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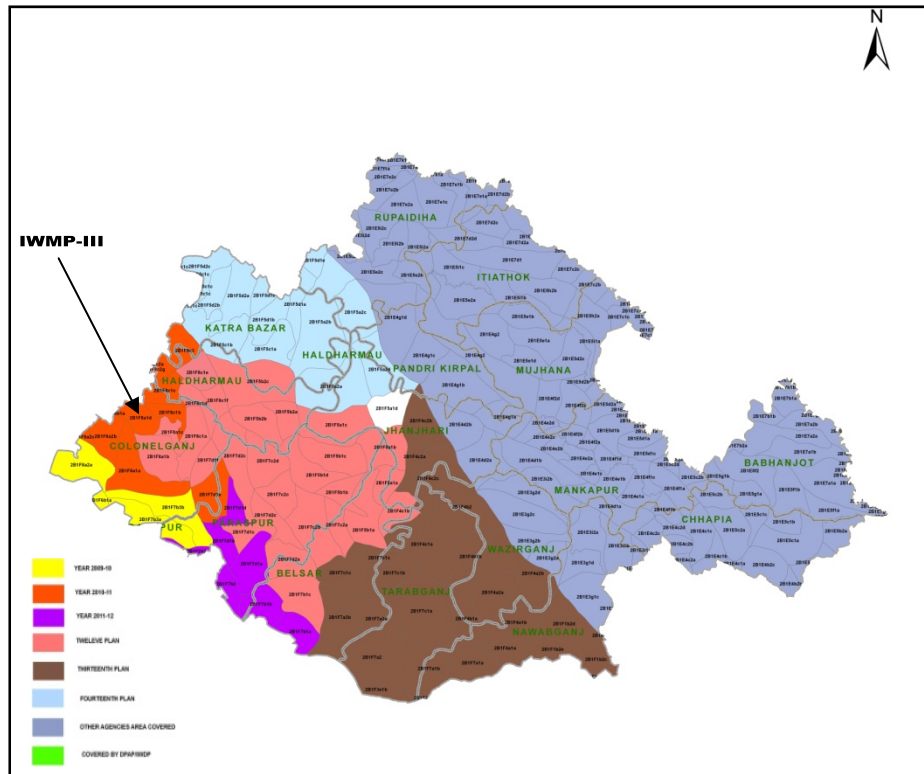
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IWMP-III, (2010-11) District-GONDA

Project at a Glance

Name of Project	Weightage	No. of MWS	Geographical Area(ha)	Rainfed Area(ha)	Treatatable area(ha)
IWMP-III (2010-11)	75	4	8382	5870	5624

1.	Name of Block	Colonalganj & Haldarmau
2.	No. of Gram Panchayats	8
3.	Four reasons for selection of Watershed	i. Productivity potential of the land ii. Poverty remove iii. Wages increased iv. To incised ground water status
4.	Date of approval of watershed Development Plan by DRDA/DPC	19-10-2010
5.	Area proposed to be treated (ha.)	5624
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.)	674.00
9.	Proposed mandays	320000



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 is located along, Lucknow -Gonda Road National Highway, about 3 Km from the Ghagra river . It lies between the longitude of 81°35'57" to 81° 44' 19" and latitudes 27°05'32" to 27°14'19", having watershed code no 2B1F8a2c, 2B1F8c1b, 2B1F8c1c, 2B1F8c3. Its altitude ranges from 87 m to 106 m above mean sea Level (MSL). The total area of watershed is 8382.00Ha.

The project area comprises of 40 villages namely Allipur Gokula, Amorhwa, Bairampur, Baranv, Barwatpur, Basehiya, Beerpur Belpur, Bhabhuwa, Birawa, Chamari, Changeriya, Chhataura, Dewa Pasiya, Dhamsara, Dhaurahara, Dhema, Duda, Dudi, Gaurawa Kalan, Gondawa, Hirapur Kamiyar, Jahagirawa, Katra Shahbajpur, Khem Pur, Malauna, Mankapur, Masauliya, Meenapur, Mohammad Pur, Nagawa Kalan, Narayanpur Majha, Pipri, Rajawapur, Rewari, Rudauliya, Sakraura, Selhari, Semara, Taiyyab Pur, Tikawar Khas. This watershed has been identified by the state department under NWDPPRA scheme by proper prioritization of different parameters for watershed selection criteria.

The climate of the region is characterized as semi-arid with average annual rainfall less than 1393 mm annually, out of which about 90 percent is received during the monsoon season from July to September. Temperature ranges from very high as 48°C in the May-June to as low as 5.1°C during December-January. The trend of rainfall is highly erratic and maximum (62%) water goes as runoff. The soils are mainly sandy, loamy and clayey.

Agriculture is the main source of income of the farmers of the watershed. Kharif is the main crop consist of Sugarcane, Arhar, Paddy and Maize. 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. It is proposed in the selected area to motivate the farmers to adopt the agro horticulture in practice because of inadequate irrigation water.

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 in the wasteland area. Due to Lack of the Irrigation water the rate of mortality of planted trees is very high. P.R.A. exercises conducted in the villages of watershed area revealed that inadequate irrigation facilities, low production of field crops.

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 through adoption of bio-engineering measures and improve the eco-development index. The proposed plan will improve the crop diversification index, productivity of existing crops and thereby will lead to self-sufficiency in food with nutritional security. The different enterprises of various sectors and the project as a whole have been found to be economically viable with sound rate of internal return and less payback period.

The agricultural land will be treated with bunding 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, Gonda, as P.I.A for the aforesaid project. The area of watershed is proposed to be taken by Bhoomi Sanrakshan Adhikari, Department of land development & water resources Gonda, 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 budget
(a) Construction of bunds (Field Bund, Contour Bund, Submergence Bund, Marginal Bund and Peripheral Bund)	203.658	
(b) Renovation of Existing bunds for in-situ soil moisture conservation	9.00	
(c) Renovation of ponds	33.184	
(d) Horticulture plantation with fencing	45.00	
(e) Drainage Line Treatment	42.158	
(f) Horticulture plantation with fencing	4.00	
Total	337.00	50%

Livelihood Activities (community Based)

Component	Total (Lakhs) Amount	% of the budget
(a) Establishment of nadev Compost Units	11.45	
(b) Dairy Work	23.20	
(c) Goat-keeping	5.00	
(d) General Merchant Shop	7.50	
(e) Fisheries	6.00	
Small industries for SHG		
Making Polato chips	4.00	
Making of pickles	4.250	
Making of Agarbatti	5.40	
Making of papar	0.60	
	67.40	10%

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

Area-Ha & Rs. In Lakh

S. No.	Item	1 st Year (2010-11)		IInd Year (2011-12)		IIIrd Year (2012-13)		IVth 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	13.48	As per column 4	18.198	As per column 4	18.198	As per column 4	17.524	As per column 4	67.4	-
2	Monitoring 1 %	-	Monitoring of the project	1.348	As per column 4	1.348	As per column 4	1.348	As per column 4	2.696	As per column 4	6.74	-
3	Evaluation 1 %	-	Evaluation of the project	2.022	As per column 4	1.572	As per column 4	1.572	As per column 4	1.574	As per column 4	6.74	-
4	Entry Point Activity 4%	26.96	Renovation of Chabootra, School boundary, old well , Brick lining channel etc.	-	As per column 4	-	As per column 4	-	As per column 4	-	As per column 4	26.96	-
5	Institutional and Capacity building 5%	-	Training and exposure visit	13.48	As per column 4	5.055	As per column 4	5.055	As per column 4	10.11	As per column 4	33.70	-
6	D.P.R Preparation 1%	6.74	Preparation of DPR	-	As per column 4	-	As per column 4	-	As per column 4	-	As per column 4	6.74	-

7	Watershed Dev. Works 50%	-	Construction of Soil and water recharging structure, Agro forestry, horticulture etc	50.55	606.60	90.99	758.25	86.609	1039.30	108.851	3219.85	337.00	5624
8	Livelihood & Income Generating 10%	-	Diary, Goat & Bee keeping, Fruit processing, Gen. Merchant, Fisheries	6.74	As per column 4	26.96	As per column 4	20.22	As per column 4	13.48	As per column 4	67.40	-
9	Production System development 13%	-	Farming system approach, animal husbandry, horticulture, vegetables growing, Crop, Silvi Pasture etc.	6.74	As per column 4	26.96	As per column 4	33.70	As per column 4	20.22	As per column 4	87.62	-
10	Consolidation Phase 5%	-	Consolidation activities	-	-	-	-	-	-	33.70	As per column 4	33.70	-
	Total	33.70		94.36	606.60	171.083	758.25	166.702	1039.30	208.155	3219.85	674.00	5624

RESOURCE CONSERVATION AND WATER MANAGEMENT IN WATERSHED WITH CODE NO. - 2B1F8a2c, 2B1F8c1b, 2B1F8c1c, 2B1F8c3, BLOCK – COLONALGANJ & HALDARMAU, GONDA DISTRICT (UTTAR PRADESH)

SALIENT FEATURES

S. No.	Component	Unit	Quantity	Cost/Unit (Lakh)	Total (Lakhs) Amount	% of the budget
A.	Management Costs					
	1.Adminstrative costs	-	-	-	67.40	10%
	2.Expert for monitoring	-	-	-	6.740	1%
	3.Expert for evaluation	-	-	-	6.740	1%
				Sub Total	80.88	
B.	Preparatory Phases					
	(1)Entry point activities	-	-	-		
	(a) Renovation of old well/Jagat	-	-	-	14.00	
	(b) Maintinance of School building	-	-	-	3.00	
	(c) Renovation of hand pump	-	-	-	2.00	
	(d) Renovation of old jagat, well, trees	-	-	-	2.60	
	(e) Maintenance of old irrigation channel	-	-	-	2.68	
	(f) Maintinance of old drainage Link	-	-	-	2.68	
				Sub Total	26.96	4%
	(2)Institutional and capacity building	-	-	-	33.70	5%
	(3)Detail project report	-	-	-	6.740	1%
				Sub Total	40.44	
C.	Watershed work phase					
	(1)Watershed Development works					
	(a) Construction of bunds (Field Bund,Contour Bund, Submergence	h	4849	0.042	203.658	

	Bund, Marginal Bund and Peripheral Bund)					
	(b)Renovation of Existing bunds for in-situ soil moisture conservation	h	200	0.045	9.00	
	(c) Renovation of ponds	Nos	27	-	33.184	
	(d)Horticulture plantation with fencing	h	05	0.30	45.00	
	(e)Drainage LineTreatment	-	-	-	42.158	
	(f)Horticulture plantation with fencing	h	20	0.20	4.00	
				Sub Total	337.00	50%
2.	Livelihood Programme (community Based) for the asset less person					
	(a)Establishment of nadev Compost Units	Nos	100	0.1145	11.45	
	(b)Dairy Work	Nos	50	0.464	23.20	
	(c)Goat-keeping	Nos	20	0.25	5.00	
	(d)General Merchant Shop	Nos	30	0.25	7.50	
	(e)Fisheries	Nos	10	0.60	6.00	
	Small industries for SHG					
	Making Polato chips	Nos	6units	0.80	4.00	
	Making of pickles	Nos	5units	0.85	4.250	
	Making of Agarbatti	Nos	12units	0.45	5.40	
	Making of papar	Nos	6units	0.10	0.60	
				Sub Total	67.40	10%
3	Production system and micro enterprises					
	(a)Crop production, diversification of Agriculture	h	192	0.09322	3.71	
	(b)Introduction of Agro-forestry/Horticulture, silvipasture system	h	40	1.64775	65.91	

	(c) Demonstration of crops green manuring	h	300	0.060	18.00	
	Sub Total				87.62	13%
4	Other activities in watershed for development living standard					
	Integrated phase					
	(a) Bathroom cum cloth changing room for female, side of well, handpump, ponds, and river etc.	Nos	12	0.40	4.80	
	(b) Soaking pits	Nos	30	0.040	1.20	
	(c) Sulab shavchalay in public place watershed village	Nos	25	0.774	19.35	
	(d) Hand pump	Nos	5	0.40	2.00	
	(e) Krishak vikas manch	Nos	10	0.50	5.00	
	(f) Tree planting with brick gourd	Nos	27	0.050	1.35	
	Sub Total				33.70	5%
	GRAND TOTAL SAY				674.00	

PHYSICAL OUTLAYS

ACTIVITIES RELATED TO	Total (quantity)
ADMINISTRATIVE COSTS	
TD & DA, POL/ Hiring of vehicles/ Office and payment of electricity and phone bill etc. computer, stationary and office consumable and contingency.	√
Expert for monitoring and evaluation.	√
PREPARATORY PHASES	
Entry Point Activities improvement old ponds old well and hand pump	√

Institutional and capacity building	√
WATERSHED WORKS	
Watershed Development Works	
Construction of Bunds (Field Bund, Contour Bund, Submergence Bund, Marginal Bund and Peripheral Bund) Gully Plug/ Chek Dam	4849.00
Renovation of the Existing Bund for insitu soil Misture Conservation	200.00
Horticulture with Fencing	05.00
Horticulture without Fencing	20.00
LIVELIHOOD PROGRAMME (community based)	
Income generating activities through SHG's for landless and marginal farmers.	
a. Goat keeping. (nos)	20
b. Establishment of Nadeff Compost Unit. (nos)	100
c. Dairy Work. (nos)	30
d. General Merchant Shop. (nos)	30
e. Livestock development activities	√
PRODUCTION SYSTEM AND MICRO ENTERPRISES	
Demonstration and assessment of improved composting system using alternate materials (290 Nadeff-compost) and 190 nutrient analysis (Nos.)	290 190
Introduction of improved crop production practices.	
i) For <i>Kharif</i> crops (ha).	150.00
ii) For <i>Rabi</i> crops (ha).	140.00
CONSOLIDATION PHASE	√

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 saryu and ghaghra rivers carrying fertile soil which has nutrients and this decreases soil fertility, there is a decline in the productivity of cereals, pulses and vegetable crops, dependency of farmers on the rain water. Therefore it is an urgent need, that rainwater should be harvested for crops and re-charged to improve the quality of the water.

TREATMENT AREA AND DETAILS

S. No.	Watershed committee	Total Area (ha)	Total Treatable Area (ha)	Total Cost (Lac)
1	Deva Parsia	1382	1000	120.00
2	Selhari	1200	600	72.00
3	Barbatpur	1200	500	60
4	Rajawapur	500	300	36.00
5	Rewari	1020	500	60.00

6	Narayanpur Majha	1640	1400	168.00
7	Basehia	900	864	103.68
8	Dhema	335	300	36.00
9	Jhangirwa	78	50	6.00
10	Duda	50	40	4.80
11	Aktiyarpur	12	11	1.32
12	Bibiyapur Gosai	35	35	4.20
13	Kaitholi	30	16	1.92
		8382.00	5616.00	673.99
				Say 674.00

FACE SHEET ABOUT BENCH MARK INDICATORS

Area Under Various LCC Classes

LCC class	Area ha
I	797.00
II	4090.00
III	3495.00
Total	8382.00

CHAPTER-1

INTRODUCTION & BACKGROUND

PROJECT BACKGROUND

An accurate and authentic data is pre-requisite for proper management. If one looks for the sustainable development of an area, then accurate & authentic data on natural resources becomes paramount. Land and water are the two prime resources. Which are mainly responsible for the development of an area. If these are managed properly and judiciously, then sustainable development could be achieved in that particular area. The Indo-gangetic plains of U.P. have undergone stress for natural resources, which are witnessing degradation at an alarming rate. 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 (I.W.M.P.) has been implemented under Common Guidelines on Watershed Development in 2008.

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

The watershed, with code No. 2B1F8a2c, 2B1F8c1b, 2B1F8c1c, 2B1F8c3, having area of 8382.00Ha, is located in South – West of the Gonda district of U.P. The area of watersheds is proposed to be taken by Bhoomi Sanrakshan Adhikari, Department of land development & water resources Gonda for integrated watershed management programme (IWMP) 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 soils are mainly sandy, loamy and clayey.

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 saryu and ghaghra 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. Vegetation 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 disturbed.
- (e) Due to increasing population pressure of man and animal there is competition 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 Saryu and Ghaghra river. Therefore it is an urgent need, that rainwater should be harvested for crops and re-charged to improve the quality of the water.

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 Allipur Gokula, Amorhwa, Bairampur, Baranv, Barwatpur, Basehiya, Beerpur Belpur, Bhabhuwa, Birawa, Chamari, Changeriya, Chhataura, Dewa Pasiya, Dhamsara, Dhaurahara, Dhema, Duda, Dudi, Gaurawa Kalan, Gondawa, Hirapur Kamiyar, Jahagirawa, Katra Shahbajpur, Khem Pur, Malauna, Mankapur, Masauliya, Meenapur, Mohammad Pur, Nagawa Kalan, Narayanpur Majha, Pipri, Rajawapur, Rewari, Rudauliya, Sakraura, Selhari, Semara, Taiyyab Pur, Tikawar Khas 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.

Weightage of the project

Project name	Project Type	Weightage													
		i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv
IWMP- III rd ,Gonda	IWMP	10	5	10	10	0	0	10	5	10	5	5	5	0	75

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) DDP Block	-33.3 to -66.6 (10) DPAP Block	0 to -33.2 (0) Non DPAP/ DDP Block	
Area under rain-fed agriculture	15	More than 90 % (15)	80 to 90 % (10)	70 to 80% (5)	Above 70 % (Reject)
Drinking water	10	No source (10)	Problematic village (7.5)	Partially covered (5)	Fully covered (0)
Degraded land	15	High – above 20 % (15)	Medium – 10 to 20 % (10)	Low- less than 10 % of TGA (5)	
Productivity potential of the land	15	Lands with low production & where productivity can be significantly enhanced with reasonable efforts (15)	Lands with moderate production & where productivity can be enhanced with reasonable efforts (10)	Lands with high production & where productivity can be marginally enhanced with reasonable efforts (5)	
Contiguity to another watershed that has already been developed/ treated	10	Contiguous to previously treated watershed & contiguity within the micro watersheds in the project (10)	Contiguity within the micro watersheds in the project but non contiguous to previously treated watershed (5)	Neither contiguous to previously treated watershed nor contiguity within the micro watersheds in	

				the project (0)	
Cluster approach in the plains (more than one contiguous micro-watersheds in the project)	15	Above 6 micro-watersheds in cluster (15)	4 to 6 micro watersheds in cluster (10)	2 to 4 micro watersheds in cluster (5)	
Cluster approach in the hills (more than one contiguous micro-watersheds in the project)	15	Above 5 micro-watersheds in cluster (15)	3 to 5 micro watersheds in cluster (10)	2 to 3 micro watersheds in cluster (5)	
	150	150	90	41	2.5

PROBLEM IDENTIFICATION AND PRIORITIZATION FOR WATERSHED

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

WATERSHED INFORMATION

Name Of the Project	No. of water sheds to be treated	Watershed Code	Watershed regime/type/order
IWMP-III, Gonda	4	2B1F8a2c, 2B1F8c1b, 2B1F8c1c, 2B1F8c3	MicroWatershed

STRENGTH, WEAKNESS, OPPORTUNITY AND THREAT (SWOT) ANALYSIS IS A USEFUL DECISION SUPPORT TOOL, A SWOT ANALYSIS OF THE WATERSHED IS PRESENTED IN TABLE BELOW.

SWOT ANALYSIS OF THE WATERSHED

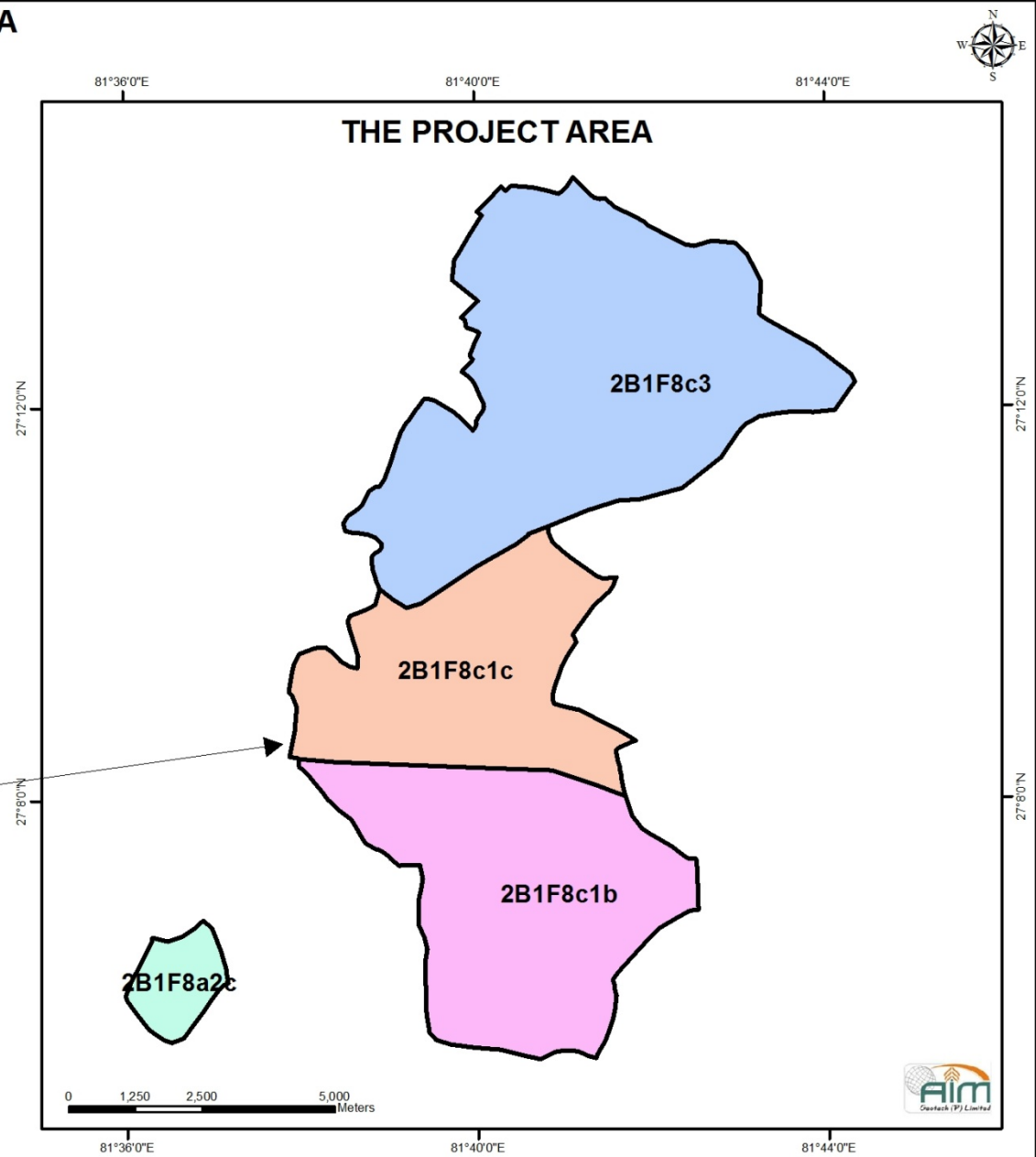
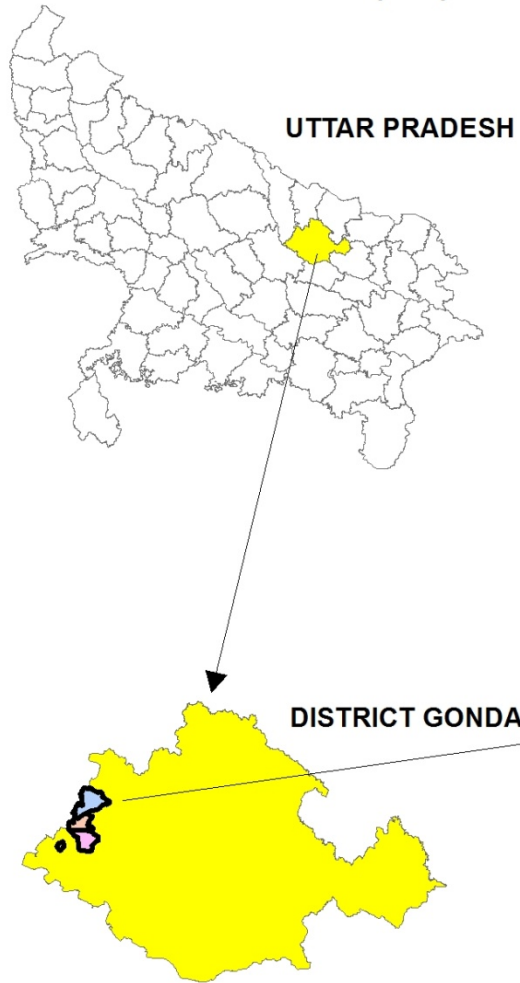
Strengths (S)	Weakness (W)
<ul style="list-style-type: none"> i. Cooperative work culture in traditional activities ii. Close ethnic ties iii. Road at the top as well as outlet of the watershed iv. Hard working v. Resource pool of crop genetics diversity vi. Awareness of farmers about watershed management programme vii. Well established CPR maintaining and sharing system viii. Good productivity of soil ix. Social outlook of the community towards land less 	<ul style="list-style-type: none"> i. Poor water management ii. Resource poor farmers iii. Out migration of youth iv. Low and erratic rainfall v. Fragile geography vi. Fragmented land holding vii. Heavy infestation of wild animals viii. Problem of fuel and fodder
Opportunities (O)	Threats (T)
<ul style="list-style-type: none"> i. Wide range of annual and perennial crops ii. Scope of regular employment opportunities to check out migration iii. Strengthening of existing irrigation system iv. Conducive climate for rainfed crop diversification v. Good scope for Agro forestry and dry land horticulture vi. Potential for collective action and management of CPR 	<ul style="list-style-type: none"> i. Prone to adverse climate like Flood ii. High market risk iii. Social conflicts owing to PRI and WSM polices and local politics iv. Weak coordination among line departments v. Lack of expertise of implementing agency in different aspects of WSM

CHAPTER – 2

GENERAL DESCRIPTION OF PROJECT

AREA

LOCATION MAP OF THE PROJECT AREA
IWMP - Illrd
DISTRICT - GONDA (U.P)



LOCATION

The selected watershed IWMP-III of Gonda district (U.P.) is located along, Lucknow -Gonda National Highway about 3.0 Km from the Ghaghra river. The distance of watershed is about 35 Kms from district headquarter, as also 8.0 Kms from Tehsil and about 8.0 Kms from Block. The watershed lies between the longitude of 81°35'57" to 81° 44' 19" and latitudes 27°05'32" to 27°14'19". The project is a cluster of four(4) micro- watersheds with code No. 2B1F8a2c, 2B1F8c1b, 2B1F8c1c, 2B1F8c3, having an area of 8382.00 ha of which 5624.00 ha, has been undertaken to be treated under Integrated Watershed Management Programme (IWMP) starting year 2010-2011 to 2014-15. There are 08 gram panchayat and 40 revenue villages in the project.

PHYSIOGRAPHY

The project area falls under the Central Ganga alluvial plain of Eastern-Uttar Pradesh, which is a level plain densely populated and most parts of the land is available for cultivation. The watershed having moderate slopes into river Sarju Branch. About 60% of the watershed area has 3 % slope, 20% area has 1% slope and remaining area has slopes varying from 3 to 5 %. All the streams of the project area finally join the main perennial river the Ghaghra. Most of the agricultural land is dependent on monsoon. The plains form a level tract which slopes gently from north-west to south-east. The height above sea-level ranges from 106 meters in north-west to 87 meters in the south-east. Higher elevations appear at places where the general flat surface is broken by irregular ranges of sandhills. In contradiction to the high ridge are low and often broad valleys of rivers known as kachhar. 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, LONGITUDE LATITUDE, RELIEF HEIGHT DIFFERENCE ETC

S. No.	Detail s 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	2B1F8a2c	Changeriya, Masauliya, Dudi, Birawa, Jahagirawa, Duda, Dhema, Rudauliya, Chamari, Bhabhuwa	27° 05' 31" to 26° 06' 46"	81° 35' 57" to 81° 37' 08"	101	90	11
2	2B1F8c1b	Narayanpur Majha, Pipri, Allipur Gokula, Sakraura, Katra Shahbajpur, Dhaurahara, Basehiya, Munderawa	27° 05' 21" to 26° 08' 18"	81° 37' 57" to 81° 42' 29"	106	87	19
3	2B1F8c1c	Chhataura, Malauna, Dhamsara, Rajawapur, Hirapur Kamiyar, Rewari, Meenapur, Beerpur Belpur, Tikawar Khas, Narayanpur Majha, Nagawa Kalan, Pipri, Allipur Gokula, Sakraura	27° 08' 10" to 26° 10' 42"	81° 37' 56" to 81° 41' 44"	103	89	14
4	2B1F8c3	Dewa Pasiya, Khem Pur, Taiyyab Pur, Gondawa, Selhari, Gaurawa Kalan, Mohammad Pur, Semara, Dhamsara, Mankapur, Barwatpur, Bairampur, Amorphwa, Chhataura, Malauna, Khinduri, Baranv, Allipur Gokula	27° 10' 01" to 27° 14' 16"	81° 38' 30" to 81° 44' 19"	106	88	18

CLIMATE

The watershed lies in the sub tropical climate. The average annual rainfall less than 1393 mm . Most of the annual rain fall (about 90%) is received during the rainy season (July to September) accompanied with high intensity storm. The temperature in the area rarely goes up to 48°C during summer and reaches 4.1°C in winter.

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.

AGRO-CLIMATE CONDITIONS

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

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	
								Name	Area (ha)
1	IWMP -III	North Plain Zone	8382	40	Sandy Loam	Moderate Slope	837 mm	Mustard, Sugarcane, Maize/Arhar	2663 1000 4200

TEMPERATURE

The data of Gonda raingauge centre may be taken as representative of the meteorological conditions in the district. From mid November there is a rapid fall in temperature. January is the coldest month with the mean daily maximum temperature at 22.8° C and the mean daily minimum temperature at 9.3° C. In association with cold waves in the wake of the western disturbances passing eastwards in the winter season, temperature tends to go down to a degree or two above the freezing point. Day temperature begins to rise rapidly after February. May is the hottest with mean daily maximum temperature at 38.4 C and the mean daily minimum at 25.1° C. With the advent of the monsoon by about the middle of June there is appreciable

drop in the day temperature, however, the nights continue to be warm. In September there is a slight increase again in the day temperature but the night temperature decreases after September. With the withdrawal of monsoon by the beginning of October it decreases progressively.

HUMIDITY

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

WATERSHED CHARACTERISTICS

Shape and Size

The watershed shape (IWMP - III, Gonda) is more or less elongated 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 16038 m and 7776 m, respectively with the length: width ratio 2.06:1

SHAPE AND SIZE OF WATERSHED

S. N.	Micro-watershed Code	Area (ha)	Shape	Approximate size in meter		Ratio Length: width
				Length	Width	
1	2B1F8a2c	272.69	Square	2212	1412	1.56:1
2	2B1F8c1b	2463.76	Rectangle	7096	5457	1.30:1
3	2B1F8c1c	1875.74	Square	4169	3834	1.08:1
4	2B1F8c3	3769.81	Rectangle	9052	7753	1.16:1

GEOMORPHOLOGY

The area lies in the West of the District- Gonda of Sarju Basin. The soil is mainly sandy loam soil which is easily transportable after detaching causing soil erosion by water erosion and wind erosion.

DETAIL OF SOIL EROSION (IWMP – III) GONDA

S. No.	Name of the Project	Water Erosion (Ha)				Run-Off	Average Soil Loss in tons/ha/yr	Wind Erosion
		Sheet	Rill	Gully	Total			
1	I.W.M.P.- III	3512	2175	183	5870	560 mm	15-16	Nil

SOILS

In the watershed area mainly four types of soil named sandy, Sandy loam, clay loam, which are the main soil type of Tarai region. Main crops are Sugarcane, Maize which need more Nitrogen, Zinc & phosphorous. Therefore deficiency of Zinc occurs 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 Sarju Branch.

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 occasional occurrence of Neem, Mango, Guava, Lemon, 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 motha

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 Sarju Branch, 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.

The total population of Forty villages of the watershed is 52663 out of which 27883 are males and 24780 are females with average family size of 6 persons.

VILLAGE WISE HUMAN POPULATION IN THE PROJECT AREA

S.No.	NAME OF VILLAGES	TOTAL HOUSE HOLDS	TOTAL POPULATION	POPULATION MALE'S	POPULATION FEMALE	TOTAL POPULATION S. C.	POPULATIONS MALE'S S. C.	POPULATIONS FEMALE S.C.
1	Barwatpur	304	1900	960	940	95	51	44
2	Chhataura	268	1407	733	674	291	156	135
3	Malauna	375	2075	1105	970	111	60	51
4	Dhamsara	114	753	389	364	140	76	64
5	Beerpur Belpur	156	1026	553	473	25	12	13

6	Rewari	373	2387	1259	1128	332	180	152
7	Tikarwar Khas	62	380	207	173	45	21	24
8	Nagawa Kalan	335	2032	1067	965	253	135	118
9	Semara	106	538	285	253	20	10	10
10	Baranv	300	1739	935	804	34	20	14
11	Amorhwa	159	942	502	440	260	137	123
12	Mankapur	175	1083	539	544	160	92	68
13	Selhari	693	3939	2143	1796	444	241	203
14	Meenapur	114	791	426	365	50	26	24
15	Rajawapur	86	585	303	282	08	04	04
16	Bhairampur	340	2177	1113	1064	456	243	213
17	Hirapur Kamiyar	344	2107	1139	968	226	117	109
18	Narayanpur Majha	611	3567	1955	1712	401	208	193
19	Pipri	141	847	432	415	121	58	63
20	Sakraura	846	5044	2703	2341	776	419	357
21	Alipur Gokula	263	1670	886	784	263	143	120
22	Katra Shahbajpur	365	2111	1118	993	227	117	110
23	Dhaurahara	132	776	412	364	80	43	37
24	Basehiya	216	1430	763	667	124	66	58
25	Jahagirawa	208	1219	651	568	76	40	36

26	Dhema	154	906	467	439	73	36	37
27	Birawa	69	335	174	191	148	72	76
28	Dudi	101	375	281	294	17	06	11
29	Rudauliya	358	2054	1123	931	168	93	75
30	Chamari	52	238	131	107	21	11	10
31	Bhabhuwa	252	662	878	784	173	92	81
32	Duda	85	491	257	234	188	107	81
33	Changeriya	359	2356	1250	1106	303	158	145
34	Masauliya	239	1391	744	647	371	208	163
	TOTAL	8755	52663	27883	24780	6480	3458	3022

MIGRATION

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

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

Name of the Project	No. of persons migrating	No. of days per year of migration	Main reason for migration	Expected reduction in no. of persons migrating
I.W.M.P.- III	1500	280	Unemployment	630

ECONOMIC ANALYSIS

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

BENEFIT COST RATIO OF I.W.M.P. GONDA

Year	Construction cost (00,000 Rs.)	Operation and maintenance cost (00,000 Rs.)	Benefit (00,000 Rs.)
1	123.60	4.94	12.36
2	185.40	12.36	54.08
3	123.60	17.30	100.43
4	185.40	24.72	247.20
5	-	24.72	247.20
6	-	24.72	247.20
7	-	24.72	247.20
8	-	24.72	247.20
9	-	24.72	247.20
10	-	24.72	247.20

BY BENEFIT, COST RATIO METHOD




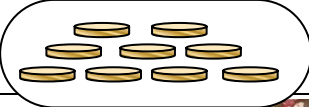





S.No.	Item	1	2	3	4	5	6	7	8	9	10	
1	Discount factor 10%	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467	0.424	0.386	
2	Total cost(00,000 Rs.)	128.54	197.76	140.90	210.12	24.72	24.72	24.72	24.72	24.72	24.72	
3	Benefit(00,000 Rs.)	12.36	54.08	100.43	247.20	247.20	247.20	247.20	247.20	247.20	247.20	
4	\sum Cost	116.84	163.34	105.81	143.51	15.35	13.94	12.68	11.54	10.84	9.54	603.03
5	\sum Benefit	11.23	44.67	75.42	168.83	153.51	139.42	126.81	115.44	104.81	95.41	1035.55

$$\begin{aligned}
 \text{Benefit cost ratio} &= \frac{\sum \text{Benefit}}{\sum \text{Cost}} \\
 &= \frac{1035.55}{603.03} \\
 &= \mathbf{1.60:1}
 \end{aligned}$$

Hence OK

SEASONAL ANALYSIS

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

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

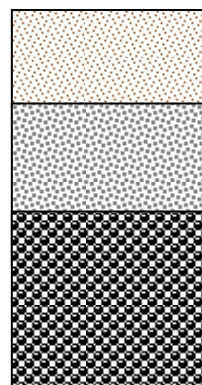
SOIL AND LAND CAPABILITY CLASSIFICATION

Soil Morphology:

The study area is situated in the South-East of District-Gonda. 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 sloppy land
- 3- Strong

Soil Profile: A Representative soil Profile



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

5 -8m (Locally called "Clay")

7 -8 m(Sandy Clay)

MORPHOLOGY OF TYPICAL SOLID PROFILE OF WATERSHED

Horizon	Depth(Cm)	Morphology
A	0-150	Yellowish 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	(Black and sandy)

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 phosphorus due to continuous growing of pulses. 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 manage-ment are taken into consideration for classifying them under various land capability classes.

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

Class I lands have slight limitations that restrict their use.

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

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

Class I lands have slight limitations that restrict their use.

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

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

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

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

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

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

‘e’ represents susceptibility to erosion by water or wind,

‘w’ represents drainage difficulties including wetness or overflow,

‘s’ represents soil limitations for plant growth and

‘c’ represents climatic limitations.

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

– Stony or rocky (0),

– Erosion hazard/slope (1),

– Coarse texture (2),

– Fine texture (3),

– Slowly permeable subsoil (4),

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

CONCLUSION

The land capability classification of the watershed provides reasonable good information with regard to capability of soil, that could be used for agriculture, agri-horticulture, 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 watersheds. The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like contour bunding *in-situ* moisture conservation practices. In class 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.

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	Agriculture	Fallow Land	Plantation	Water Bodies	Wasteland all types	Total
1	2B1F8a2c	Changeriya,Masauliya,Dudi,Birawa,Jahagirawa, Duda,Dhema, Rudauliya, Chamari, Bhabhuwa	13.17	236.05	17.12	1.88	4.47	-	272.69
2	2B1F8c1b	Narayanpur Majha, Pipri,Allipur Gokula, Sakraura, Katra Shahbajpur, Dhaurahara, Basehiya, Munderawa	76.89	1956.93	89.04	11.73	87.36	241.81	2463.76
3	2B1F8c1c	Chhataura,Malauna,Dhamsara,Rajawapur,Hirapur Kamiyar, Rewari, Meenapur, Beerpur Belpur, Tikawar Khas, Narayanpur Majha, Nagawa Kalan, Pipri, Allipur Gokula, Sakraura	70.09	1592.63	68.38	11.23	60.15	73.26	1875.74
4	2B1F8c3	Dewa Pasiya, Khem Pur, Taiyyab Pur, Gondawa, Selhari, Gaurawa Kalan, Mohammad Pur, Semara, Dhamsara, Mankapur, Barwatpur, Bairampur, Amorhwa, Chhataura, Malauna, Khinduri, Baranv	161.45	3327.93	82.75	33.61	108.06	56.01	3769.81
		Total	321.60	7113.54	257.29	58.45	260.04	371.08	8382.00

Present Landuse/Landcover of the project area:

S. No	Landuse	Area (ha)	%
1	Built-up land	321.60	3.83
2	Waste Land	371.08	4.42
3	Water Bodies	260.04	3.14
4	Plantation	58.45	0.69
5	Agricultural Land	7113.54	84.86
6.	Fallow Land	257.29	3.06
Total		8382.00	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 and the total area under category is 321.60 Hectare which is 3.83% of the total mapped area. Under this category road network and other built-up area has also been included.

WASTE LAND

Land which is deteriorating for lack of appropriate water and soil on account of natural causes comes under this category. The total area under this category comes about 371.08 Hectare which is 4.42% 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 impounded in the form of ponds, lake & reservoirs. The total area under this category comes about 260.04 Hectare which is 3.14% 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 indicating the presence of a fence around it. Depending on the location, they exhibit a dispersed or contiguous pattern. The total area under this category comes about 58.45 Hectare which is 0.69 % of the total mapped area.

AGRICULTURAL LAND

These are the lands primarily used for farming and for production of food; it includes land under the (irrigated and un-irrigated). Areas with standing crop as on the date of satellite overpass. Cropped areas are in varying shape and size in a contiguous and non contiguous pattern. They are widely distributed in different terrains; prominently appear in the irrigated areas irrespective of the source of irrigation. The study area is predominantly paddy producing area being its flatness in 2007-08 maximum production of paddy recorded in this region under the double crop area, sugarcane belt capture 561 Hectare total agriculture land. It is important to know that the project area has maximum **two crop areas** i.e. **Kharif and Rabi**. The average size of the agricultural field is less than 0.5 Hectare. The total area under this category comes about 7113.54 Hectare which is 84.86% of the total mapped area.

FALLOW LAND

The current Fallow land have been mapped in the study area as viewed in the satellite scene. Actually the above category is a part of agriculture land which have left for sowing due to some reason by the farmers. The total area under this category comes about 257.29 Hectare which is 3.06 % 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 water (both for irrigation and drinking) is most scarce natural resource in the watershed. The operation of tube wells for irrigation of agricultural crops frequently leads to the drinking water problem to the farmers for watershed.

The agricultural soils in the watershed have diversified texture i.e. clay, silty clay, sand mixed with gravel and loam which are located in patches throughout the watershed. Four types of sandy, loam, Clay, clayloam are the main soil of district-Gonda. 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 juliflora, 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, Rehabilitation of wasteland and substantial income generation for socio-economic uplift of farmers in the watershed.

One Year Crop Rotation

Single Cropping: Sugarcane Fallow, Paddy

Double Cropping: Sugarcane, wheat, Maize, Potato

Irrigated Agriculture

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

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

(9-19Qu./ha) and rice (14.5-31 Qu/ha.) under rainfed and irrigation, condition respectively. At present level of rainfed farming. The total produce from Rabi and Kharif crops obtained by a medium size of holding owning family can meet food requirements for upto 6 to 7 months only.

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

The mixed cropping is in practice in limited area with Kharif crops like Sugarcane, Maize+Arhar but it is not only irrational but also unscientific and beset with low productivity. Subsequent rabi crops in general are raised on residual soil moisture under rain-fed production system during past monsoon season. Imbalanced use of fertilizers is common in not only Rabi and Kharif crops but also in rain fed and irrigated production system. The recommended deep ploughing for enhanced in situ residual soil moisture conservation and higher production is also not followed in the watershed. The shallow ploughing tractors drawn tillage implements are available with the farmers in the watershed but deep ploughing implements yet need to be introduced.

The soil fertility/health restoration practices like green manuring, crop rotations and intercropping specially with legumes, use of FYM/compost, vermi-compost, biofertilizers, soil and water conservation measures, use of brought up or in situ mulches are widely lacking in the watershed. The soil and water conservation measures are limited to mechanical/earthen measures created by the state Govt. agencies. Conservation agronomical measures like seeding and ploughing across the slope, weed mulching, agro-forestry, vegetative barriers etc. also completely lack in the watershed.

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.

HORTICULTURE

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

AGRO-FORESTRY

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

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.

LIVESTOCK POPULATION

Total live stock population of the watershed is 23902. Buffalo is preferred as milch animal compare to cow but milk yield is very low. Goats are kept mainly for the meat purpose. Homestead poultry rearing is common among marginal farmers.

LIVELIHOOD

Out of the total population 52663 in the watershed, a majority i.e. more than 75% has farming as their major source of livelihood followed by 23% labourer and 2% service+ business class.

LAND HOLDINGS

Majority of the watershed farmers are in category of marginal (< 1 ha) and small (1-2 ha). These small land holding are further scattered in different places which makes cultivation very difficult.

INFRASTRUCTURE SOCIAL FEATURES

The watershed has moderate communication facilities and all 40 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. Out of 24 villages, television is available in 18 villages only. Nearest small market is colonganj and district headquarter Gonda. Small land holdings (average less than 0.1 ha) with large family size (average 6 person) 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.

DETAILS OF THE VILLAGE WISE INFORMATION IN THE PROJECT AREA

Village Wise Utilities In The Project Area Part - 1

S.No.	NAME OF VILLAGES	EDUCATION FACILITIES						MEDICAL FACILITIES						DRINKING WATER FACILITIES				
		P SCH	M SCH	S SCH	SS SCH	ADLT LT CT	OTH SCH	ALL HOSP.	AYU HOSP.	ALL DISP.	MCW CENTR	M HOME	CWC	RPM	CHW	WELL WATER	TANK WATER	TUBE WELL WATER
1	Barwatpur	1													1		2	15
2	Chhataura	1													1		5	17
3	Malauna	1													1		2	15
4	Dhamsara	1													1		4	15
5	Beerpur Belpur	1													1		2	17
6	Rewari	1													1		5	16
7	Tikarwar Khas	1													1		2	18

8	Nagawa Kalan	1													1		2	20
9	Semara	1													1		2	20
10	Baranv	1													1		2	19
11	Taiyyab Pur	1													1		1	15
12	Amorhwa	1													1		4	16
13	Mankapur	1													1		2	18
14	Selhari	1													1		5	14
15	Meenapur	1													1		2	16
16	Rajwapur	1													1		5	18
17	Bhairampur	1													1		2	20
18	Hirapur Kamiyar	1													1		4	20
19	Narayanpur Majha	1													1		2	20
20	Pipri	1													1		4	15
21	Sakraura	1													1		2	16
22	Alipur Gokula	1													1		2	14
23	Katra Shahbajpur	1													1		2	20
24	Dhaurahara	1													1		5	18
25	Basehiya	1													1		5	20
26	Jahagirawa	1													1		5	14
27	Dhema	1													1		2	16
28	Birawa	1													1		2	14

29	Dudi	1													1		2	20
30	Rudauliya	1													1		5	18
31	Chamari	1													1		5	20
32	Bhabhuwa	1													1		5	20
33	Duda	1													1		2	18
34	Changeriya	1													1		5	18
35	Masauliya	1													1		5	20
36	Dewa Pasiya	1													1		5	20
37	Gaurawa Kalan	1													1		5	14
38	Gondawa	1													1		2	16
39	Khem Pur	1													1		2	14
40	Mohammad Pur	1													1		5	14

Village Wise Utilities In The Project Area Part - 2

NAME OF VILLAGES	POST, TELEGRAPH, BUS STAND & BANK'S							SOCIETY & ROADS					POWER SUPPLY			
	POST OFFICE	TELEGRAPH OFFICE	POST & TELE. OFFICE	PHONE	BUS SERVICE	COMMERCIAL BANK	CO-OPERATIVE BANK	AG. CR. SOCIETY	NON AG. CR. SOCIETY	APPROACH PAVED ROAD	APPROACH MUD ROAD	APPROACH FOOT PATH	ELECTRICITY FOR DOMESTIC	ELECTRICITY FOR AGRICULTURE	ELECTRICITY FOR OTHER PURPOSES	ELECTRICITY FOR ALL PURPOSES
Barwatpur	1			1						2	1	1	1	2	1	1
Chhataura										1	1	1	1	1	1	1
Malauna										1	1	1	1	1	1	1
Dhamsara										1	1	1	1	1	1	1

Beerpur Belpur	1			1						2	1	1	1	2	1	1
Rewari										1	1	1	1	1	1	1
Tikarwar Khas										1	1	1	1	1	1	1
Nagawa Kalan										1	1	1	1	1	1	1
Semara										1	1	1	1	1	1	1
Baranv	1									2	1	1	1	2	1	1
Taiyyab Pur										1	1	1	1	1	1	1
Amorhwa										1	1	1	1	1	1	1
Mankapur										1	1	1	1	1	1	1
Selhari	1									2	1	1	1	2	1	1
Meenapur										1	1	1	1	1	1	1
Rajawapur										1	1	1	1	1	1	1
Bhairampur										1	1	1	1	1	1	1
Hirapur Kamiyar										1	1	1	1	1	1	1
Narayanpur Majha										1	1	1	1	1	1	1
Pipri										1	1	1	1	1	1	1
Sakraura										1	1	1	1	1	1	1
Alipur Gokula										1	1	1	1	1	1	1
Katra Shahbajpur										1	1	1	1	1	1	1
Dhaurahara	1									2	1	1	1	2	1	1
Basehiya										1	1	1	1	1	1	1

Jahagirawa										1	1	1	1	1	1	1
Dhema	1									2	1	1	1	2	1	1
Birawa	1									2	1	1	1	2	1	1
Dudi	1			1						2	1	1	1	2	1	1
Rudauliya										1	1	1	1	1	1	1
Chamari										1	1	1	1	1	1	1
Bhabhuwa										1	1	1	1	1	1	1
Duda	1			1						2	1	1	1	2	1	1
Changeriya										1	1	1	1	1	1	1
Masauliya										1	1	1	1	1	1	1
Dewa Pasiya	1									2	1	1	1	2	1	1
Gaurawa Kalan	1			1						2	1	1	1	2	1	1
Gondawa	1			1						2	1	1	1	2	1	1
Khem Pur										1	1	1	1	1	1	1
Mohammad Pur										1	1	1	1	1	1	1

Village-Wise code in the watershed

S.No.	NAME OF VILLAGES	VILLAGE CODE	VILLAGE CENSUS CODE
1	Barwatpur	889	06788900
2	Chhataura	890	06789000
3	Malauna	891	06789100
4	Dhamsara	892	06789200
5	Beerpur Belpur	893	06789300
6	Rewari	894	06789400
7	Tikarwar Khas	895	06789500
8	Nagawa Kalan	896	06789600
9	Semara	897	06789700
10	Baranv	898	06789800
11	Amorhwa	901	06790100
12	Mankapur	902	06790200
13	Selhari	903	06790300
14	Meenapur	904	06790400
15	Rajawapur	905	06790500
16	Bhairampur	957	06795700
17	Hirapur Kamiyar	979	06797900
18	Narayanpur Majha	980	06798000

19	Pipri	981	06798100
20	Sakraura	982	06798200
21	Alipur Gokula	001	06800100
22	Katra Shahbajpur	002	06800200
23	Dhaurahara	003	06800300
24	Basehiya	004	06800400
25	Jahagirawa	009	06800900
26	Dhema	010	06801000
27	Birawa	011	06801100
28	Dudi	012	06801200
29	Rudauliya	015	06801500
30	Chamari	016	06801600
31	Bhabhuwa	017	06801700
32	Duda	018	06801800
33	Changeriya	022	06802200
34	Masauliya	023	06802300

MEANS OF COMMUNICATION

The watershed can be approached from one main road Lucknow – Gonda

IMPORTANCE OF DEVELOPMENT INSTITUTION

In the Venn diagram, farmer's perception was recorded for importance and role of different development institutions in relation to infrastructure development in the villages. Importance has been depicted with the size of the circle and role with distance from the village circle.

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 from cow dung cake, woody stem of Arhar crop and Mustard. About 65 to 70 percent of the domestic energy requirement is met from the Agro By-Product and cow dung cake. Rest is met out from the forest outside the village and watershed boundary.

b) Fodder:

Villages do not have any significant dependency on forest based fodder as these sources are not available in the forests. There is shortage of green fodder in winter and summer due to inadequate irrigation facility. Due to lack of fodder availability here is Anna Pratha in this area which is the most important reason for more mortality rate of planted trees also.

This also leads to low productivity. There is a lot of ignorance about the use of new farming methods and technologies such as multiple cropping. They don't use FYM and other input in a proper way; that is why they don't get 100% output. So these factors contribute to low productivity.

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 FINANCES FOR FARMERS

In the Project Area, most of the farmers are marginal and small. They do not have enough money to buy good quality seeds, machinery and other inputs.

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.

P.R.A. EXERCISE



CHAPTER - 4
INSTITUTION BUILDING & PROJECT
MANAGEMENT

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 Distt. - Gonda for IWMP-III.

DETAIL STAFFING PATTERN OF PIA

S.No.	Name	Designation	Qualification	Experience (Year)
1	Sri. N.K. Singh	Dy. Director	B.Tech. Ag. Engg.	07
2	Sri. Ratnakar Singh	B.S.A.	Inter, Diploma, Ag. Engg.	07
3	Sri. B.L. Yadav	Jr. Engg.	Inter, Diploma, Civil Engg.	30
4	Sri. S.N. Yadav	Accountant	M.Com.	30
5	Sri. Sanjay Gaul	Asstt. Accountant	M.Com.	07
6	Sri. Moti Chandra	Draft Man	Inter, Diploma, Draft Man	25
7	Dr. Rajesh Kumar	A.S.C.I.	Ph.D. (Ag. Horti.)	07
8	Sri. Om Prakash Pandey	Jiledar	B.A.	6
9	Sri. Ram Bhawan Upadhyay	Work Incharge	B.A.	2
10	Sri. Jagroop Chauhan	Work Incharge	High School	2
11	Sri. Ram Brichha Ram	Work Incharge	Inter	2
12	Sri. Sangram Ram	Work Incharge	M.A.	2
13	Sri. Prasu ram	Work Incharge	Inter	2
14	Sri. Dev Narayan Singh	Work Incharge	Inter	2
15	Sri. Surendra Yadav	Work Incharge	High School	2
16	Sri. Ram Bihari	Work Incharge	Inter	2
17	Sri. Rakesh Gautam	Work Incharge	B.A.	2
18	Sri. Ramesh Kumar	Work Incharge	Inter	2
19	Sri. Musir Ali	Work Incharge	B.A.	1
20	Sri. Awanish Tiwari	Tracer	B.A.	07
21	Sri. Manoj Kumar	IVth Class	Inter	7
22	Sri. Om Prakash	IVth Class	8th Pass	7
23	Sri. Chandra Bhusan	IVth Class	Illiterate	30

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 TEAM

S. No.	Name of Member of WDT	Address	Qualification	Designation	Experience
1	Shri N.K. Singh	Office:Soil Conservation Officer Saryu Canal Phase -1, Gonda	B.Tech., Agg. Eng.	Dy. Director	7
2	Shri Ratnaker Singh	Office:Soil Conservation Officer Saryu Canal Phase -1, Gonda	Inter, Diploma Ag. Eng.	Soil Conservation Officer	7
3	Sri B.L. Yadav	Office:Soil Conservation Officer Saryu Canal Phase -1, Gonda	Inter, Diploma Civil, Engg	Jr. Enginner	30
4	Dr. Rajesh Kumar	Office:Soil Conservation Officer Saryu Canal Phase -1, Gonda	Ph.D., Ag (Hort.)	Assistant Soil Conservation Inspector	7
5.	Sri Moti Chand Prasad	Office:Soil Conservation Officer Saryu Canal Phase -1, Gonda	Inter Dip. Dr.	Draughtman	30
6.	Sri S.N. Yadav	Office:Soil Conservation Officer Saryu Canal Phase -1, Gonda	M.Com.	Accountant	30
7.	Sri Sanjay Kumar Gaul	Office:Soil Conservation Officer Saryu Canal Phase -1, Gonda	M.Com.	Asstt. Accountant	7

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 VILLAGE WISE

Year-2010-11, Village wise Committee and area pertaining to Micro-Watershed Code-2B1F8a2c, 2B1F8c1b, 2B1F8c1c, 2B1F8c3

S. No.	Watershed committee	Village Name	Total Area (ha)	Total Treatable Area (ha)	Total Cost (Lac)	President/Secretary of Watershed committee	Member of WDT
1	Deva Parsia	Khem Pur, Taiyyab Pur, Dewa Pasiya, Gondawa	1382	1000	120.00	Sri Pal Gupta	Dr. Rajesh Kumar
2	Selhari	Selhari, Mohammad Pur, Semara, Gaurawa Kalan	1200	600	72.00	Sita Devi	Dr. Rajesh Kumar
3	Barbatpur	Barbatpur, Baranv, Mankapur, Bairampur	1200	500	60	Jainu	B.L Yadav
4	Rajawapur	Rajawapur, Meenapur, Malauna, Dhamsara, Chhataura	500	300	36.00	Dileep Kumar	Dr. Rajesh Kumar
5	Rewari	Rewari, Beerpur Belpur, Nagawa Kalan, Tikawar Khas	1020	500	60.00	Puspa Singh	S.N. Yadav
6	Narayanpur Majha	Narayanpur Majha, Pipri, Hirapur Kamiyar, Sakraura	1640	1400	168.00	Pawan Kumar Dube	Dr. Rajesh Kumar
7	Basehia	Katra Shahbajpur, Dhaurahara, Basehiya	900	864	103.68	Ram Kumar Gupta	Ratnakar Singh
8	Dhema	Dhema, Dudi, Birawa	335	300	36.00	Ram Lalli	Dr. Rajesh Kumar
9	Jahangirwa	Jahangirwa, Parsauli, Allipur Gokula, Malauli	78	50	6.00	Rakesh Singh	Sanjay Gaul
10	Duda	Duda	50	40	4.80	Gyan Bahadur Singh	Dr. Rajesh Kumar
11	Aktiyarpur	Rudaulia	12	11	1.32	Reena Devi	Dr. Rajesh Kumar

12	Bibiyapur Gosai	Chamri	35	35	4.20	Sarju Prasad	Dr. Rajesh Kumar
13	Kaitholi	Chengaria, Masaulia, Babhuwa	30	16	1.92	Jagdeesh Prasad	Dr. Rajesh Kumar
		Total	8382.00	5616.00	673.99 Say 674.00		

DETAILS OF WATERSHED COMMITTEE & SUB WATERSHED COMMITTEE

S.N.	Name Of Gram Panchyat/ Village	Date Of Constitution	Name Of President	Name Of Secretary	Member Of User Group	Member Of SHG	Female Member	SC Member	Land Less Member	Work In Charge	WDT Member
1	Dhamsara	02.02.11	Bhagwan Deen	Nand Prakash	Bachha Ram	Tulsi Ram	Noor Jahan	Jokhu	-	Ram Bhawan	Dr. Rajesh Kumar, B.L. Yadav
2	Revari	02.02.11	Shiv Shankar	Ram Chandar	Ram Avtar	Baba Deen	Usha	Ram Avtar	-	Ram Brich Ram	Dr. Rajesh Kumar, B.L. Yadav
3	Mankapur	03.02.11	Devbaksh Singh	Rananjai Singh	Babadeen	Balram	Sankara Devi	Ishwar Singh	-	Jagroop Chauhan	Dr. Rajesh Kumar, B.L. Yadav
4	Nagwa Kalan	03.02.11	Devta Deen	Sanjay	Rajaram	Ram Prakash	Radha	Rukmani	-	Jagroop Chauhan	Dr. Rajesh Kumar, B.L. Yadav
5	Baranv	04.02.11	Shiv Prasad	Shyam Mohan	Murari	Ram Dev	Durga	Pappu	-	Ram Bhawan	Dr. Rajesh Kumar, B.L. Yadav
6	Selhari	04.02.11	Ram Sukhal	Raghu Ram	Devi Dayal	Radeep	Geeta	Ram Dev	-	Ram Bhawan	Dr. Rajesh Kumar, B.L. Yadav
7	Amorwa	04.02.11	Bhajau	Hari Ram	Jamua	Dharmendra	Laxmi	Nan Moon	-	Ram Bhawan	Dr. Rajesh Kumar, B.L. Yadav
8	Barwatpur	04.02.11	Must Keem	Noor Mohammad	Santosh Kumar	Sabir Ali	Noor Jahan	Shankar	-	Ram Bhawan	Dr. Rajesh Kumar, B.L. Yadav

9	Chhataura	04.02.11	Basant Lal	Ram Bujharat	Amit	Suresh	Laxmi	Chedi	-	Ram Brich Ram	Dr. Rajesh Kumar, B.L. Yadav
10	Malauna	04.02.11	Sunil Kumar	Ganshyam	Lalta Prasad	Sunil Kumar	Parmela	Bhawani	-	Ram Brich Ram	Dr. Rajesh Kumar, B.L. Yadav -
11	Rajwapur	04.02.11	Wasim	Sadam Hussain	Ali Anjar	Shahid Ali	Tahid	Barsati	-	Dr. Rajesh Kumar	Dr. Rajesh Kumar, B.L. Yadav -
12	Meenapur	04.02.11	Rajesh	Ram Sahai	Ram Kumar	Bansi Lal	Dulari	Kishor	-	Dr. Rajesh Kumar	Dr. Rajesh Kumar, B.L. Yadav -

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.

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

S.No	Name Of Village	Name of SHG	Name of President	Name of Secretary	Occupation of S.H.G
1	Dhamsara	Tulsi	Bhagwandeem	Dand Prakash	Buffalo
2	Revari	Usha	Shiv Shankar	Ram Chander	Buffalo
3	Khinduri	Savana	Khaleel Ur Rahman	Phool Khan	General Merchant, Goat Keeping

4	Nagwa Kalan	Radha	Devta Deen	Sanjay	Buffalo
5	Baranv	Durga	Shiv Prasad	Shyam Mohan	Buffalo
6	Selhari	Shiv	Ram Sukhal	Raghu Ram	Buffalo
7	Amorwa	Lalla	Ali Ahmad	Pratap	Goat Keeping/Fisheries
8	Barwatpur	Noor Jahan	Yunus	Abdul Mannan	General Merchant, Goat Keeping
9	Chhataura	Laxmi	Lal Chand	Laxmi Narayan	Buffalo
10	Malauna	Puspha	Ram Niwas	Durga Prasad	Buffalo

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, GONDA

S. No.	Name of water user group	Name of President	Name of Secretary
1	Malauna	Lalta Prasad	Avdesh Kumar
2	Rewari	Pramod Kumar	Radha
3	Nagwa Kalan	Laxmi Narayan	Ram Raj
4	Selhari	Vijay Kumar	Jang Bahadur
5	Baranv	Shiv Prasad	Shyam Mohan
6	Amorhwa	Laxmi Kant	Nan Moon
7	Rajwapur	Wasim	Yusuf
8	Meenapur	Ram Sahai	Ram Kumar
9	Khinduri	Phool Khan	Gulam Mustafa
10	Barbatpur	Ram Chandra	Jamuna Prasad

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.

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 – 5

MANAGEMENT / ACTION PLAN

PREPARATORY PHASE

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. 26.96 Lacs 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) (All financial figures in lakh Rs.)

S.No	Name of Watershed	Name of Villages	Amount earmarked for EPA	Entry point activities Planned	Per unit cost (in lac.)	Estimated Total cost (in lac)	Expected month & year of completion	Remarks
1	Deva Parsia	Khem Pur, Taiyyab Pur, Dewa Pasiya, Gondawa	4	1. Renovation of old well 2. Renovation of old plate form	1.20	4.80	March 2011	
2	Selhari	Selhari, Mohammad Pur, Semara, Gaurawa Kalan	6	1. Renovation of old well 2. Renovation of old plate form	0.48	2.88	March 2011	
3	Barbatpur	Barbatpur, Baranv, Mankapur, Bairampur	3	1. Renovation of old well 2. Renovation of old plate form	0.80	2.40	March 2011	
4	Rajawapur	Rajawapur, Meenapur, Malauna, Dhamsara, Chhataura	5	1. Renovation of old well 2. Renovation of old plate form	0.288	1.44	March 2011	
5	Rewari	Rewari, Beerpur Belpur, Nagawa Kalan, Tikawar Khas	4	1. Renovation of old well 2. Renovation of old plate form	0.60	2.40	March 2011	
6	Narayanpur Majha	Narayanpur Majha, Pipri, Hirapur Kamiyar, Sakraura	4	1. Renovation of old well 2. Renovation of old plate form	1.68	6.72	March 2011	
7	Basehia	Katra Shahbajpur, Dhaurahara, Basehiya	3	1. Renovation of old well 2. Renovation of old plate form	1.3824	4.1472	March 2011	
8	Dhema	Dhema, Dudi, Birawa	3	1. Renovation of old well 2. Renovation of old plate form	0.48	1.44	March 2011	

9	Jahangirwa	Jahangirwa, Parsauli, Allipur Gokula, Malauli	2	1. Renovation of old well 2. Renovation of old plate form	0.12	0.24	March 2011	
10	Duda	Duda	1	1. Renovation of old well 2. Renovation of old plate form	0.192	0.192	March 2011	
11	Aktiyarpur	Rudaulia	1	1. Renovation of old well 2. Renovation of old plate form	0.0528	0.0528	March 2011	
12	Bibiyapur Gosai	Chamri	1	1. Renovation of old well 2. Renovation of old plate form	0.168	0.168	March 2011	
13	Kaitholi	Chengaria, Masaulia, Babhuwa	3	1. Renovation of old well 2. Renovation of old plate form	0.0256	0.0768	March 2011	

WATERSHED DEVELOPMENT WORK

Watershed Development works is proposed to be taken up from 2nd year of the initiation of the project. These works are proposed to be taken up from village to village. And allocation of Rs 337.00Lakh & 50% of the total cost has been made for watershed development works.

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).

Activity related to livelihood by self help groups (SHGS) in the Project area

S.No	Name Of Village	Occupation of S.H.G	Per unit cost (Rs. In lacs)
1	Dhamsara	Buffalo	0.58
2	Revari	Buffalo	0.58
3	Khinduri	General Merchant, Goat Keeping	0.58/0.25
4	Nagwa Kalan	Buffalo	0.58
5	Baranv	Buffalo	0.58
6	Selhari	Buffalo	0.58
7	Amorwa	Goat Keeping/Fisheries	0.25/0.58
8	Barwatpur	General Merchant, Goat Keeping	0.58/0.25
9	Chhataura	Buffalo	0.58
10	Malauna	Buffalo	0.58

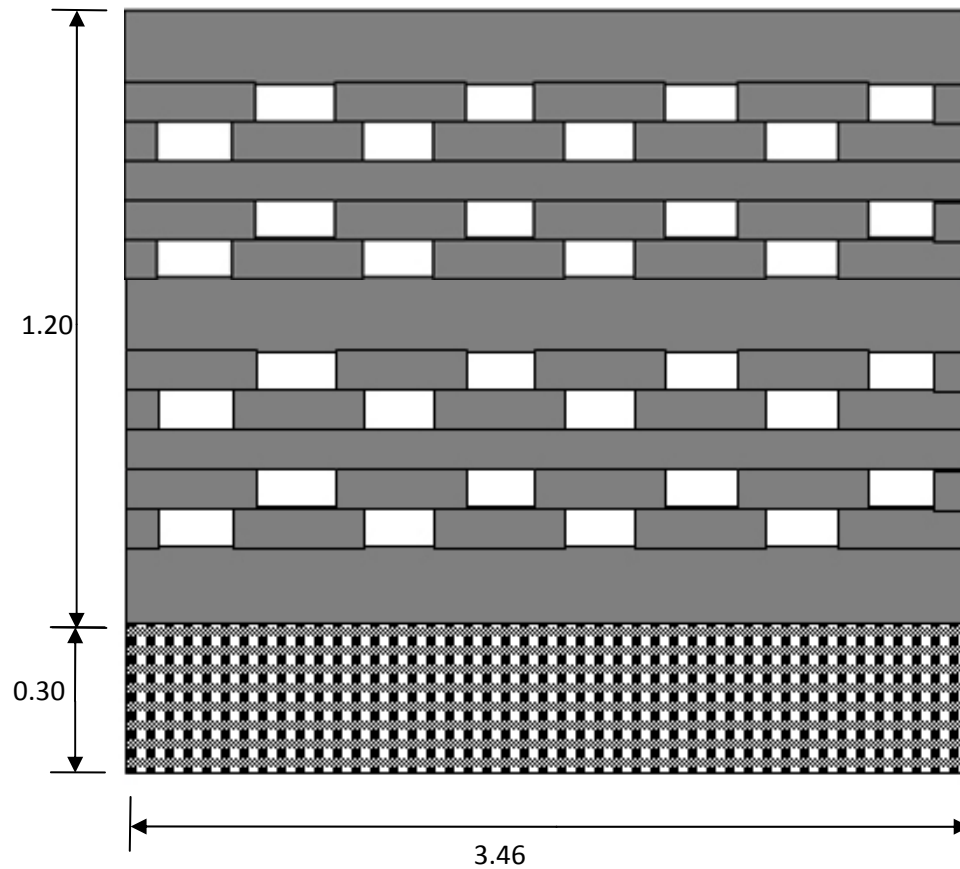
Total Buffalow Unit- 30

Total Cost- 17.4 Lacs

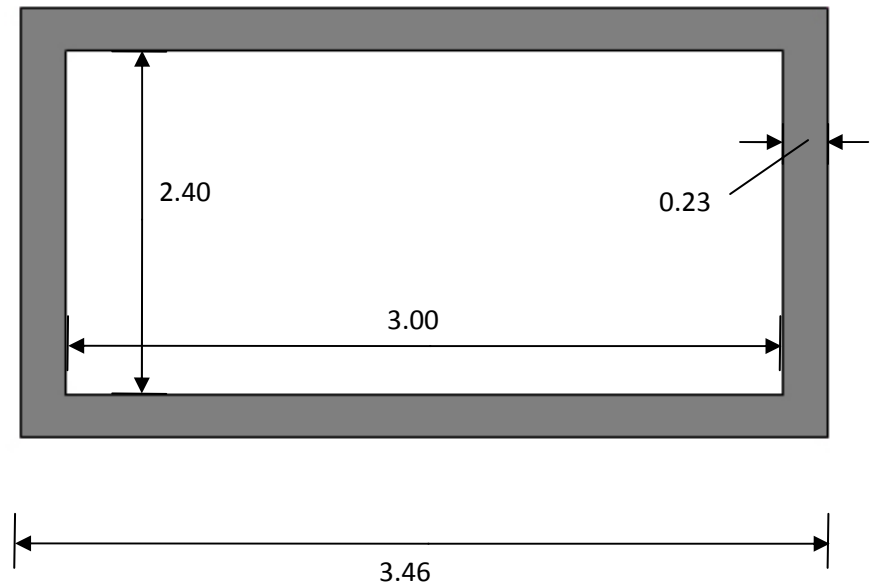
Total General Merchant – 30

Total Cost- 7.5 Lacs

DRAWING OF NADEF COMPOST STRUCTURE



ELEVATION



PLAN

DESCRIPTION.

1. Brick work = 1:4.
2. Plastering = 1:4.
3. Thickness of wall = 0.23 m.
4. Total height of Structure = $1.20 + 0.30 = 1.50$ m.

(Not to Scale)

PREPARATION OF COMPOST BY NADEF METHOD

Nadef is the name of inventor of this method. In this method glazed pit of brick masonry above Ground level is made as shown in the drying. In this method by using a little quantity of cow dung, and crop residue, leaf of trees, straw and other organic materials. The method of filling up the pit is below.

First of all best soil of pond or field is spread in the bottom of pit as least 3" thickness and then one layer of 6" thickness and other agriculture waste is made then best soil is spread on it and on this layer the liquid made of cow dung is spread to wet the crop residue, straw etc. this method is repeated until the pit is net completely filled up. On the top layer of this material a bulk is made and then the pit is closed by earthen gara. Water is spread on the top of bulk and from glazed side weekly. This process is repeated to moist the filling material always. The decomposition in filling material started and within six month filled material becomes compost khad.

ESTIMATE OF COMPOST BY NADEF METHOD

S.No.	Description of Work	No.	L.	B.	D./H.	Quantity
1.	Earth Work					
	Long Wall	2	3.60	0.30	0.30	0.648
	Short Wall	2	2.33	0.30	0.30	0.419
	Total					1.067 cum
2.	Brick Work 1:4					
	Long Wall Solid	2	3.46	0.23	0.90	1.432
	Short Wall Solid	2	2.40	0.23	0.90	0.993
	Total					2.425 cum
	Long Wall Glazed	2	3.46	0.23	0.60	0.954
	Short Wall Glazed	2	2.40	0.23	0.60	0.662
	Total					1.616 cum

3.	Plastering Work					
	Long Wall	2	3.46	-	0.60	4.152
	Short Wall	2	2.40	-	0.60	2.880
	Top of Long Wall	2	3.46	0.23	-	1.591
	Top of Short Wall	2	2.40	0.23	-	1.104
	Total					9.727 m²

ABSTRACT OF WORK

S.No.	Particulars	Quantity
1.	Earth Work	1.06 cum
2.	Brick Work 1:4 2.425 + 1.616/ 2	3.233 cum
3.	Plastering 1:4	9.727 m ²

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Coarse Sand (cum)	Bricks (nos.)
1.	Brick work 1:4	3.233 cum	5.82	0.873	1487
2.	Plastering 1:4	9.727 m ²	1.07	0.146	-
	Total		6.89	1.019	1487
	Say		7 Bags	1.02 cum	1500 nos.

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	7 Bags	285.00/ Bag	1995.00
2.	Coarse Sand	1.02 cum	2500.00/ cum	2550.00
3.	1 st class Brick Work 1:4	1500 nos.	4500.00/ Thousand	6750.00
Total				Rs. 10795.00

LABOUR CHARGES

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

Total Expenditure	
1. Cost of Materials	10795.00
2. Labour Charges	1616.14
Total	Rs. 12411.14
Say Rs. 12411.00 only	

DAIRY WORK

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

Establishment of Goat Units for S.H.G.'s formed in I.W.M.P. IIIrd Project

District Gonda is situated in Eastern U.P. region where the number of sheep is very less and they are small in nature. Goat population is appreciable and in fact, it is the major source of livelihood for poor people of the district.

In the state, on an average, 16 kg of meat is obtained from a goat, if they are dewormmed twice, there shall be increment of 4 kg in meat on an average, benefiting the farmers of the state.

Deworming and vitamins, mineral- supplement to the goats shall enhance their productivity and also improve anti-body response and protection level through vaccination, i.e., importance in efficiency of vaccination. More productivity and assured health and low mortality shall result into adoption of more farmers to goat farming with the formation of more S.H.G.'s and in turn availability of goats for processing units.

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

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

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

16 Goat Units are proposed in I.W.M.P. IIIrd Project for S.H.G. One unit constituting 10 goats and 1 buck will be distributed to one S.H.G.

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

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

Financial Component

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

Estimate of Livestock Development Activities

Total number of female animals:	Buffalo	-	3665
	Cow	-	5006
	Total	-	86,71
1. Artificial Insemination (A.I.):	33% of total animals per year, i.e., 2894		
	Amount required for A.I. by BAIF @ 100.00/ animal.		
	Total Amount		- Rs. 2,89,400.00
2. Vaccination:	Total number of animals in I.W.M.P. II nd	-	10372 nos.
	1. H.S. + B.Q.	@ 5.50	57046.00
	2. F.M.D.	@10.50	217812.00
	(Twice in a year)		
	Total Amount		- Rs. 274858.00
3. Deworming:	Adult animals	-	9335
	Child animals	-	1037
	Albendazole for 9335 animals	@ 40.56	3,78,627.60
	1037 child animals	@20.28	21,036.36
	Total Amount		- Rs. 3,99,663.96
4. Mineral Mixture:	Agrimine Forte Chelated for 7015 animals	@ 115.00	Rs. 8,06,725.00
	GRAND TOTAL	-	Rs. 17,70,646.96
	Say	-	Rs. 17,70,600.00

DEMONSTRATION OF WHEAT

- 1- Variety recommended for District-Gonda
 Irrigated-RR-21
 Unirrigated –HD2285, K68
- 2- Seed rate -100 -125 Kg/hectare
- 3- Requirement of fertilizers/ha N-125 Kg, P-70-75 Kg, K-70-75 Kg

ESTIMATE OF DEMONSTRATION OF WHEAT IN WATERSHED (PER ha)

S.No.	Particulars	Quantity	Rate	Amount	Remark
1	Tillage operation or preparation of field for sowing	1.0ha	1000.00/ha	1000.00	Since the project is to be operated in a participatory Mode, contribution in form of the tillage, sowing, irrigation and harvesting done by farmer is not included in the estimates
2	Cost of seed	100.00kg	18.00/kg	1800.00	
3	Sowing by seed drill	1.0ha	1000.00/ha	1000.00	
4	D.A.P. 18:46	160kg	573.00/ 50 kg	1833.60	
5	Urea	210kg	270.00/ 50 kg	1134.00	
6	Potash(M.O.P.)	150kg	300.00/50kg	900.00	
7	Irrigation(three irrigation)	1.00ha	650.00/ha	650.00	
8	Harvesting	1.00ha	2000.00/ha	2000.00	
Total				5667.60	
Say				5700.00	

Hence demonstration cost of wheat /ha is Rs. 5700.00

DEMONSTRATION OF GRAM IN WATERSHED AREA (per ha)

- 1- Variety - Kabuli, Local (Desi)
- 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)

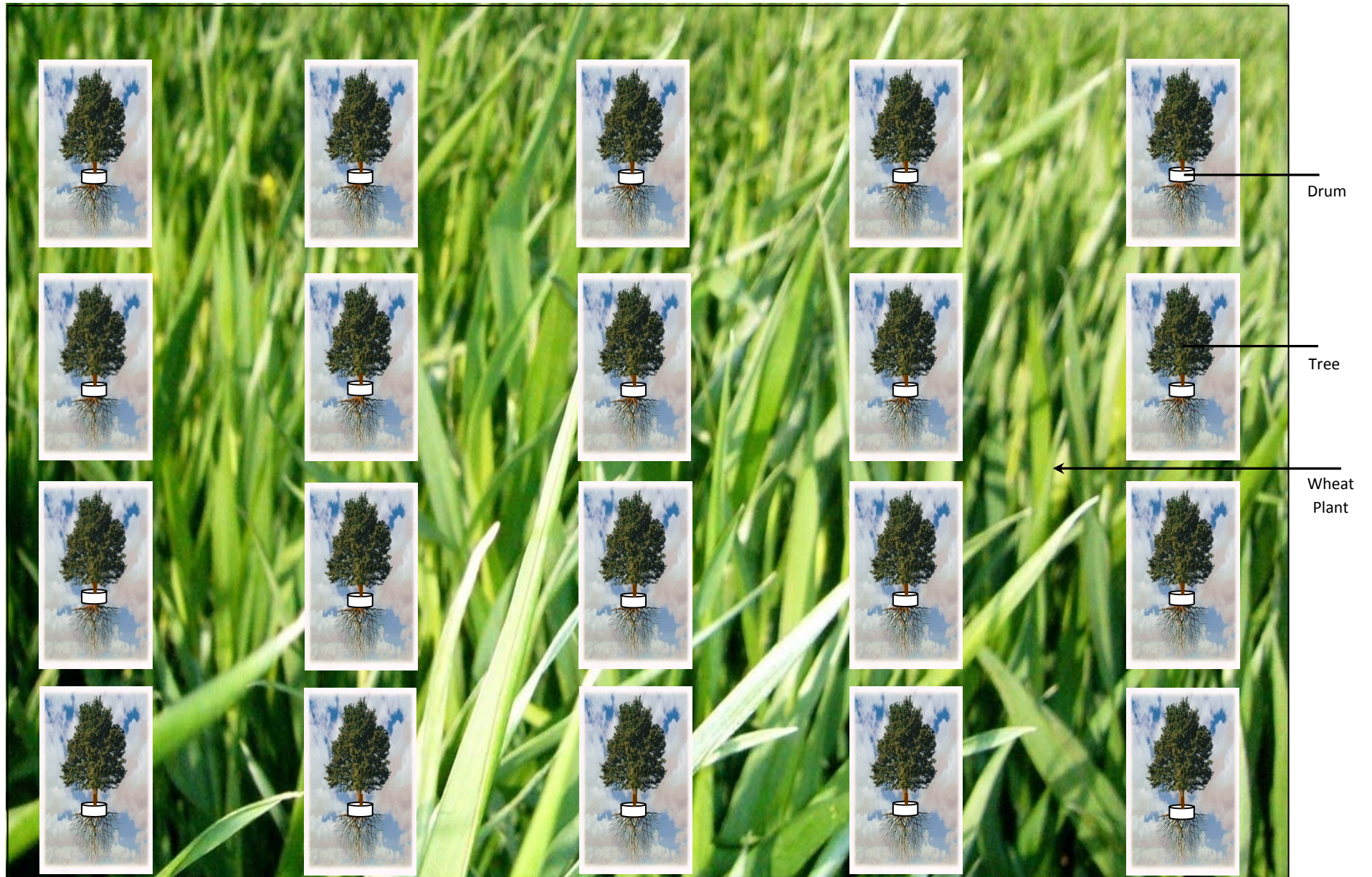
- 1- Requirement of Seed / ha -10kg
- 2- Requirement of fertilizers/ ha N- 60.00 kg, P- 40.00 kg, K-40.00 kg
- 3-

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 200 LITRES CAPACITY

District Gonda 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 be able to take nutrients from upper layer of fields and there will be no effect of plants on crops.

In summer season up to 1 to 1.50m depth of soil becomes dry causes more mortality rate of plants, using drums plants are planted below 50-60 from Ground level and in rainy and winter season up to February roots of plants go below 2.10m below where moisture will be available and plants will be safe in summer also. Using barbed wire fencing the plants will be protected 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. 1,69,203.50

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	1,69,203.50
2. Labour Charges	58,527.85
Total	Rs. 2,27,730.35
Say	Rs. 2,27,730.00 only

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 dryfarming conditions to increase the productivity by minimizing evapotranspiration losses.

6-Drip Irrigation:

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

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

The name of Nakshtra and their tree are as follows:

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

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

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

S.No.	Particular	No.	L	B	D/H	Quantity	Rate	Amount
1	Earth work in digging	1	1.0	1.0	1.00	1.00	36.66	36.66
2	Cost of FYM, in Kg/pit	1	-	-	-	10Kg	8.00	80.00
3	Filling of pits mixed with FYM and soil	1	1.0	1.0	1.0	1.00	36.66	36.66
4	Cost of plants	1	-	-	-	1	18.00	18.00
Total								171.32
Say								Rs. 172.00

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 2 nd year onwards – 15 % of 1 st 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 weeding and hoeing		1.00/Plant	540	
7.	Contingency and unforeseen (3%)			492.00	
	Total			Rs. 6,007.00	
	Say			Rs. 6,000.00	
	Maintenance cost 2 nd year onwards – 15 % of 1 st year cost			900.00	
	For next 5 years i.e., Rs. 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	

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 Juncea* (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.- 3rd Project, efforts will be made to oblige 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.	Particulars	Rate	Cost	Remark
1	Seed of Sesbania (Dhaincha)25Kg/ha	25.00/Kg	625	Since the project is to be operated in a participatory mode, contribution in the form of tillage will be done by farmers is not included in the estimate.
2	Tillage operation before sowing and to plough the plants of Dhaincha after 40-45 days of sowing for Green Manuring.	1000/ha Before and after saring	2000.00	
Total			Rs. 625.00	

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

PASTURE MANAGEMENT

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

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

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

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

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

Conservation on of Forages: In order to sustain animal production, it is essential that the optimum feeding should be maintained round the year. In India, we have two seasons, rainy season and winter season, when surplus quantities of green fodder is available-country to this there are 2 to 3 months of lean periods(October-November and April to July) when the fodder availability to animals is at its low. In the summer months, it is difficult even to meet the maintenance requirements of the animals. Stage of maturity to feed the animals adequately during the lean period. The conservation of forages could be done in the form of silage from cultivated fodders (legumes and cereals) and also pasture grasses. Forages could also be conserved in the form of hay when dried to its nutrients. This feed stuff is quantitatively important from both maintenance and nutritional point of view.

Agro-forestry system for fodder production: A number of fodder trees play an important role in human food security through their function as animal food sources, especially as drought services. Agro-forestry systems consisting of such tress and animals and/or pasture are called Silvo-Pastoral system.

Silvi-Pasture (or Silvo-Pastoral system) is the most promising alternate land use system which integrates multipurpose trees, shrubs, legumes and grasses mostly on non-arable, degraded and marginal lands for optimizing land productivity. It helps in conservation of vegetation, soil and nutrients and provides forage, timber and fuel wood on a sustainable basis.

Potentials of Semi-arid region for different forage production systems.

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

ROLE OF GRASSLAND IN SOIL CONSERVATION

The grass plant itself protects the soil from the forces of water erosion including the impact of rain drops and surface flow. Grass acts a spring cushion intercepting and broking up the falling rain drops in their way down. Conducting the water down the blades and stems of the plants and finally allowing it to reach the ground as fine sprays without disturbing the surface. Clamps of grass plants, in a mechanical way, obstruct-flowing water and reduce its rate of flow.

In fact to control soil erosion whatever technique is adopted, there are four approaches to deal with the problem:

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

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

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

CHAPTER – 6

CAPACITY BUILDING

CAPACITY BUILDING

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

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

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

Capacity Building Institution

S. No.	Name of the Training Institute	Full Address with contact no., website & e-mail	Type of Institute#	Area(s) of speciali-zation\$	Accreditation details	Trainings		
						Reference Year	No. of Trainings Assigned	No. of Trainees to be Trained
1	Deen Dayal Gram Vikas Sansthan	Bakshi Ka Talab, Lucknow	Research Institutes	Agriculture/ Horticulture/ Animal Husbandry	Govt. of U. P.	2012-2014	3	40
2	Acharya Narendra Dev Agril. University	Faizabad	University	Agriculture/ Horticulture/ Animal Husbandry	Govt. of U. P.	2012-2014	3	70
3	Aim Geotech (P) Ltd.	L.G.F. 11 & 12, Swaroop Arcade, Kapoorthala, Aliganj, Lucknow	NGO	Remote Sensing/GIS Capacity Building	Society Reg. Act	2010-2015	2	80
4	Land Development & Water Resource Development Training Institute	Beli Kala Lucknow	Training Institute	Watershed Development	Govt. Of U.P.	2010-2014	4	60

Institutional Arrangement & Capacity Building in the Projects

S. No.	Project Stake holders	No. of Stake holders	Total no. of persons	No. of persons trained so far	No. of Persons to be trained	Sources of funding for training, BSA Unit or DOLR or others		Name & Address of Training institute
						DOLR	BSA unit or others	
1	Distinct Data centre	1	3	-	3	DOLR	BSA unit	UPLDWR Training Centre, Belikala, Lucknow
2	PIA	1	12	2	12	DOLR	BSA unit	Acharya Narendra Dev, Training Centre, Faizabad
3	WDTs	1	8	-	8	DOLR	BSA unit	Belikala Faizabad Walmi Lucknow
4	W.Cs	13	130	-	130	DOLR	BSA unit	District Level
5	GPs	13	13	-	13	DOLR	BSA unit	District Level
6	SHG	50	500	-	500	DOLR	BSA unit	District Level
7	JG	56	550	-	550	DOLR	BSA unit	District Level
8	Community	-	5	-	5	DOLR	BSA unit	District Level
9	Any others	-	-	-	-	DOLR	BSA unit	District Level

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, Gonda Project consist of 4 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)

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.

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

Component wise & Year wise Phasing of Physical & Financial Outlay,I.W.M.P-III,GONDA

Phasing of various works/activities during different years of the project period for treatable area 5624.00 ha out of total area 8382.00 ha is presented in Table Component wise & Year wise Phasing of Physical & Financial Outlay

Financial (Lacs Rs.) Physical (ha.)

S. No.	Component	% of Budget	Ist Year (2010-11)		IInd Year (2011-12)		IIIrd Year (2012-13)		IV Year (2013-14)		V Year (2014-15)		Total	
			F	P	F	P	F	P	F	P	F	P	F	P
1.	<u>Administration Cost</u>	10%	-	-	13.48	-	18.198	-	18.198	-	17.524	-	67.4	-
A.	TA & DA, POL/Hiring of vehicles/ office and payment of electricity and Phone bill etc. computer, stationary and office consumable and contingency.													
B.	Monitoring	1%	-	-	1.348	-	1.348	-	1.348	-	2.696	-	6.74	-
C	Evaluation	1%	-	-	2.022	-	1.572	-	1.572	-	1.574	-	6.74	-
Sub Total		12%			16.85		21.118		21.118		21.974		80.88	
2.	<u>Preparatory Phases</u>	4%	26.96		-		-		-		-		26.96	-
A.	Entry Point Activities, like well repairing, Kisan vikash munch renovation of chabootra, school boundary, old well , brick lining channel etc.													
B.	Capacity Building	5%	-		13.48		5.055		5.055		10.11		33.70	-
C.	Preparation of DPR	1%	6.74		-		-		-		-		6.74	-
	Sub Total	10%	33.70		13.48		5.055		5.055		10.11		67.40	

3. Watershed works		50%	-	-	50.55	606.60	90.99	758.25	86.609	1039.30	108.851	3219.85	337.00	5624
A Soil & moisture conservation														
Construction of Bunds. (graded bund, contour bund, field Bund, Marzinal bund & Peripheral Bundh)														
B. Water Resources Development														
i. New and Renovation of existing Water Harvesting Structure/ Gully plug/Chak Dam/Ponds etc.														
ii. Drainage line treatment(Pucca structure/ Check Dam)														
C. Agroforestry														
i. Rainfed horticulture with fencing														
ii. Rainfed horticulture without fencing														
iii. Aforestation & development of Silvi_pastoral system														
Sub Total		50%	-	-	50.55	606.60	90.99	758.25	86.609	1039.30	108.851	3219.85	337.00	5624
4.	<u>Livelihood Activities</u>													
	Income generating Activities through SHGs for landless and Marginal formers (Diary, Goat farming, Bee keeping, Fruit processing ,General merchant shop & live stock development Activities)	10%	-	-	50.55		90.99		86.609		108.851		337.00	5624
	Sub Total	10%	-	-	50.55		90.99		86.609		108.851		337.00	5624
5.	<u>Production System & Micro enterprises</u>													
	Farming system approach, animal husbandry, horticulture, vegetables growing, Crop, Silvi Pasture etc	13%	-	-	6.74	-	26.96	-	33.70	-	20.22	-	87.62	-
	Sub Total	13%	-	-	6.74	-	26.96	-	33.70	-	20.22	-	87.62	-
6.	<u>Consolidation Phase</u>	5%	-	-	-	-	-	-	-	-	33.70	-	33.70	-
	Sub total	5%	-	-	-	-	-	-	-	-	33.70	-	33.70	-
Grand Total		100%	33.70		94.36	606.60	171.083	758.25	166.702	1039.30	208.155	3219.85	674.00	5624

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 come mainly from the fund generated .

USER CHARGES

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

SUSTAINABILITY AND ENVIRONMENT SECURITY

In the proposed watershed management plan of I.W.M.P.-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

The Economic analysis of horticulture plantation in agri-horticulture system at I.W.M.P.- 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 I.W.M.P.- 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.

RATIO OF COST AND PROFIT

Status Before Work

S. No.	Name of Cereal	Area in hectare	Production /Hect./Quintal	InvestCost/hect.	Rate/Quintal.	Net profit/hect.	Total Net profit.
1.	Paddy	2400.00	18.00	4000.00	800.00	10400.00	24960000.00
2.	Arhar	450.00	5.00	2300.00	3500.00	15200.00	6840000.00
3.	Maize	50.00	8.00	2600.00	900.00	4600.00	230000.00
4.	Wheat	3000.00	20.00	4200.00	1000.00	15800.00	47400000.00
5.	Mustard	120.00	8.00	2600.00	2000.00	13400.00	1608000.00
	Total	6020.00					81038000.00

Status After Work:

S. No.	Name of Cereal	Area in hectare	Production /Hect./Quintal	InvestCost/hect.	Rate/Quintal.	Net profit/hect.	Total Net profit.
1.	Paddy	2900.00	20.00	4000.00	800.00	12000.00	34800000.00
2.	Arhar	590.00	6.00	2300.00	3500.00	18700.00	11033000.00
3.	Maize	80.00	10.00	2600.00	900.00	6400.00	512000.00
4.	Wheat	3500.00	22.00	4200.00	1000.00	17800.00	62300000.00
5.	Mustard	180.00	12.00	2600.00	2000.00	21400.00	3852000.00
	Total	7250.00					112497000.00

Bhoomi Sanrakshan after the treatment of Land	–	112497000.00
Bhoomi Sanrakshan before the treatment of Land	-	81038000.00
Net Profit	-	31459000.00
Ratio of cost profit ratio	-	<u>112497000.00</u> = 1:1.38 81038000.00

The above ratio clearly indicated that the conservation of land is extremely profitable.

CHAPTER -9

EXPECTED OUTCOME

EMPLOYMENT

Employment has always been a problem in the village. The principal occupations of the people are agriculture, animal husbandry and casual labour work. Animal husbandry does not keep them engaged full time, Thus the people mainly depend upon casual labour, either in the village itself or outside it.

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

Labour migration in search of gainful employment is one of the major problems in the remote watershed in particular. Causal employment opportunities to the tune of more than 2.581 lacs will be generated during the implementation of the project activities. However, the changes in land use pattern and adoption of other subsidiary enterprises will generate employment opportunities for persons of 3.125 lacs in the watershed.

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	40	46200	-	75200	22200	143600	680	-	1127	-	1807	95	-	165	32	292

MIGRATION

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

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

Name of the Project	No. of persons migrating	No. of days per year of migration	Main reason for migration	Expected reduction in no. of persons migrating
I.W.M.P.- III	1500	280	Unemployment	630

AGRICULTURE

It is expected that after compilation of the project, the crop productivity of Rice-Wheat and Sugarcane will certainly enhance, It would be around Paddy (21.40 qt/ha),Wheat (24.10 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. N.	Names of the crop	Current status		Expected Post-Project Status	
		Area (ha)	Productivity (kg/ha)	Area(ha)	Productivity(kg /ha)
1	Kharif	2550	650	3200	760
	Bazra/Jowar				
2	Mustered/Pulses	2100	830	2700	900
	Maize/Wheat	2992	630	1300	750
3	Zaid/Other season	-	-	-	-

FOOD SUFFICIENCY

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

STATUS OF FOOD REQUIREMENT AND AVAILABILITY PER ANNUM IN WATERSHED

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

DRINKING WATER

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 μ . 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 6.0 to 7.0 metre. As a result of the watershed activities, it is expected that the quantity and quality of drinking water would be improve.

STATUS OF DRINKING WATER

S. N.	No. of the villages	Availability of drinking water (no. of months in a year)		Quality of drinking water	
		Pre-project	Expected Post-Project	Pre-project	Expected Post-Project
1	40	10 months	12 months	Smelly	Pure

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	40	Open wells	6.40	5.90	-

LIVESTOCK

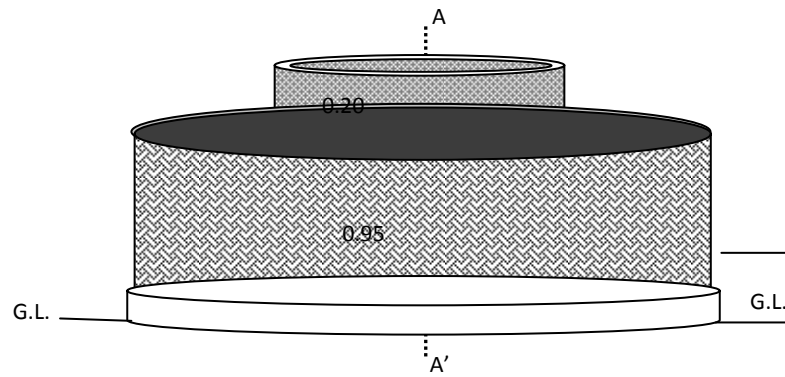
The village has quite a good of livestock population. These include cows, bullocks, buffaloes, goats. The interventions like provision of good quality cows and buffaloes, the establishment of a fodder bank and other such related activities would spur up the dairy development in the village. It is expected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

ABSTRACT OF EXPECTED /ESTIMATED OUTCOMES OF IWMP-III (2010-2011), GONDA

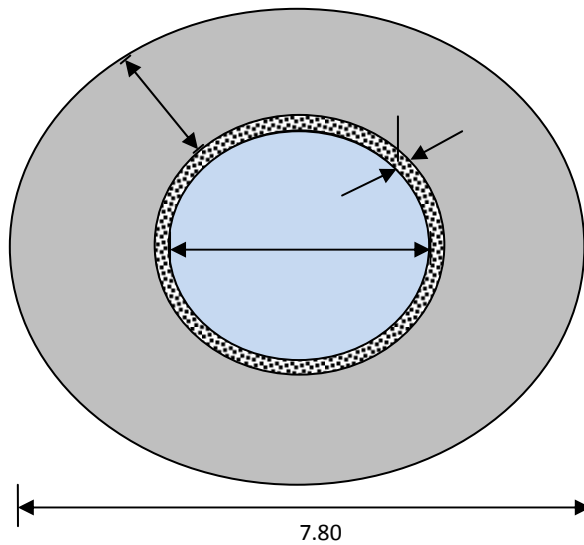
S.No.	Name of the Distict	Item	Unit of Measurement	Pre-project Status	Expected Post-project Status
1	Gonda	Status of water table	Meter	6.40	5.90
2		Ground water sturcture repaired/ rejuvenated	-	-	-
3		Quality of drinking water	-	Poor	Good
4		Availability of drinking water	Meter	10 months	12 Months
5		Increase in irrigation potential			
6		Change in cropping/land use pattern	-	Sugarcane, Paddy, Single	Double Cropping
7		Area under agriculture crop	Hector	7114	7500
8		i- Area under single crop	Hector	3829	4229
9		ii- Area under double crop	Hector	1914	2014
10		iii- Area under multiple crop	Hector	1915	2015
11		iv-Cropping Intensity	Hector	-	3%
12		Increase in area under vegetation	Hector	175	250
13		Increase in area under horticulture	Hector	165	300
14		Increase in area under fuel & fodder	Hector	3.50	9.0
15		Increase in milk production	%	3	4
16		No. of SHGs	No.	-	50
17		Increase in no. of livelihoods	No.	-	85
18		Migration	No.	750	450
19		SHG Federation formed	No.	26	30
20		Credit Linkage with banks	-	-	-

CHAPTER -10
COST NORMS & DESIGN OF STRUCTURE
PROPOSED

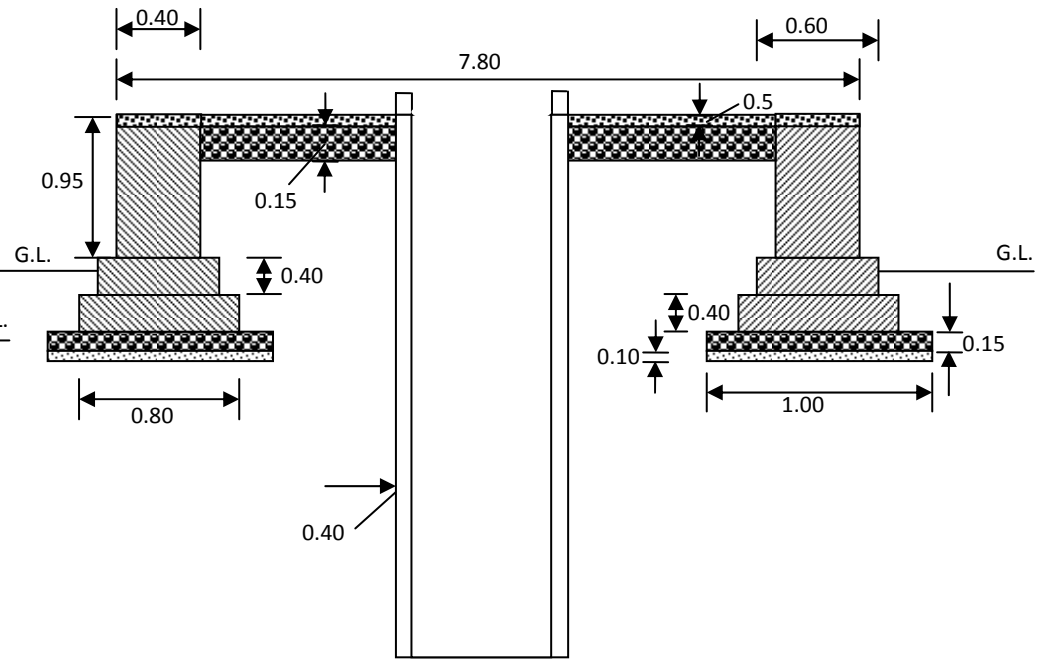
DRAWING OF WELL



ISOMETRIC VIEW OF WELL



PLAN



SECTION AT A-A'

DESCRIPTION

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

DETAIL ESTIMATE OF JAGAT OF WELL

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

CONSUMPTION OF MATERIALS

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

COST OF MATERIALS

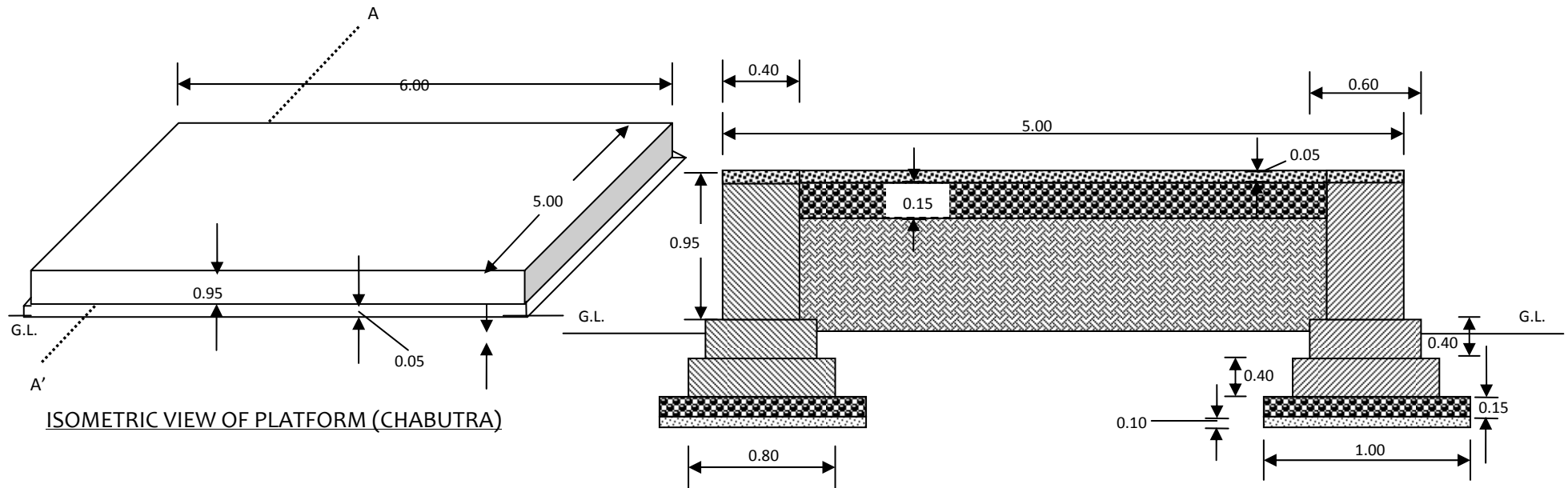
S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	91 Bags	285.00/bag	25935.00
2.	Coarse Sand	14.13 cum	2500.00/cum	35325.00
3.	Coarse	20.20 cum	950.00/cum	19190.00
4.	Brick Ballast 25-40 mm	7.01 cum	855/cum	5993.55
Total				Rs. 86443.00

LABOUR CHARGES

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

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

DRAWING OF PANCHAYATI CHABUTARA



ISOMETRIC VIEW OF PLATFORM (CHABUTRA)

SECTION AT A-A'

DESCRIPTION

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

DETAIL ESTIMATE OF WATERSHED VILLAGE CHABUTARA

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

	Long Wall					
	Short Wall	2	6.00	0.40	0.90	4.320
		2	4.20	0.40	0.90	3.024
Total						18.768 cum
5.	Earth work in filling	1	5.20	4.20	0.75	16.38 cum
6.	C.C.W. 1:4:8	1	5.20	4.20	0.15	3.276 cum
7.	C.C.W. 1:2:4	1	6.00	5.00	0.05	1.500 cum
8.	Raised Pointing 1:3					
	Long Wall	2	6.00	-	0.90	10.80
	Short Wall	2	5.00	-	0.90	9.00
Total						19.80 m²

ABSTRACT OF WORK

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

CONSUMPTION OF MATERIALS

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

COST OF MATERIALS

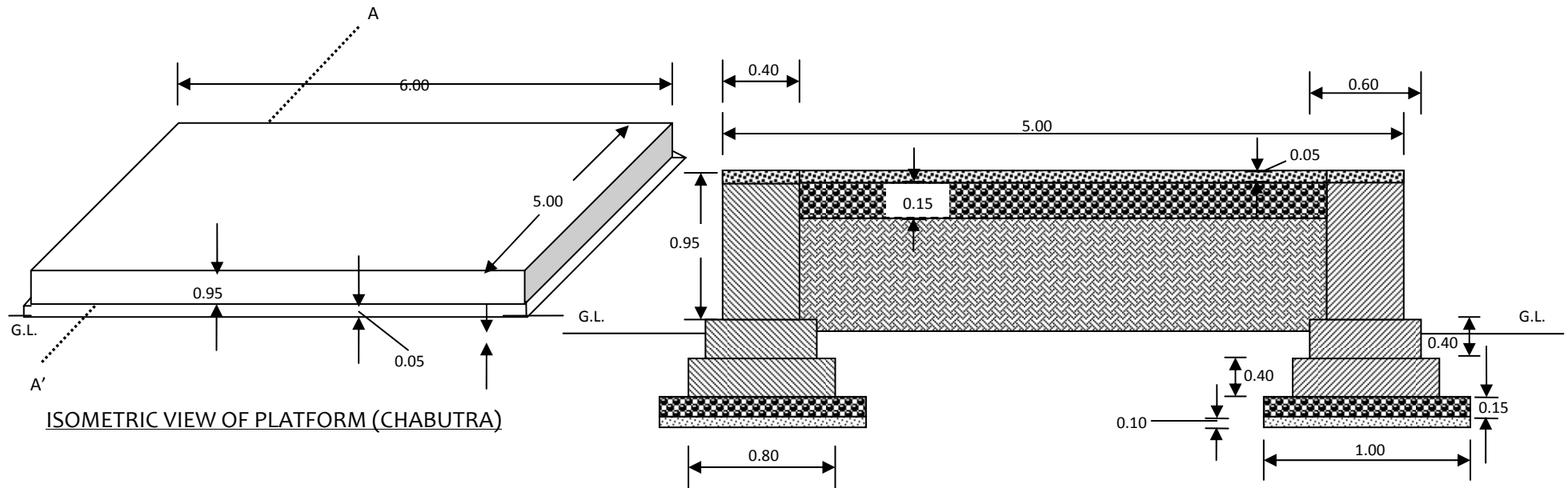
S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	77 Bags	285/Bag	21945.00
2.	Coarse Sand	12.00 cum	910.00/cum	10920.00
3.	Coarse	11.04 cum	950.00/cum	10490.40
4.	G.S.B. 25-40 mm	5.900 cum	855.00/cum	5044.00
5.	G.S. Grit 10-20 mm	1.280 cum	1250.00/cum	1600.00
Total				Rs. 50000.00

LABOUR CHARGES

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

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

DRAWING OF PANCHAYATI CHABUTARA



ISOMETRIC VIEW OF PLATFORM (CHABUTRA)

SECTION AT A-A'

DESCRIPTION

5. C.C.W. - 1:4:8.
6. Brick Work - 1:4
7. Plastering- 1:4
8. Raised Pointing- 1:3.

DETAIL ESTIMATE OF WATERSHED VILLAGE CHABUTARA

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

	Long Wall					
	Short Wall	2	6.00	0.40	0.90	4.320
		2	4.20	0.40	0.90	3.024
Total						18.768 cum
5.	Earth work in filling	1	5.20	4.20	0.75	16.38 cum
6.	C.C.W. 1:4:8	1	5.20	4.20	0.15	3.276 cum
7.	C.C.W. 1:2:4	1	6.00	5.00	0.05	1.500 cum
8.	Raised Pointing 1:3					
	Long Wall	2	6.00	-	0.90	10.80
	Short Wall	2	5.00	-	0.90	9.00
Total						19.80 m²

ABSTRACT OF WORK

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

CONSUMPTION OF MATERIALS

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

COST OF MATERIALS

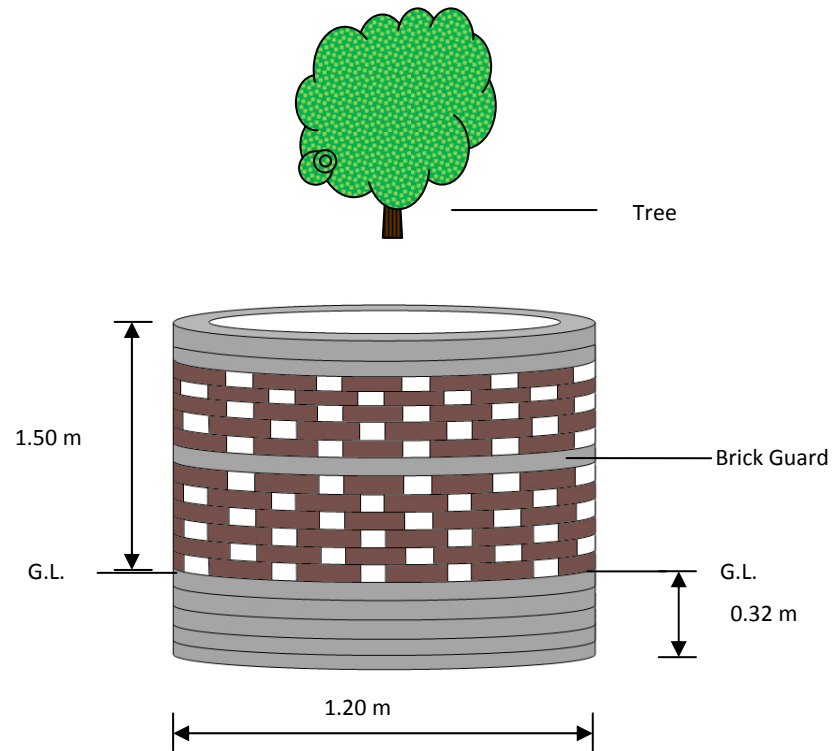
S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	77 Bags	285/Bag	21945.00
2.	Coarse Sand	12.00 cum	910.00/cum	10920.00
3.	Coarse	11.04 cum	950.00/cum	10490.40
4.	G.S.B. 25-40 mm	5.900 cum	855.00/cum	5044.00
5.	G.S. Grit 10-20 mm	1.280 cum	1250.00/cum	1600.00
Total				Rs. 50000.00

LABOUR CHARGES

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

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

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 m²	

CONSUMPTION OF MATERIALS

S.No.	Description of work	Quantity	Brick Nos.	Cement Bags	Coarse Sand
1.	Brick work 11 cm thick 1:4	0.211 cum	100	0.29	0.050
	Brick work glazed	0.362 cum	86	0.25	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 I st class	190 nos.	3650.00	693.50
2.	Cement	0.65 Bags	255.00	165.75
3.	Coarse sand	0.110 cum	910.00	100.10
Total				Rs. 959.35

LABOUR CHARGES

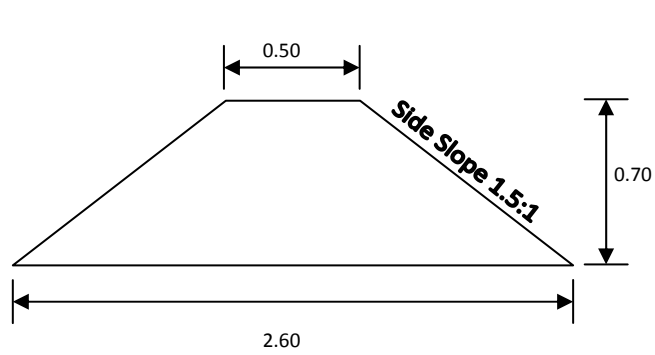
S.No.	Particulars	Quantity	Rate	Amount
1.	Earth work	0.421 cum	39.16/cum	16.48
2.	Brick work	0.391 cum	370.00/cum	144.67
3.	Plastering	1.068 m ²	40.00/m ²	42.72
Total				Rs. 203.87

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

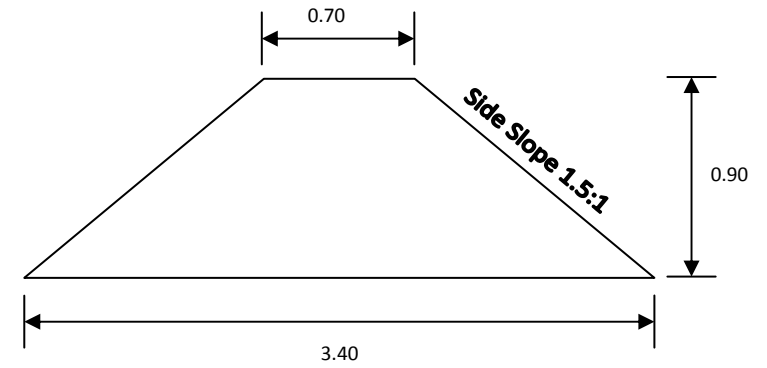
Total Expenditure		
1.	Material	2822.50
2.	Labour	1093.87
3.	Head load and transportation	1083.63
Total		Rs. 5000.00
Say Rs. 5000.00 only.		

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

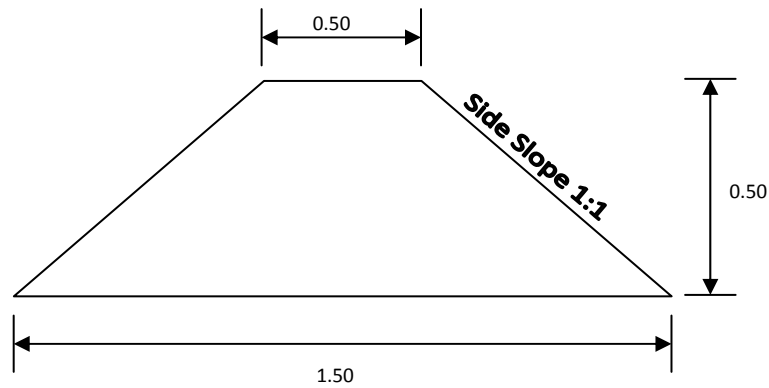
(Not to Scale)



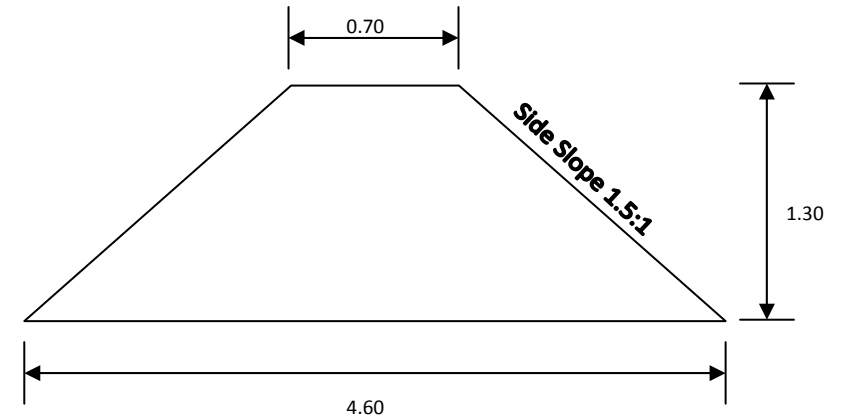
(C.B., Cross-Section – 1.085 m²)



(S.B., Cross-Section – 1.845m²)

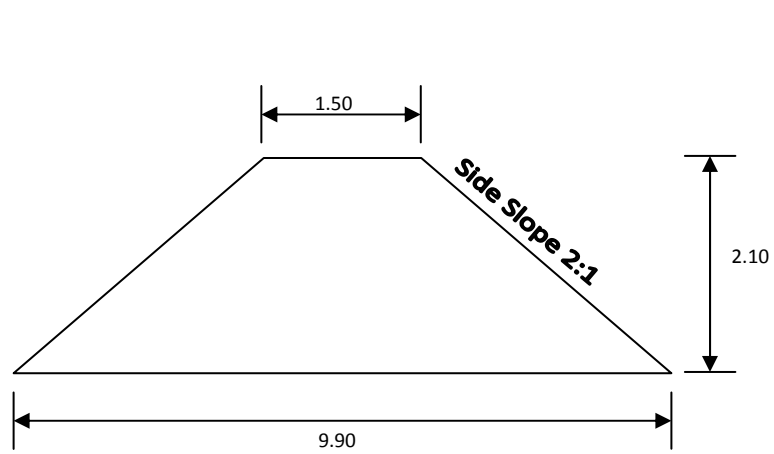


(Field Bund, Cross-Section – 0.50 m²)

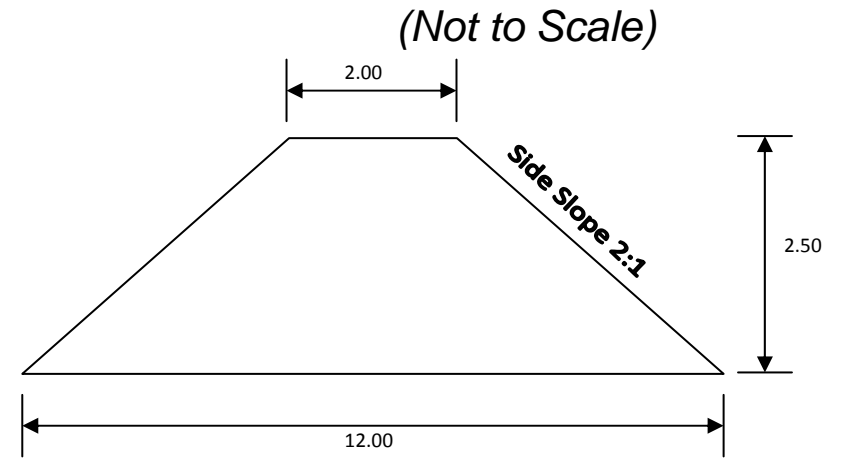


(S.B. /P.B. /M.B., Cross-Section – 3.445 m²)

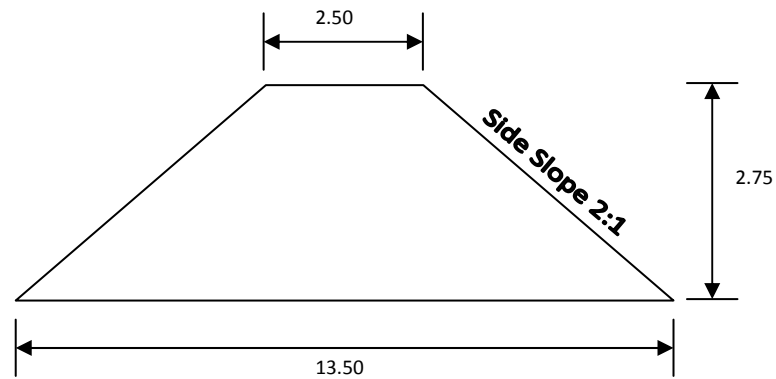
DRAWING OF EARTHEN CHEKDAM / GULLY PLUG



(C.D. /G.P., Cross-Section – 11.97 m²)



(C.D. /G.P., Cross-Section – 17.50 m²)



(W.H.B., Cross-Section – 22.00 m²)

DESIGN OF CONTOUR BUND

Type of Soil	-Loam, Sandy Loam	
Rain fall	-24 hr in cm -25 cm	
Field Slope -1%		
Vertical Interval (VI)	$= [s/3+2] \times 0.3$ $= [1/3+2] \times 0.3$ $= 0.70 \text{ m}$	
Horizontal Interval (HI)	$= 100 \times \text{V.I./s}$ $= 100 \times 0.7/1$	
Height of bund h	$= \sqrt{(\text{Re} \times \text{VI})/50}$ $= \sqrt{(25 \times 0.7)/50}$ $= \sqrt{0.35}$ $= 0.59$	Re=maximum rainfall in cm
Free board	=15% of height minimum -10 cm	
Height	$= 0.60 + 0.10$ $= 0.70 \text{ m}$	
Taking top width of bund 0.50 m and side slope 1.5:1		
Then base of Bund	$= 0.50 + (1.50 \text{ d}) \times 2$ $= 2.60 \text{ m}$	
Cross-Section of bund	$= (0.50 + 2.60) \times 0.70 / 2$ $= 1.085 \text{ m}^2$	
Length of bund	$= 100 \text{ s} / \text{V.I.}$ $= 100 \times 1 / 0.70$ $= 142.85 \text{ m/ha}$	
Earth work/ha	$= 150 \times 1.085$ $= 162.75 \text{ cum}$	
Cost Rs. / ha	$= 162.75 \times 39.16 = 6373.29$ $\text{Say } 6375.00$	

DESIGN OF SUBMERGENCE BUND

Types of soil – -Loam,Sandy Loam

Rainfall intensity for 24 hrs – 25cm

Field slope 3%

$$V.I. = [s/3+2] \times 0.30$$

$$= 0.90 \text{ m}$$

Horizontal Interval = $(100 \times V.I.) / s$

$$= (100 \times 0.90) / 3$$

$$= 30 \text{ m}$$

Height of bund $h = \sqrt{(Re \times V.I.) / 50}$

$$= \sqrt{(25 \times 0.90) / 50} = \sqrt{0.45} = 0.67 \text{ m. Say } \mathbf{0.70 \text{ m}}$$

Free board 20% of height minimum 20cm

Total Height

$$= 0.90 \text{ m}$$

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

Bottom of bund

$$= 0.70 + 2 \times 1.5d$$

$$= 0.70 + 2.70$$

$$= 3.40$$

Cross Section of Submergence Bund

$$= (0.70 + 3.40) \times 0.90 / 2$$

$$= 1.845 \text{ m}^2$$

Length of bund

$$= 100 \text{ s} / V.I.$$

$$= (100 \times 3) / 0.90$$

$$= 333 \text{ m}$$

Feasible length

$$100 + 25 + 25$$

$$= 150 \text{ m}$$

Earth work/ha

$$= 150 \times 1.845$$

$$= 276.75$$

Cost per ha

$$= 276.75 \times 39.16$$

$$= 10,837.53$$

$$\mathbf{\text{Say } 10,850=00}$$

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	= $(0.50+1.50) \times 0.50 / 2 = 0.50 \text{ m}^2$
Length per hectare	= 200 m
Earthwork	= $200 \times 0.50 = 100 \text{ cum}$
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	= $(0.70+4.60) \times 1.30 / 2$ = 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	= $(1.50 + 9.90) \times 2.10 / 2$ = 11.97 m ²
Cost per meter	= Rs. 551.45

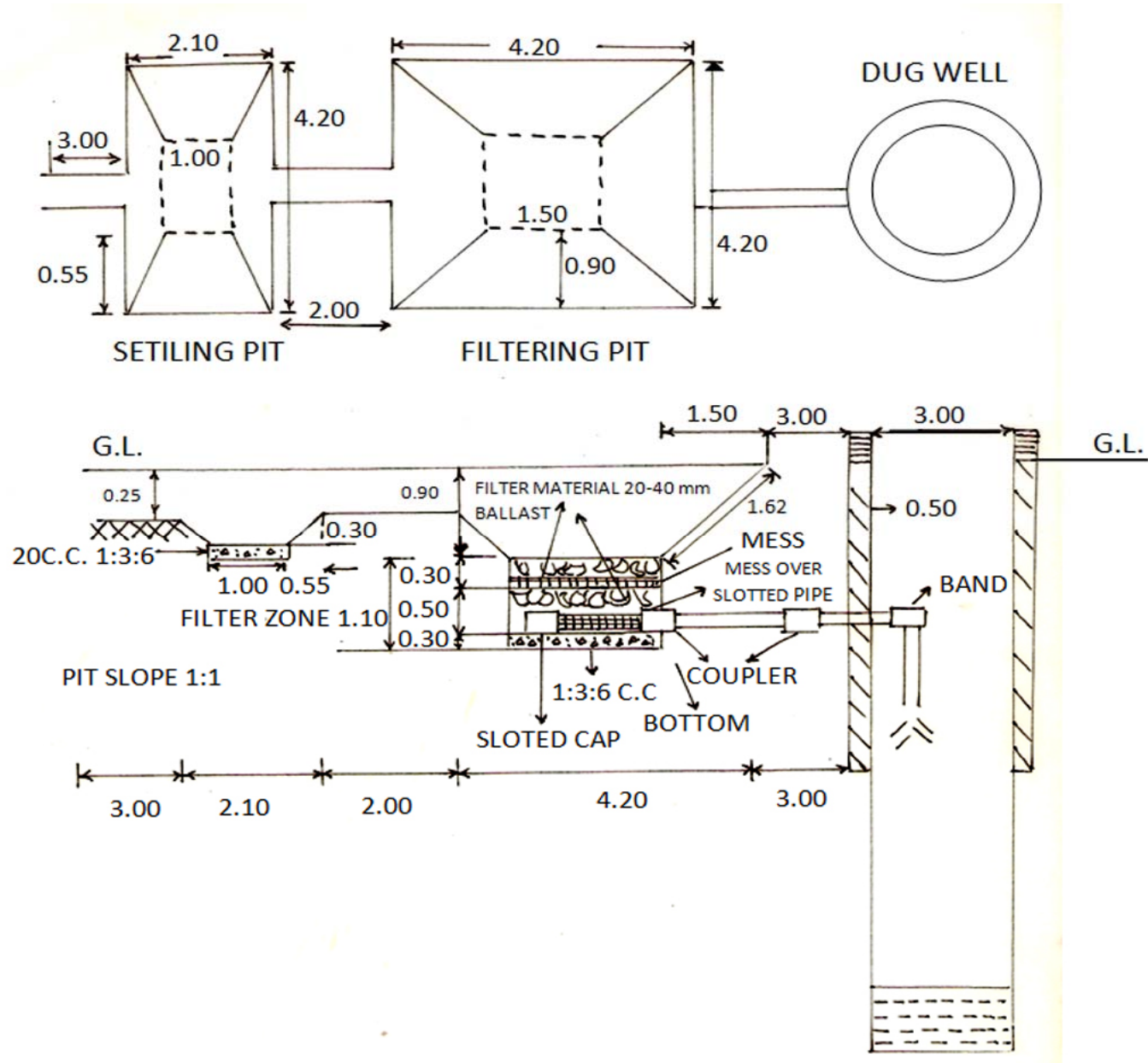
TYPICAL SECTION OF CHECK DAM / GULLY PLUG

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

TYPICAL SECTION OF W.H.B

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

DUG WELL RECHARGING STRUCTURE



ABSTRACT OF COST BRICK WORK JAGAT

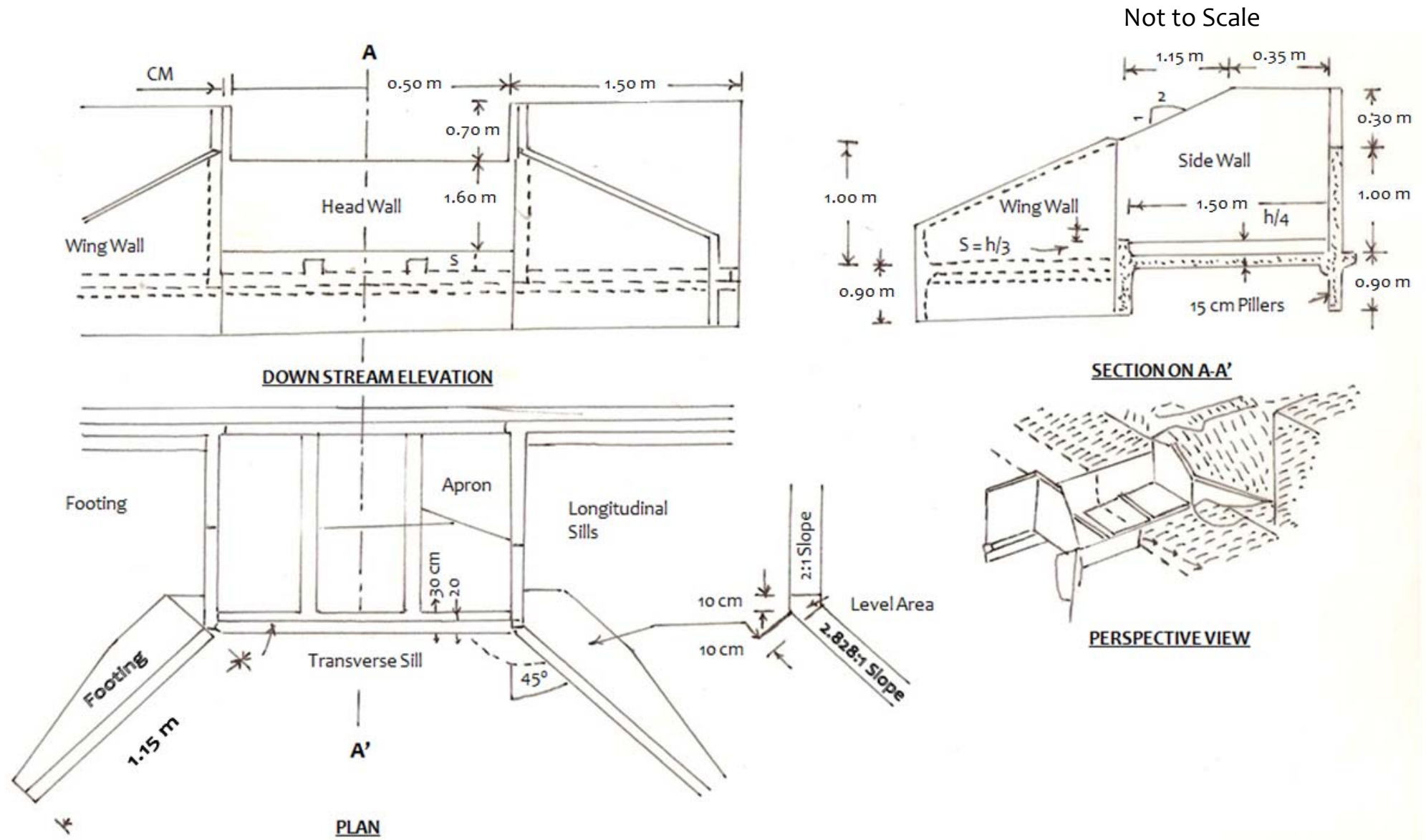
S.No.	Name of Work	Quantity	Unit	Rate	Amount
1.	Earth Work	25.84	M ³	36.36	947.29
2.	C.C.W. Work in 1:3:6	1.49	M ³	2766.00	4121.34
3.	Laying Brick Supply & fixing	1.16	M ³	4000.00	4640.00
4.	Plaster work in 1:2	9.00	M ³	81.98	737.80
5.	S/F of 110 mm P.V.C. pipe	6.00	R.M	150.00	900.00
6.	Slotted Cap 110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

DETAILS OF MEASUREMENT (DUG WELLS RECHARGING)

S.No.	Name of Work	No.	L B D/H	Unit	Quantity
1.	Earth work in excavation hard soil mixed with <i>kanker</i> gravel, etc. in foundation.				
a	Settling pit (i) Long Wall	4	0.65 x 1.75 x 0.10/2	M ³	0.09
		2	1.50 x 0.62 x 0.75	M ³	1.39
	(ii) Short Wall	4	0.55 x 0.75/2 x 0.10	M ³	0.08
		2	1.00 x 0.55 x 0.75	M ³	0.82
b	Filtering pit	8	1.85 x 1.00 x 1.00 x /2 x 0.10	M ³	1.19
		2	1.50 x 1.62 x 0.90	M ³	4.37
c	Drain-Filter zone	1	1.50 x 1.50 x 1.10	M ³	2.47
		1	7.10 x 0.75 x 0.25	M ³	1.86
d	Excavation for laying of P.V.C. pipe & filling after laying of P.V.C. pipe				
		1	4.35 x 2.00 x 0.80	M ³	6.96
		1	1.35 x 0.90 x 2.00/2	M ³	1.21
		1	3.00 x 2.00 x 0.90	M ³	5.40
	Total				25.84
2	C.C. in 1:3:6 settling pit	1	1.00 x 1.50 x 0.20	M ³	0.30
	Filtering pit filter zone	1	1.50 x 1.50 x 0.30	M ³	0.67
	Drain –Filter Zone	1	7.00 x 0.75 x 0.10	M ³	0.52
				M ³	1.49
3	Cut- Brick work 1:4				
a	Settling pit Long wall	4	1.05 x 0.55 x 0.10/2		0.11
		2	1.50 x 0.62 x 0.05		0.09
	Settling pit Short wall	4	0.55 x 0.55 x 0.10/2		0.06
		2	1.00 x 0.62 x 0.05		0.06
b	Filtering pit	8	1.85 x 1.62 x 0.05/2		0.60
		2	1.50 x 1.62 x 0.05		0.24

				M ³	1.16
4	Plaster work 1:2				
	Drain-Bottom	1	7.00 x 0.25	M ²	1.75
	Drain-Side	2	7.00 x 0.25	M ²	3.50
	Selting base	1	1.50 x 1.00	M ²	1.50
	Filtering base	1	1.50 x 1.50	M ²	2.25
	Total			M ²	9.00
5	Supply & Fixing of 110 mm P.V.C. Pipe	1	6.00	M	6.00
6	Slotted cap of 110 mm P.V.C.	1		No.	1.00
7	P.V.C. Bend 110 mm	1		No.	1.00
8	P.V.C. coupler 110 mm	1x2		No.	2.00
9	Mesh ss S/F between	1x2		Job	2.00
10	S/O Brick sign board	1		Job	1.00
11	Filter Material of 20-40 mm blast	1	1.50 x 1.50 x 0.80	M ³	1.80
12	Slotted pipe P.V.C. 110 mm	1	1 x 1	M	1.00

DRAWING OF SPILLWAY OF CREST LENGTH 0.5 m



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 $L = 0.50 \text{ m}$ (since width of gully is 1.00 m)

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

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

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

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

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

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

3. Structural design –

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

$$E = 3 \times 0.5 + 0.6 \quad \text{or} \quad 1.5 \times 0.50$$

$$E = 2.10 \text{ m} \quad \text{or} \quad 0.75 \text{ m}$$

Adopted 2.10 m

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

$$= 0.50 \times 2.74 = 1.37 \text{ m says } 1.40 \text{ m}$$

$$3\text{- Height of end sill, } S = \frac{h}{3} = \frac{0.50}{3} = 0.16 \text{ m says } 0.20 \text{ m}$$

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

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

$$= 2 \times 0.50 \text{ or } [0.50 + 0.50 + 0.16 - (1.37 + 0.10)/2]$$

$$= 1.0 \text{ or } [1.16 - 0.735]$$

$$= 1.0 \text{ or } 0.425$$

adopt $J = 1.00 \text{ m}$

$$\begin{aligned} 5- \quad M &= 2(f + 1.33h - J) = 2(0.50 + 1.33 \times 0.25 - 1.00) \\ &= 2 \times (-0.167) = -0.335 \text{ m} \end{aligned}$$

$$\begin{aligned} 6- \quad K &= (L_B + 0.1) - M = (1.37 + 0.1) - 0.335 \\ &= 1.47 - 0.335 \\ &= 1.135 \text{ m} \end{aligned}$$

Toe and cut off walls

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

$$\begin{aligned} \text{Maximum Scour depth (M S D)} &= 1.5 \times \text{N S D} \\ &= 1.5 \times 0.219 \\ &= 0.328 \text{ m} \\ &\text{says } 0.35 \text{ m} \end{aligned}$$

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

Apron thickness : For an over fall of 0.5 m. The Apron thickness in concrete construction is 0.20 m since the structure is constructed in masonry, the Apron thickness will be $0.20 \times 1.50 = 0.30$ 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 work1:4

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	4.70	0.80	0.45	1.692
		1	4.70	0.60	0.45	1.269
2	Head wall	1	0.50	1.10	0.45	0.247
		1	0.50	1.00	0.45	0.2250.180
		1	0.50	$(0.40 + 1.00) / 2$	0.60	
3	Head wall extension	2	2.10	0.80	0.45	1.512
		2	2.10	0.60	0.45	1.134
		2	2.10	0.60	0.60	1.512
		2	2.10	0.40	0.70	1.176
4	Side wall	2	1.50	1.00	0.45	1.350
		2	1.50	0.80	0.45	1.080
		2	1.50	0.80	0.60	1.440
		2	1.50	0.60	0.40	0.720
		2	$(0.35 + 1.50) / 2$	0.40	0.30	0.222
5	Wing wall	2	1.15	0.80	0.45	0.828
		2	1.15	0.60	0.45	0.621
		2	1.15	0.40	$(1.00 + 0) / 2$	0.460
6	Toe wall	1	0.50	0.80	0.45	0.180
		1	0.50	0.60	0.45	0.135

		1	0.50	0.40	0.20	0.040
7	Apron	1	0.50	1.50	0.45	0.337
Total						16.360 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	0.35	0.40	0.025	0.007
		2	1.18	0.40	0.025	0.023
3	Head wall extension	2	2.10	0.40	0.025	0.042
4	Wing wall	2	1.52	0.40	0.025	0.030
5	Toe Wall	1	0.50	0.40	0.025	0.005
6	Apron	1	0.50	1.50	0.025	0.018
Total						0.130 cum

6. Raised Pointing 1:3

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

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Coarse Sand (cum)	Brick (cum)	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.	R/R Brick Masonry	16.360 cum	39.26	5.562	16.36	-	-
4.	C.C.W. 1:2:4	0.130 cum	0.79	0.054	-	-	0.110
5.	Raised Pointing 1:3	9.62 m ²	0.44	0.045	-	-	-
Total			46.90	7.327	16.36	1.342	0.110
Say			47 Bags				

COST OF MATERIALS

S.No	Name of materials	Quantity	Rate	Amount
1.	Cement	47 Bags	285.00/bag	13395.00
2.	Coarse sand	7.327 cum	2500.00/cum	18317.50
3.	Brick	16.36 cum	1025.00/cum	16769.00
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. 49766.41

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 Work	16.36 cum	370/cum	6053.20
5.	C.C.W. 1:2:4	0.130 cum	494/cum	64.22
6.	Raised 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. 12,548.75

Total Expenditure	
1. Cost of materials	49766.48
2. Labour Charges	12548.75
Total	Rs. 62314.00
Say Rs. 62314.00 only	

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:

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

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 $L = 1.0 \text{ m}$ (since width of gully is 2.00 m)

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

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

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

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

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

$E = 3 \times 0.50 + 0.6$ or 1.5×1

$E = (1.5 + 0.60)$ or 1.50
 $= 2.10$ or 1.50

Adopted = 2.10 m

2- Length of apron basin $L_B = f(2.28 h/f + 0.54) = 1(2.28 \times \frac{0.50}{1.00} + 0.54)$

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 :

$$\begin{aligned}
 J &= 2h \text{ or } [f + h + S - (L_B + 0.10)/2] \text{ whichever is greater} \\
 &= 2 \times 0.50 \text{ or } [1.0 + 0.50 + 0.16 - (1.68 + 0.10)/2] \\
 &= 1.0 \text{ or } [1.66 - 0.89] \\
 &= 1.00 \text{ or } 0.77
 \end{aligned}$$

adopt $J = 1.00 \text{ m}$

$$\begin{aligned}
 5- \quad M &= 2(f + 1.33h - J) = 2(1.0 + 1.33 \times 0.50 - 1.00) = 2(1.665 - 1.00) \\
 &= 1.33 \text{ m}
 \end{aligned}$$

$$\begin{aligned}
 6- \quad K &= (L_B + 0.1) - M = (1.68 + 0.1) - 1.33 \\
 &= 0.45 \text{ m}
 \end{aligned}$$

Toe and cut off walls

$$\begin{aligned}
 \text{Normal scour depth (N S D)} &= 0.473 \times (Q/f)^{1/3} \\
 &= 0.473 \times (0.5/1.0)^{1/3} \quad \text{taking } f = 1 \\
 &= 0.473 \times (0.5)^{1/3} = 0.473 \times 0.793 = 0.375 \text{ m}
 \end{aligned}$$

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

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 $0.30 \times 1.50 = 0.45$ 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	1.00
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. R/R 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. Raised 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)	Coarse (cum)	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 Work	17.145 cum	41.14	5.829	17.145	-	-
4	C.C.W. 1:2:4	0.166 cum	1.01	0.069	-	-	0.141
5	Raised Pointing 1:3	12.13 m ²	0.55	0.057	-	-	-
	Total		52.65	8.508	17.145	1.947	0.141
	Say		53 Bags	8.51 cum	17.15 cum	1.95 cum	0.14 cum

COST OF MATERIALS

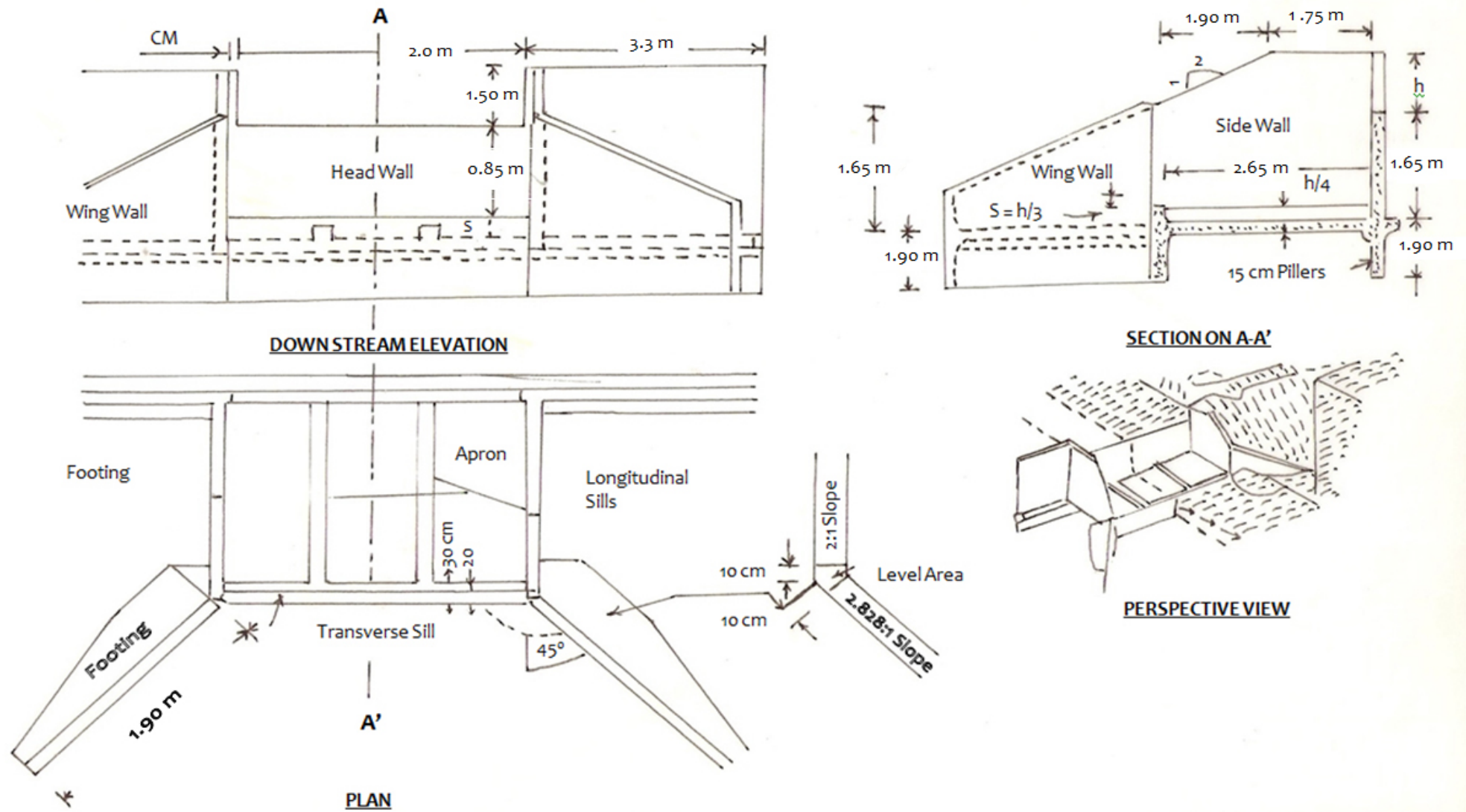
S.No	Name of materials	Quantity	Rate	Amount
1	Cement	53 Bags	285.00	15105.00
2	Course sand	8.51 cum	2500.00	21275.10
3	Coarse	17.51 cum	1025.00	17578.75
4	G.S.B. 25-40 mm	1.95 cum	855.00	1667.25
5	G.S.Grit 10-20 mm	0.14 cum	1250.00	175.00
Total				Rs. 55800.40

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 Work	17.145 cum	370/ cum	6343.65
6.	Raised 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. 13,841.85

Total Expenditure	
1. Cost of Materials	55800.00
2. Labour Charges	13841.85
Total	Rs. 69641.85
Say Rs. 69650.00	

DRAWING OF SPILLWAY OF CREST LENGTH 2.0 m



Not to Scale

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:

$$Q = \frac{C.I.A.}{360} = \frac{0.3 \times 120 \times 20.0}{360} = 2.0 \text{ m}^3/\text{second}$$

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 gully is 3.00 m)

$$2.00 = \frac{1.711 L H^{3/2}}{(1.1+0.1 \times 0.5)} = \frac{1.711 L H^{3/2}}{(1.10 + 1.15)}$$

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

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

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

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

$$0.75$$

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

$$1.50$$

Hence the designed hydraulic dimensions of the Spillway are:

$$\text{Crest Length (L)} = 2.00 \text{ m}$$

$$\text{Weir depth (h)} = 0.81 \text{ m}$$

3. Structural design –

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

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

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

Adopted 3.03 m

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

$$1.5$$

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

3- Height of end sill , $S = \frac{h}{3} = \frac{0.81}{3} = 0.27 \text{ m}$

$$3 \quad 3$$

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

$$\begin{aligned} J &= 2h \text{ or } [f + h + S - (L_B + 0.10)/2] \text{ whichever is greater} \\ &= 2 \times 0.81 \text{ or } [1.50 + 0.81 + 0.27 - (2.61 + 0.10)/2] \\ &= 1.62 \text{ or } [2.58 - 1.35] \\ &= 1.62 \text{ or } 0.123 \end{aligned}$$

adopt $J = 1.62 \text{ m}$

$$\begin{aligned} 5- \quad M &= 2(f + 1.33h - J) = 2(1.50 + 1.33 \times 0.81 - 1.62) \\ &= 1.90 \text{ m} \end{aligned}$$

$$\begin{aligned} 6- \quad K &= (L_B + 0.1) - M = (2.61 + 0.1) - 1.90 \\ &= 0.81 \text{ m} \end{aligned}$$

Toe and cut off walls

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

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

$$\text{Depth of cutoff /Toe wall} = 0.89 \text{ m}$$

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 $0.30 \times 1.50 = 0.45$ 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 work1:4

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. Raised 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	2.65	-	1.65	4.37
		1	$(0.80 + 2.65) / 2$	-	0.70	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)	Coarse (cum)	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 Work 1:4	51.806 cum	124.33	17.614	51.806	-	-
4.	C.C.W. 1:2:4	0.294 cum	1.79	0.123	-	-	0.249
5.	Raised Pointing 1:3	22.84 m ²	1.05	0.107	-	-	-
Total			144.10	22.243	51.806	3.545	0.249
Say			144 Bags	22.243 cum	51.80 cum	3.55 cum	0.250 cum

COST OF MATERIALS

S.No	Name of materials	Quantity	Rate	Amount
1.	Cement	144 Bags	285.00/bag	41040.00
2.	Coarse sand	22.243 cum	2500.00/cum	55607.50
3.	Brick	51.80 cum	1025.00/cum	53095.00
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. 153090.00

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 Work	51.806 cum	370/cum	19168.22
6.	Raised Pointing	22.84 m ²	51.61/m ²	1178.77
7.	Curing	51.806 cum	25.00/cum	1295.15
8.	Chowkidar	13 Man Days	100.00/Man Day	1300.00
9.	Head load & local transportation cost 10% cost of material	-	-	11340.03
Total				Rs. 37,888.66
Total Expenditure				
1. Cost of materials		113403.88		
2. Labour Charges		37888.66		
Total		Rs. 1,51,292.54		
Say Rs. 1,51,300.00 only				

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:

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

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 $L = 3.0 \text{ m}$ (since width of gulley is 4.00 m)

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

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

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

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

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

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

Hence the designed hydraulic dimensions of the Spillway are:

$$\text{Crest Length (L)} = 3.00 \text{ m}$$

$$\text{Weir depth (h)} = 0.80 \text{ m}$$

3. Structural design –

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

$$E = 3 \times 0.80 + 0.6 \quad \text{or} \quad 1.5 \times 1.50$$

$$E = 3.0 \text{ m} \quad \text{or} \quad 2.25 \text{ m}$$

$$\text{Head wall extension} = 3.0 \text{ m}$$

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

$$1.5$$

$$= 1.50(1.216 + 0.54) = 1.5 \times 1.756$$

$$= 2.634 \text{ m says } 2.63 \text{ m}$$

3- Height of end sill, $S = \frac{h}{3} = \frac{0.80}{3} = 0.26 \text{ m}$

$$\frac{3}{3}$$

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

$$\begin{aligned}
 J &= 2h \text{ or } [f + h + S - (L_B + 0.10)/2] \text{ whichever is greater} \\
 &= 2 \times 0.80 \text{ or } [1.50 + 0.80 + 0.26 - (2.63 + 0.10)/2] \\
 &= 1.6 \text{ or } [2.56 - 1.365] \\
 &= 1.6 \text{ or } 1.195
 \end{aligned}$$

adopt $J = 1.60 \text{ m}$

$$\begin{aligned}
 5- \quad M &= 2(f + 1.33h - J) = 2(1.50 + 1.33 \times 0.80 - 1.60) = 2(2.564 - 1.60) \\
 &= 1.928 \text{ m}
 \end{aligned}$$

$$\begin{aligned}
 6- \quad K &= (L_B + 0.1) - M = (2.63 + 0.1) - 1.93 \\
 &= 0.80 \text{ m}
 \end{aligned}$$

Toe and cut off walls

$$\begin{aligned}
 \text{Normal scour depth (N S D)} &= 0.473 \times (Q/f)^{1/3} \\
 &= 0.473 \times (3/1)^{1/3} \\
 &= 0.473 \times 1.442 \\
 &= 0.68 \text{ m}
 \end{aligned}$$

$$\begin{aligned}
 \text{Maximum Scour depth (M S D)} &= 1.5 \times \text{N S D} \\
 &= 1.5 \times 0.68 \\
 &= 1.02 \text{ m}
 \end{aligned}$$

$$\text{Depth of cutoff /Toe wall} = 1.02 \text{ m}$$

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 $0.30 \times 1.50 = 0.45 \text{ m}$

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 work 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. Raised 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 (cum)	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	S/M 1:4	53.689 cum	128.85	18.254	53.689	-	-
5	Raised Pointing 1:3	39.86 m ²	1.83	0.187	-	-	-
Total			153.71	23.910	53.689	4.258	0.374
Say			154	23.910	53.68	4.26	0.374

COST OF MATERIALS

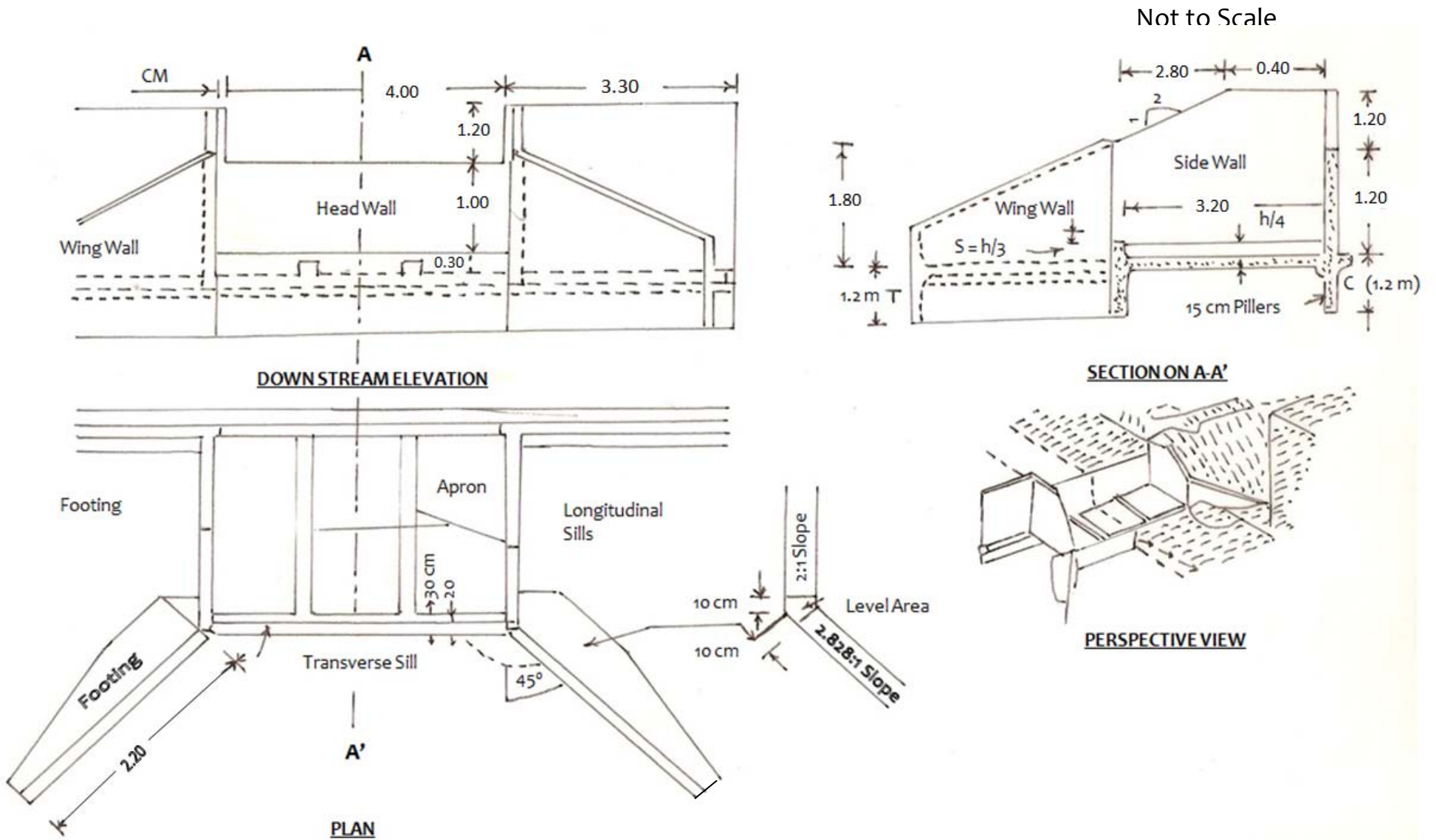
S.No	Name of materials	Quantity	Rate	Amount
1	Cement	154 Bags	285.00	43890.00
2	Coarse sand	23.91	2500.00	59775.00
3	Brick	53.68	950.00	50996.00
4	G.S.B. 25-40 mm	4.26	855.00	3633.75
5	Grit 10-20 mm	0.374	1250.00	467.50
Total				162788.00

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.	S/M 1:4	53.689 cum	370/cum	19864.93
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	-	-	12074.53
Total				Rs. 40504.22

Total Expenditure	
1. Cost of materials	120745.35
2. Labour Charges	40504.22
Total	Rs. 1,61,735.57
Say Rs. 1,61,735.00 only	

DRAWING OF SPILLWAY OF CREST LENGTH 4.0 m



DESIGN OF DROP SPILLWAY FOR 50.00 HA CATCHMENT AREA

Design of Drop Spillway to be constructed at a place in a gully having width of 5.0 m and catchment area 50.00 ha and net drop 2.0m 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:

$$Q = \frac{C.I.A.}{360} = \frac{0.3 \times 120 \times 50}{360} = 5.00 m^3/second$$

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 land L and H

Let us assume L = 4.0 m (since width of gully is 5.0 m)

$$5 = \frac{1.711 \times 4.0 \times h^{3/2}}{(1.10 + 0.01 \times 2)}$$

$$h^{3/2} = \frac{5.0 \times 1.12}{6.844} = \frac{5.60}{6.844} = 0.818$$

$$h = (0.818)^{2/3} = 0.874 \text{ m says } 0.90 \text{ m.}$$

Test: $L/h = 4/0.9 = 4.44 \geq 2.0$ hence, O.K.

$h/f = 0.9/2.0 = 0.45 \leq 0.5$ hence, O.K

Hence the designed hydraulic dimensions of the Spillway are:

$$\text{Crest Length (L)} = 4.0 \text{ m}$$

$$\text{Weir depth (h)} = 0.90 \text{ m}$$

3. Structural design –

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

$$E = 3 \times 0.9 + 0.6 = 3.3 \text{ or } 1.5 \times 2 = 3.00 \text{ m}$$

$$E = 3.30 \text{ m}$$

2- Length of apron basin $L_B = f(2.28 h/f + 0.54) = 2(2.20 \times 0.9/2.0 + 0.54)$

$$= 2(0.99 + 0.54) = 2 \times 1.53 = 3.06 \text{ m Says } 3.10$$

3- Height of end sill, $S = \frac{h}{3} = 0.9/3 = 0.3 \text{ m}$

3

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

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

$$= 2 \times 0.9 \text{ or } [2 + 0.9 + 0.30 - (3.06 + 0.10)/2]$$

$$= 1.8 \text{ or } [3.20 - 1.58]$$

$$= 1.8 \text{ or } 1.62 \text{ hence adopt } J = 1.8 \text{ m}$$

5- $M = 2(f + 1.33 h - J) = 2(2 + 1.33 \times 0.9 - 1.8)$

$$= 2 \times 1.397 = 2.794 \text{ Says } 2.80 \text{ m}$$

6- $K = (L_B + 0.1) - M = (3.06 + 0.1) - 2.80$

$$= 0.36 \text{ m}$$

Toe and cut off walls

$$\begin{aligned} \text{Normal scour depth (N S D)} &= 0.473 \times (Q/f)^{1/3} \\ &= 0.473 \times (5/1)^{1/3} \\ &= 0.473 \times 1.7099 \\ &= 0.808 \end{aligned}$$

$$\begin{aligned} \text{Maximum Scour depth (M S D)} &= 1.5 \times \text{N S D} \\ &= 1.5 \times 0.808 \\ &= 1.212 \text{ says } 1.21 \text{ m} \end{aligned}$$

$$\text{Depth of cutoff /Toe wall} = 1.21 \text{ m}$$

Apron Thickness : For an over fall of 2.0 m in concrete construction is 0.3 m, since the structure is constructed in masonry , the Apron thickness will be $1.5 \times 0.30 = 0.45 \text{ m}$

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 4.00 METRE

1. Earth work in cutting in foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	3.20	1.20	1.15	8.32
2	Head wall	1	4.00	1.60	1.15	7.36
3	Head wall extension	2	3.30	1.00	1.15	7.59
4	Wing wall	2	2.20	1.00	1.15	5.06
5	Toe wall	1	4.00	1.00	1.15	4.60
6	Cut off wall	1	10.60	1.00	1.15	12.19
7	Apron	1	4.00	3.20	0.70	8.96
Total						54.08 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	3.20	1.20	0.10	0.768
2.	Cut off wall	1	10.60	0.90	0.10	0.954
3.	Head wall	1	4.00	0.60	0.10	0.240
4.	Head Wall Extension	2	3.30	0.40	0.10	0.264
5.	Wing wall	2	2.20	0.90	0.10	0.396

6.	Toe wall	1	4.00	0.90	0.10	0.360
7.	Apron	1	4.00	3.20	0.10	1.280
Total						4.262 cum

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

S.No.	Description of work	No.	L	B	D/H	Quantity
1.	Side Wall	2	3.20	1.20	0.15	1.152
2.	Cut-off Wall	1	10.60	0.90	0.15	1.431
3.	Head Wall	1	4.00	0.60	0.15	0.360
4.	Head Wall Extension	2	3.30	0.40	0.15	0.396
5.	Wing Wall	2	2.20	0.90	0.15	0.594
6.	Toe Wall	1	4.00	0.90	0.15	0.540
7.	Apron	1	4.00	3.20	0.15	1.920
Total						6.393 cum

4. Brick work1:4

S.No.	Description of work	No.	L	B	D/H	Quantity
1.	Cut off wall	1	10.60	0.90	0.90	8.586
2.	Head wall	1	4.00	1.40	0.90	5.040
		1	4.00	$(0.50 + 1.40) / 2$	1.00	3.800

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	1.20	3.168
4.	Side wall	2	3.20	1.20	0.45	3.456
		2	3.20	1.00	0.45	2.790
		2	3.20	0.80	0.60	3.072
		2	3.20	0.60	0.60	2.304
		2	3.20	0.50	0.60	1.920
		2	$(0.40 + 3.20) / 2$	0.40	0.60	0.768
5.	Wing wall	2	2.20	0.80	0.45	1.584
		2	2.20	0.60	0.45	1.188
		2	2.20	0.50	$(1.80 + 0) / 2$	1.980
6.	Toe wall	1	4.00	0.80	0.60	1.920
		1	4.00	0.60	0.60	1.440
		1	4.00	0.40	0.30	0.480
7.	Longitudinal sill	2	3.20	0.20	0.30	0.384
8.	Apron	1	4.00	3.20	0.45	5.760
Total						59.045 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	4.00	0.50	0.025	0.050
2.	Side wall	2	0.40	0.40	0.025	0.008
		2	2.86	0.40	0.025	0.057
3.	Head wall extension	2	3.30	0.40	0.025	0.066
4.	Wing wall	2	2.84	0.50	0.025	0.071
5.	Longitudinal sill	2	3.20	0.20	0.025	0.032
6.	Apron	3	3.20	1.20	0.025	0.192
7.	Toe Wall	1	4.00	0.40	0.025	0.040
Total						0.445 cum

6. Raised Pointing 1:3

S.No.	Description of work	No.	L	B	D/H	Quantity
1.	Head wall	1	4.00	-	1.00	4.00
		1	4.00	-	1.72	6.88
2.	Side wall	2	3.20	-	1.80	11.52
		2	$(0.40 + 3.20) / 2$	-	0.60	2.16
3.	Head wall extension	2	3.30	-	1.00	6.60
4.	Wing wall	2	2.20	-	$(1.80 + 0) / 2$	3.96
Total						35.12 m ²

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Coarse Sand (cum)	Coarse (cum)	G.S.B 25-40 mm (cum)	G.S. Grit 10-20 mm (cum)
1.	Sand laying	4.262 cum	-	4.262	-	-	-
2.	C.C.W. 1:3:6	6.393 cum	27.48	2.876	-	5.75	-
3.	C.C.W. 1:2:4	0.445 cum	2.71	0.186	-	-	0.378
4.	Brick work 1:4	59.045 cum	141.70	20.075	59.045	-	-
5.	Raised Pointing 1:3	35.120 m ²	1.61	0.165	-	-	-
Total			193.50	27.5640	59.045	5.75	0.378
Say			194 Bags	27.5640 cum	59.04 cum	5.75 cum	0.38 cum

COST OF MATERIALS

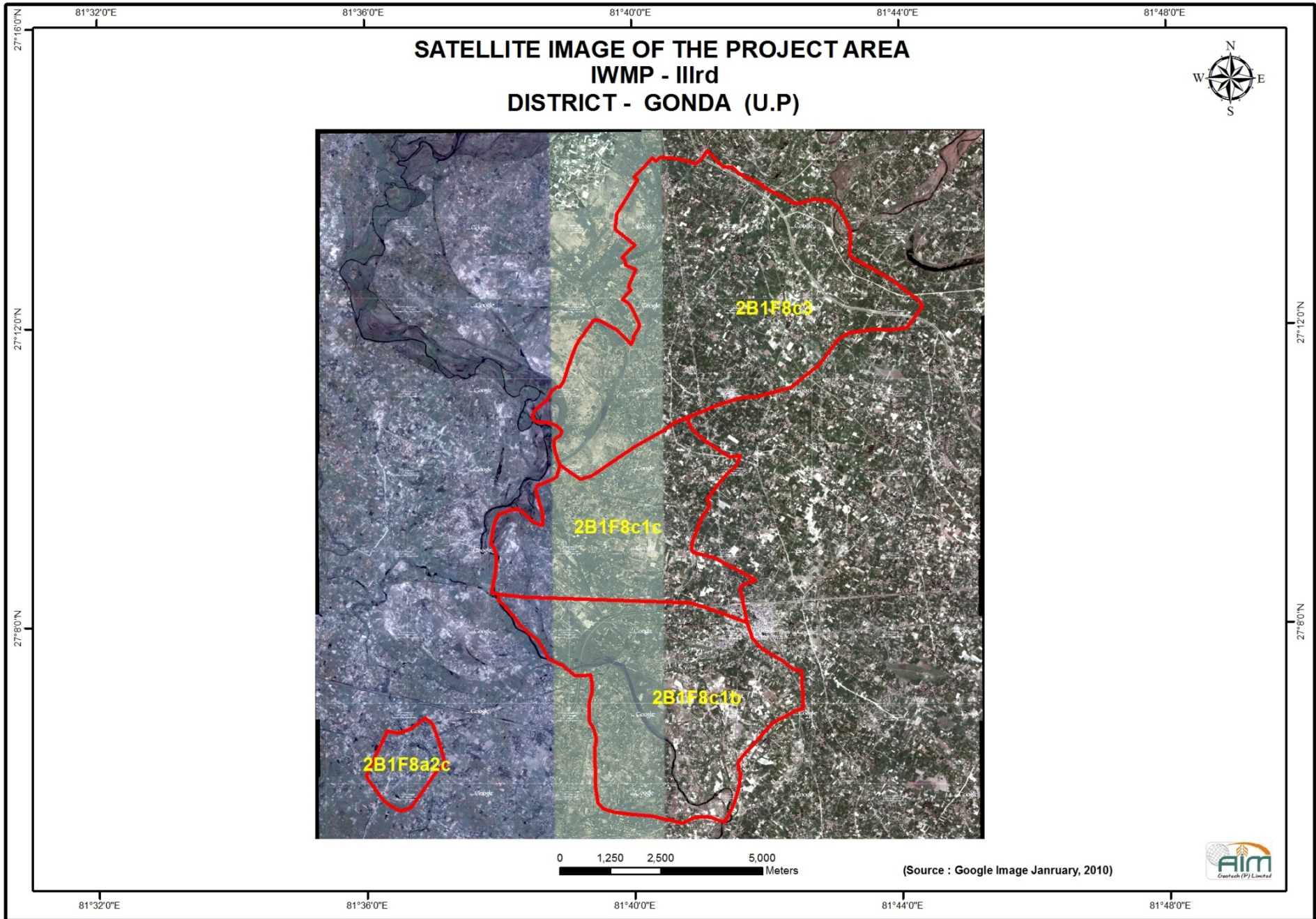
S.No	Name of materials	Quantity	Rate	Amount
1.	Cement	194 Bags	285.00/bag	55290.00
2.	Coarse sand	27.564 cum	2550.00/cum	68910.00
3.	Brick	59.04 cum	1025.00/cum	60516.00
4.	G.S.B. 25-40 mm	5.75 cum	855.00/cum	4916.25
5.	G.S.Grit 10-20 mm	0.38 cum	1250.00/cum	475.00
Total				Rs. 190107.25

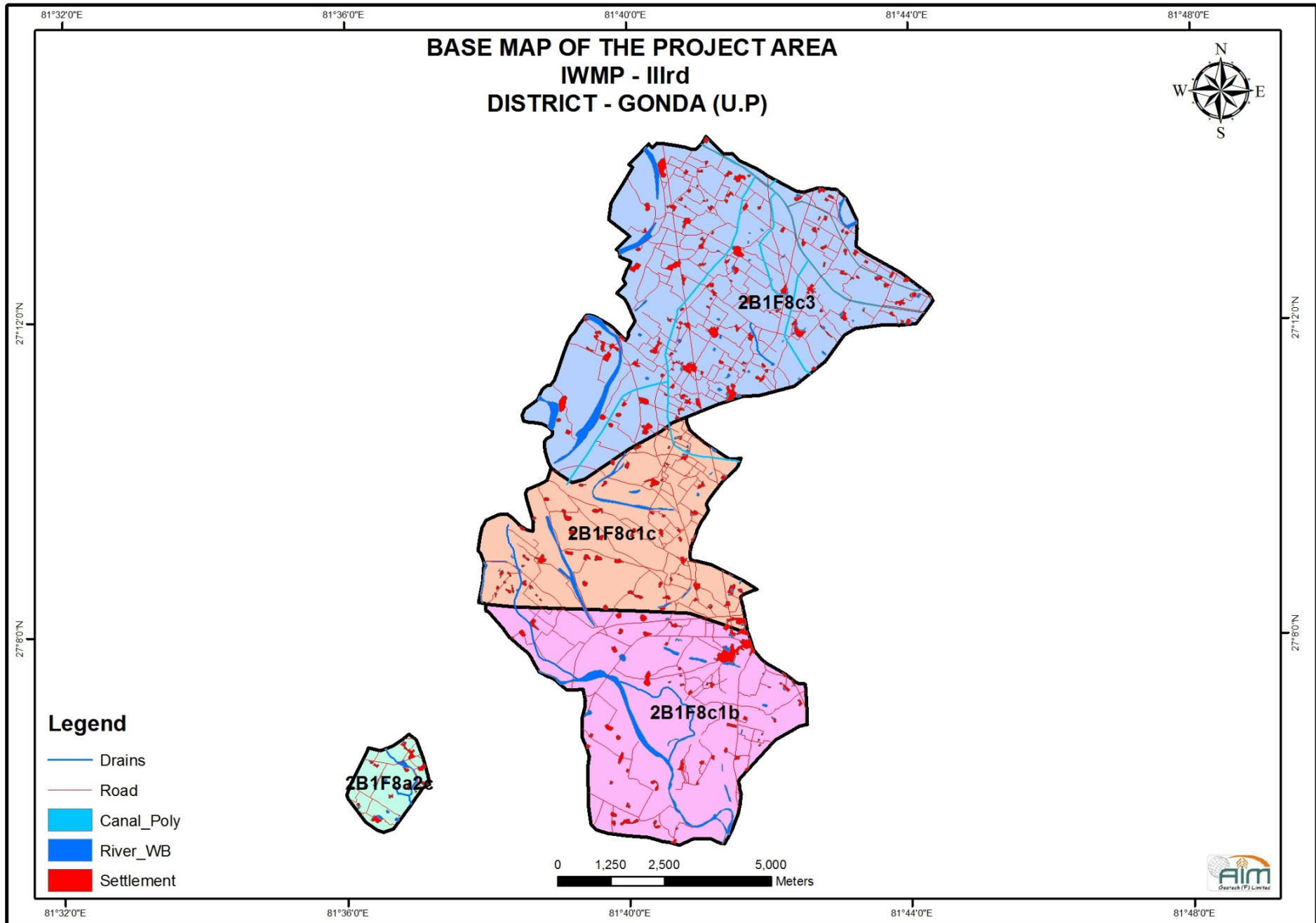
LABOUR CHARGE

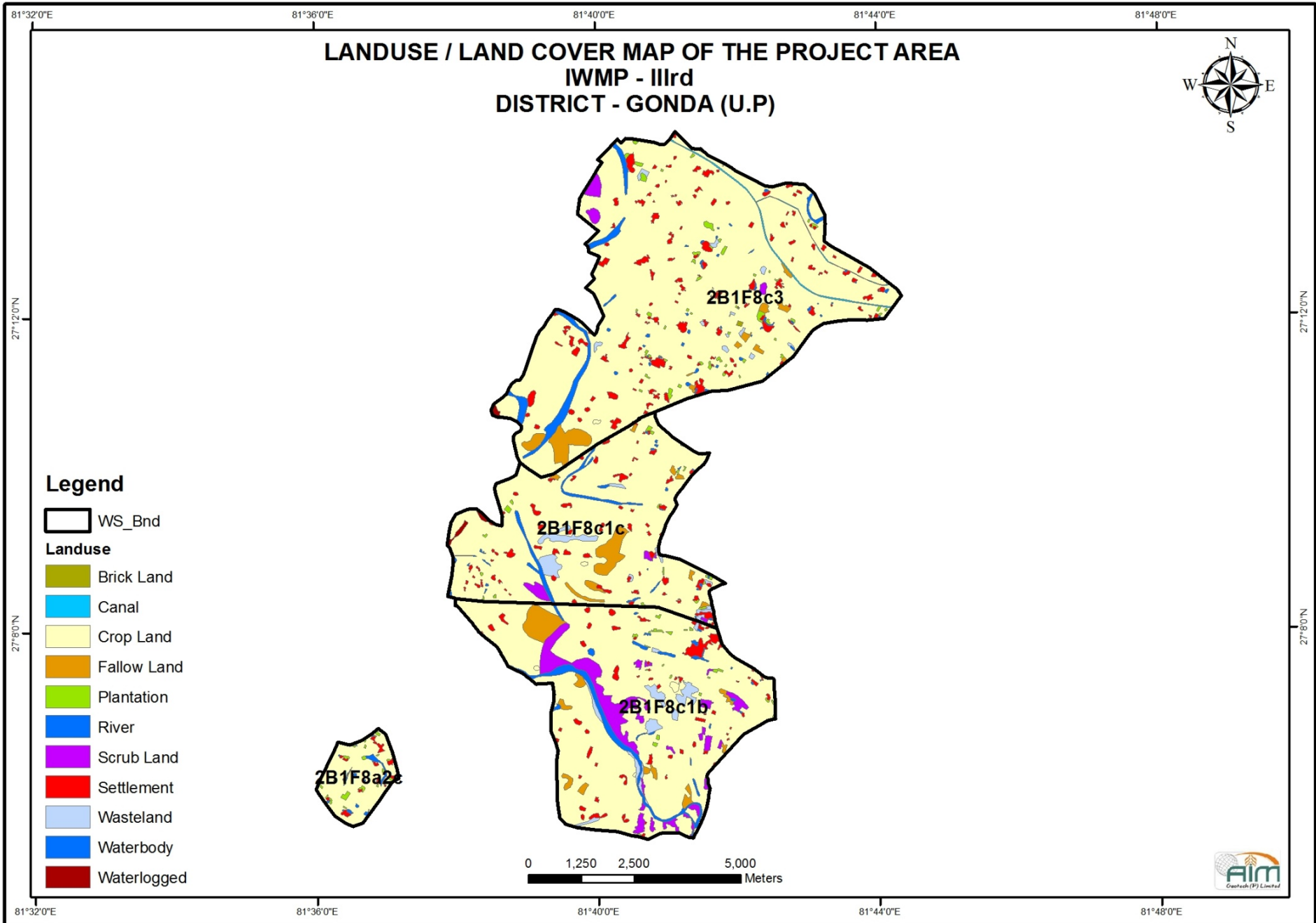
S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	54.08 cum	36.66/cum	1982.57
2.	Sand Laying	4.262 cum	33.33/cum	142.05
3.	C.C.W. 1:3:6	6.393 cum	494/cum	3158.14
4.	C.C.W. 1:2:4	0.445 cum	494/cum	219.83
5.	Brick masonry	59.045 cum	370/cum	21846.65
6.	Raised Pointing	35.12 m ²	51.61/m ²	1812.54
7.	Curing	59.045 cum	25.00/cum	1476.12
8.	Chowkidar	13 Man Days	100.00/Man Day	1300.00
9.	Head load & local transportation cost 10% cost of material	-	-	14046.60
Total				Rs. 45,984.50

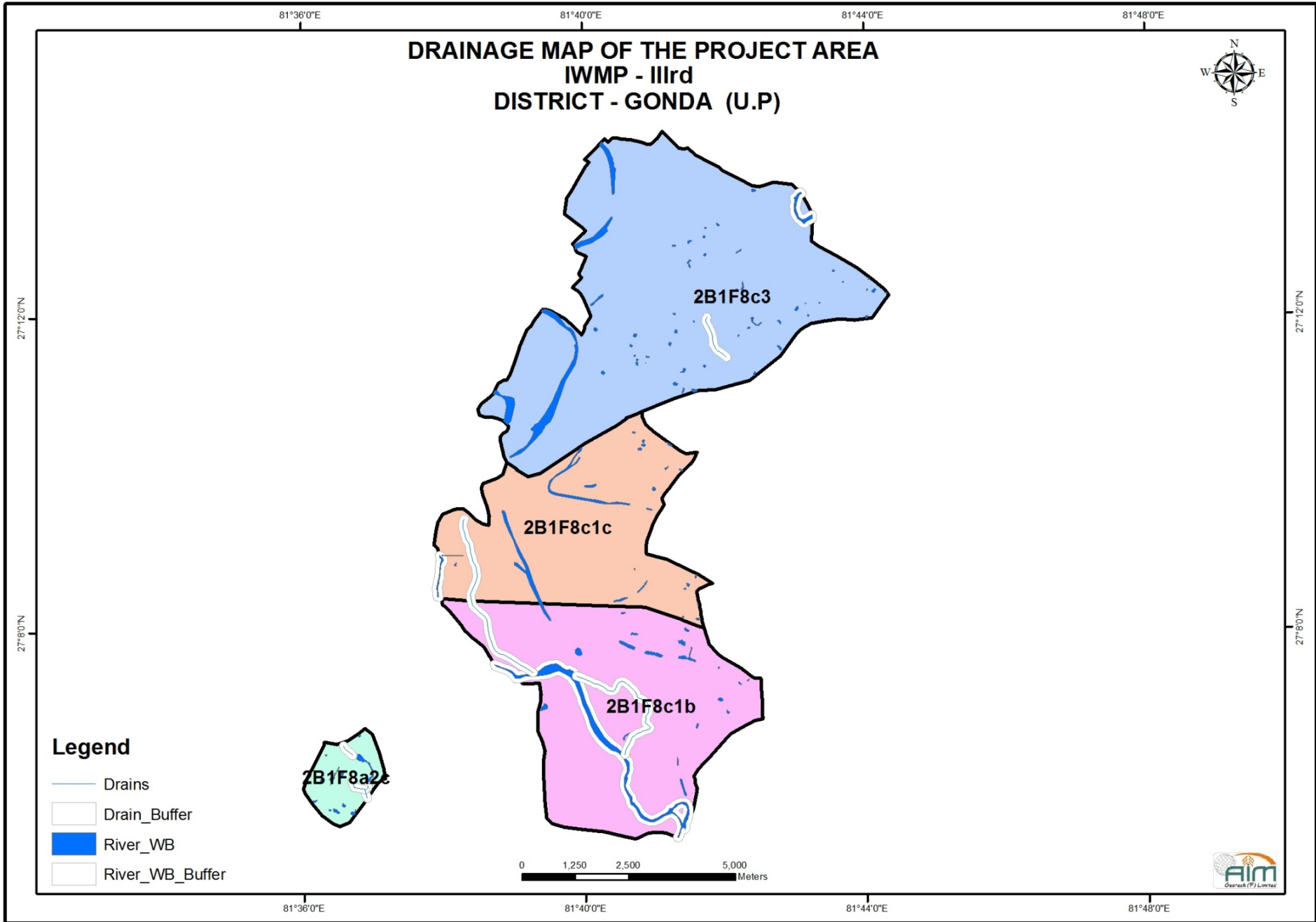
Total Expenditure	
1. Cost of materials	190107.00
2. Labour Charges	45984.50
Total	Rs. 236091.25
Say Rs. 236091.00 only	

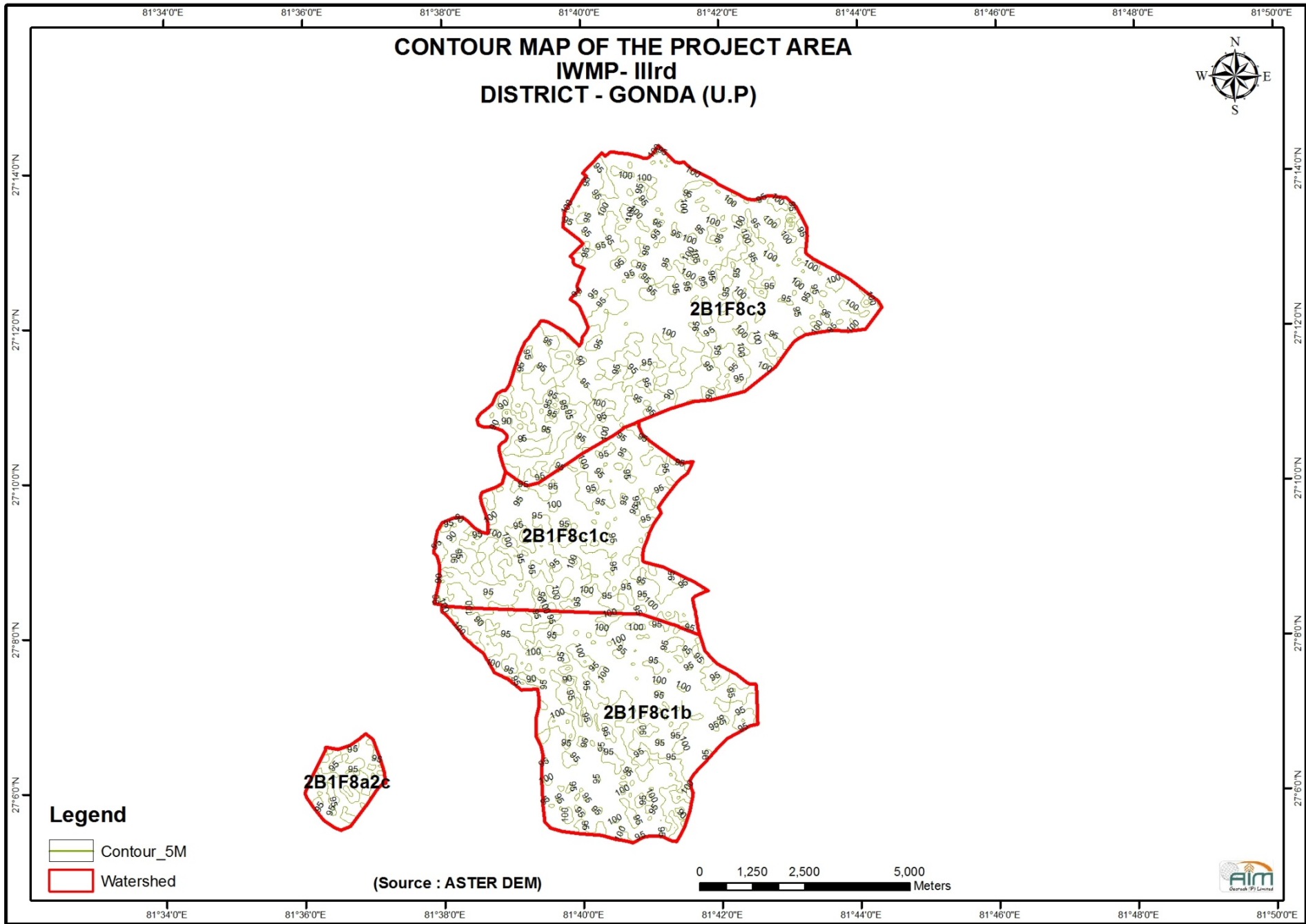
MAPS

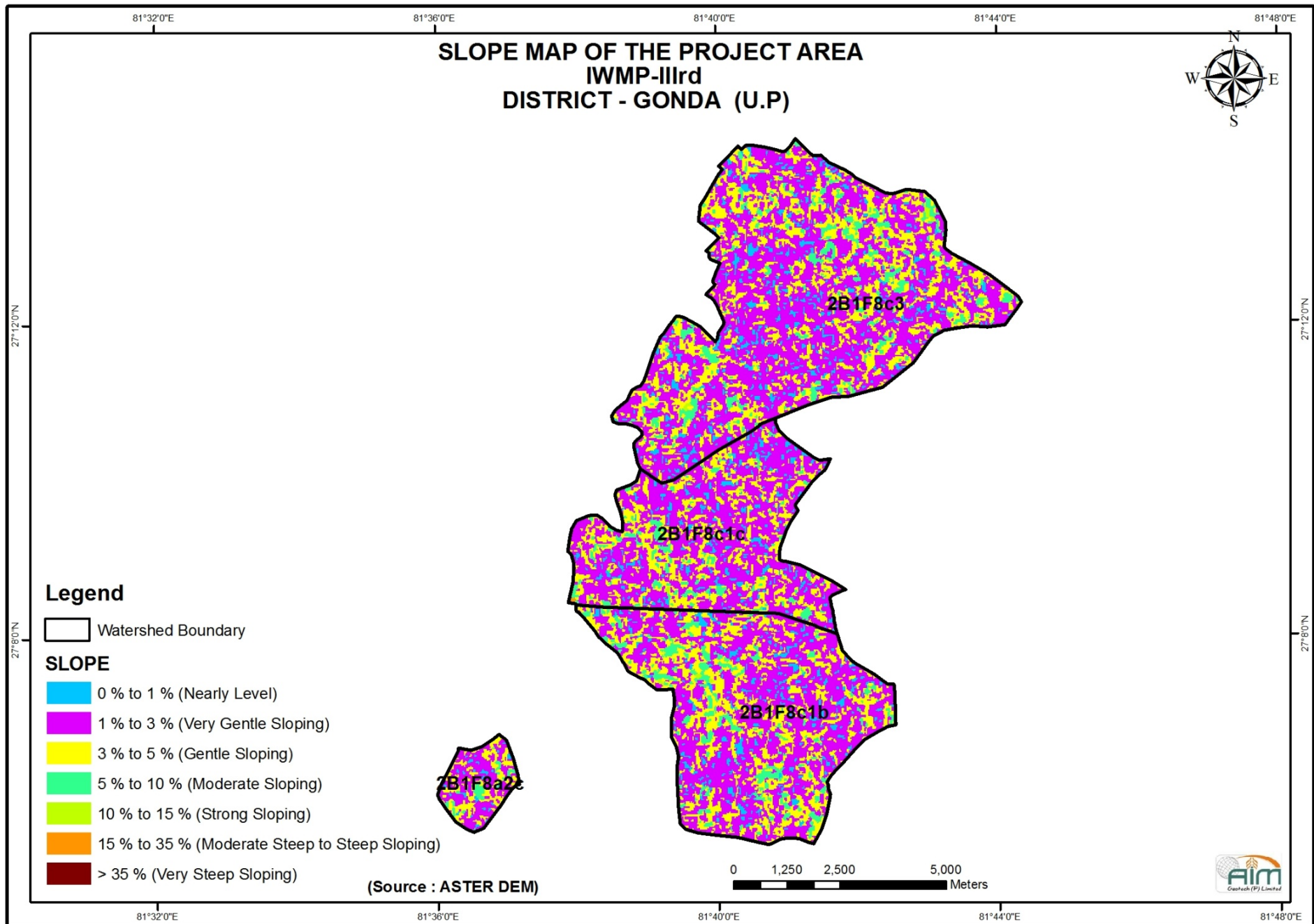












Preparation of DPR

Detail Project Report of Integrated Watershed Management Programme IWMP-II 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, Gonda, 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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