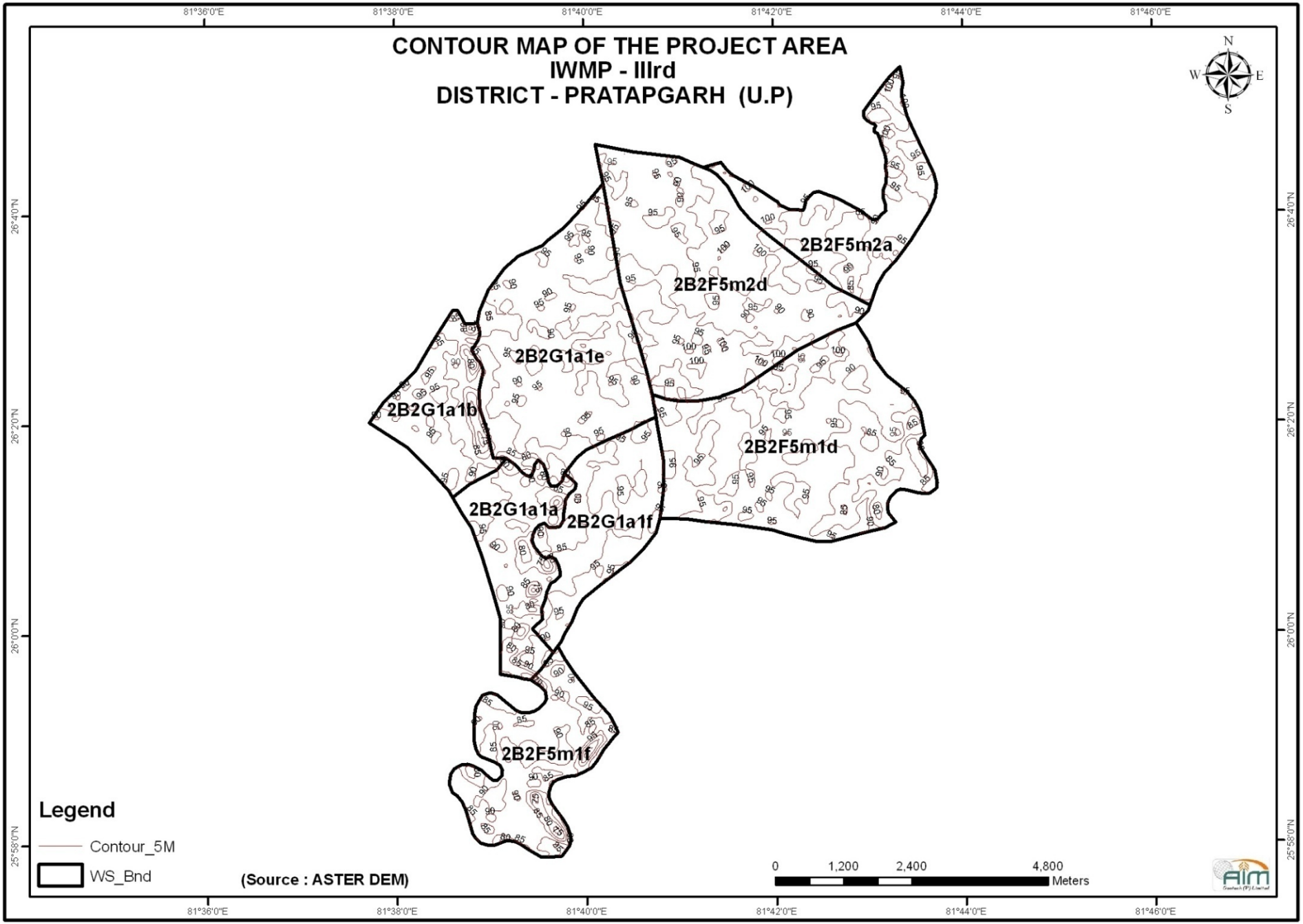
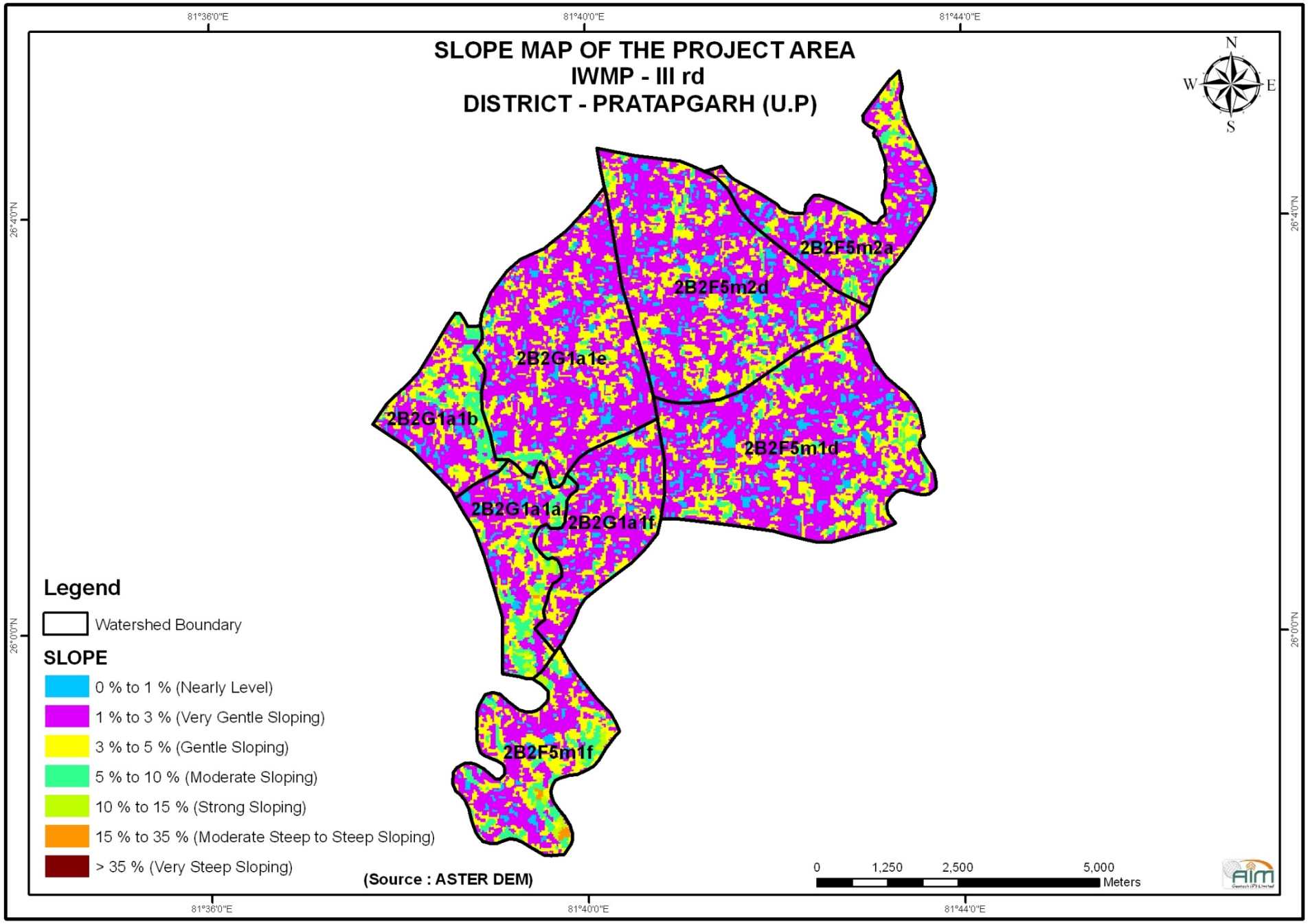

BASE MAP OF THE PROJECT AREA
IWMP - IIIrd
DISTRICT - PRATAPGARH (U.P)
81°36'0"E
81°40'0"E
81°44'0"E
26°4'0"N
26°0'0"N
N
S
E
W
2B2F5m2a
2B2F5m2d
2B2G1a1e
2B2G1a1b
2B2F5m1d
2B2G1a1f
2B2G1a1a
2B2F5m1f
Legend
Drains
Road
Canal
River_WB
Settlement
0
1,250
2,500
5,000
Meters


DRAINAGE MAP OF THE PROJECT AREA
IWMP - IIIrd
DISTRICT - PRATAPGARH (U.P)
81°36'0"E
81°40'0"E
81°44'0"E
26°40'0"N
26°0'0"N
N
W
E
S
2B2F5m2a
2B2F5m2d
2B2G1a1e
2B2G1a1b
2B2F5m1d
2B2G1a1f
2B2G1a1a
2B2F5m1f
Legend
Drains
Drain_Buffer
River_WB
River_Buffer
0
1,250
2,500
5,000
Meters


LANDUSE/LAND COVER MAP OF THE PROJECT AREA
IWMP - IIIrd
DISTRICT - PRATAPGARH (U.P)
81°36'0"E
81°40'0"E
81°44'0"E
26°4'0"N
26°0'0"N
N
S
E
W
2B2F5m2a
2B2F5m2d
2B2G1a1e
2B2G1a1b
2B2F5m1d
2B2G1a1f
2B2G1a1a
2B2F5m1f
Legend
WS_Bnd
Landuse
Brick Land
Canal
Crop Land
Fallow Land
Plantation
Pond
River
Scrub Land
Settlement
Waste Land
Waterlogged
0
1,250
2,500
5,000
Meters


CONTOUR MAP OF THE PROJECT AREA
IWMP - IIIrd
DISTRICT - PRATAPGARH (U.P)
81°36'0"E
81°38'0"E
81°40'0"E
81°42'0"E
81°44'0"E
81°46'0"E
26°40'0"N
26°20'0"N
26°0'0"N
25°58'0"N
N
W
E
S
2B2F5m2a
2B2F5m2d
2B2G1a1e
2B2G1a1b
2B2F5m1d
2B2G1a1a
2B2G1a1f
2B2F5m1f
Legend
Contour_5M
WS_Bnd
(Source : ASTER DEM)
0
1,200
2,400
4,800
Meters


SLOPE MAP OF THE PROJECT AREA
IWMP - III rd
DISTRICT - PRATAPGARH (U.P)
81°36'0"E
81°40'0"E
81°44'0"E
26°4'0"N
26°0'0"N
N
S
E
W
2B2F5m2a
2B2F5m2d
2B2G1a1e
2B2G1a1b
2B2F5m1d
2B2G1a1a
2B2G1a1f
2B2F5m1f
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

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, 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, Pratapgarh, Topo sheet (1: 50000) survey of India- Deheradoon and technical & specific input and health with preparation and drafting of detail project report.

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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:

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