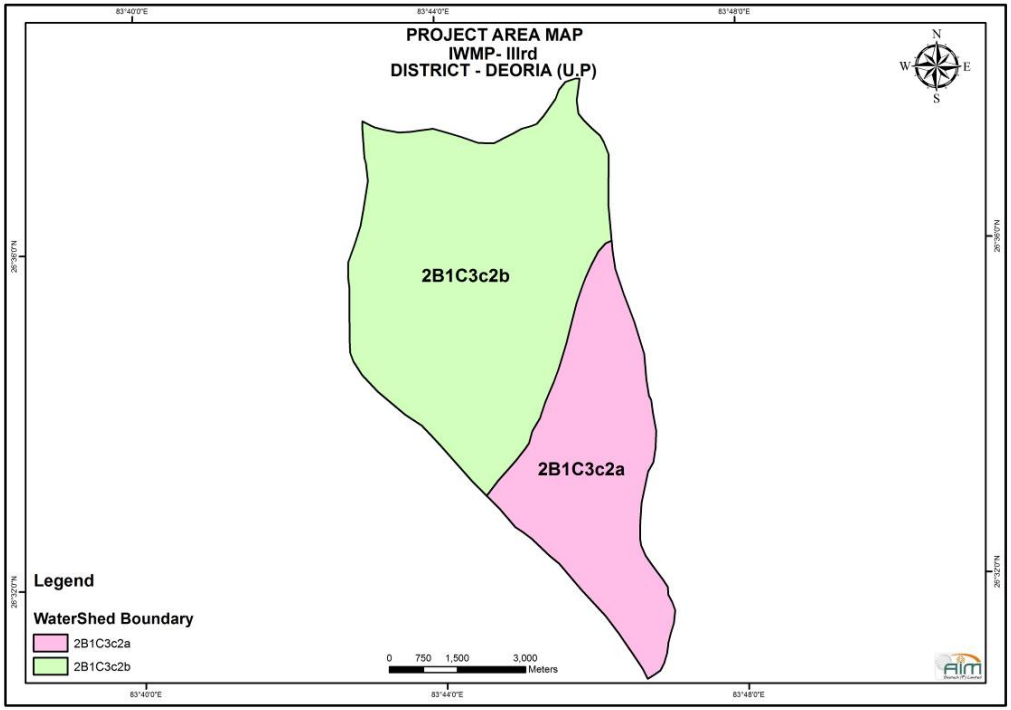
DETAILED PROJECT REPORT (D.P.R.)

(I.W.M.P. III - DEORIA)

INTEGRATED WATERSHED MANAGEMENT PROGRAMME LITTLE GANDAK WATERSHED, BLOCK- BAITALPUR, DASAI DEORIA, DISTRICT- DEORIA (UTTAR PRADESH)



Submitted to: -
Department of Land Development & Water Resources. Lucknow (U.P.)

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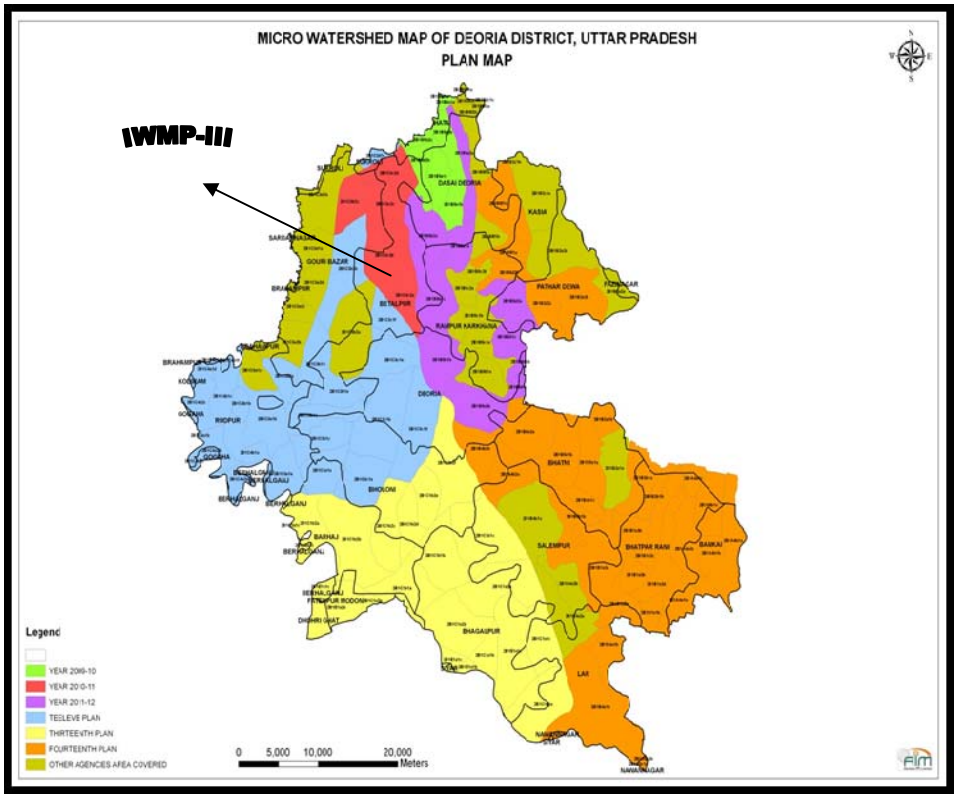
Land Development & Water Resources Government of U. P. Lucknow

TABLE OF CONTENT

I.W.M.P.-III (2010-11) DISTRICT- DEORIA (U.P.)

Name of the project	Weightage	No.of MWS	Geographial Area (ha)	Rainfed Area(ha)	Treatable area(ha)
I.W.M.P.III	82.5	02	5209.00	4688.10	4167.20



PROJECT AT A GLANCE

1.	Name of Block	Baitalpur, Dasai Deoria
2.	No. of Gram Panchayats	30
3.	Four reasons for selection of Watershed	(i)Major Percentage of SC, (ii)Actual wages are lower than 80%, (iii)Small and marginal farmers
4.	Date of approval of watershed Development Plan by DRDA/DPC	19-10-2010
5.	Area proposed to be treated (ha.)	4167.20
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.)	477.60
9.	Proposed mandays	240000

PROJECT AT A GLANCE

1.	Name of Project	-	I.W.M.P. III, DEORIA
2.	Name of Block	-	Baitalpur, Dasai Deoria
3.	Name of District	-	Deoria
4.	Name of State	-	Uttar Pradesh
5.	Name of watershed	-	Little gandak
6.	Name of Concern villages	-	Kariahan,Barari,Mahuadih,Rampur,Ijrahimafi,Araipar,Belwamafi,Dontkhas,Bhatauli,Baitakra, Sekhauna, Bharwali khas, Barni Khas,Thakurpur,Sjhawa,Baitalpur,Araji Tenduhi, Choriha, Bhanda, Sirjamkhas, Jamuna,Itwa, Bankati, Gudri,S opari Khurd, Biadhy,Bisunpur, Mathpalgir, Kasbobai, Kharidi, Sankarpur Bujurg, Parsauna, Mundera,Bankat, Narainpur, Rampur, Narainpur, Barari, Basantpur, Bailpur, Bwelwar, dubawar, Jaitpura, Basantpur Buzarg, Mundera, Baliya, Pandaychack, Bishunpur,Bhagwan, AwaraChoak, Balahi, Govindpur, Rociyapar, Mahuwa, Boriya Ananat, Mehara,Boriya Sultanpur, Pokhabhinda, Parsa Barwa, Narainpur
7.			
8.	Code of Micro Watershed	-	Gaura- 2B1C3c2b, 2B1C3c2a
8.	Total area of Project.	-	5209.00 ha.
9.	Proposed area to be treatment.	-	4167.20 ha.
10.	Rainfed Area	-	4688.10 Ha
11.	Cost per hectare	-	Rs. 12000.00
12.	Project period	–	2010-11 to 2014-15
13.	Total Cost of Project	-	Rs. 477.60 Lacs
14.	Proposed Man days	-	240000 Nos.

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 non repairable 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 in the Mid-North of Deoria district. It lies between 26^0 30' 52" to 26^0 37' 57" N latitude and 83^0 42'49" to 83^0 47' 02"E longitude having code no. Gaura- 2B1C3c2b, 2B1C3c2a.Its altitude ranges from 58 to 74 m from the mean sea level (MSL). The total area of watershed is 5209.00 ha. It is surrounded by the catchments of river Little Gandak.

The Little Gandak river watershed comprises of Fifty eight Villages namely Kariahan, Barari, Mahuadih, Rampur, Ijrahimafi, Araipar, Belwamafi, Dontkhas, Bhatauli, Baitakra, Sekhauna, Bharwali khas, Barni Khas, Thakurpur, Sjhawa, Baitalpur, Araji Tenduhi, Choriha, Bhanda, Sirjamkhas, Jamuna,Itwa, Bankati, Gudri, Sopari Khurd, Biadhy,Bisunpur, Mathpalgir, Kasbobai, Kharidi, Sankarpur Bujurg, Parsauna, Mundera,Bankat, Narainpur, Rampur, Narainpur, Barari, Basantpur, Bailpur, Bwelwar, dubawar, Jaitpura, Basantpur Buzarg, Mundera, Baliya, Pandaychack, Bishunpur,Bhagwan, AwaraChoak, Balahi, Govindpur, Rociyapar, Mahuwa, Boriya Ananat, Mehara,Boriya Sultanpur, Pokhabhinda, Parsa Barwa, Narainpur of

Baitalpur, Dasai Deoria blocks in district Deoria (U.P.). This watershed has been identified by the state department under IWMP scheme by proper prioritization of different parameters for watershed selection criteria.

The climate of the region is characterized as sub tropical humid with average annual rainfall of 995 mm. About 70 percent of rainfall occur during the month of June, July and august of the year. The area receives very less rainfall in the winter season. Temperature ranges from as high as 46 ^{o}C in the May-June to as low as 5.5^{0}C during December-January.

The catchment area of Little Gandak covers by sloppy and flat land. The soils of the area Clay loam to sandy loam. These soils are light yellow in color with medium fertility and are inherently high in fertility status. Soil texture is clay loam particularly in depressions and loam in the elevated portion. Agriculture is the main source of income of the farmers of the watershed. In Kharif reason the main crops are Rice, Arhar and Urd. Some of the lands are kept fallow because maximum areas are rainfed and the main Rabi crop is taken with the conserved moisture of rainfall. In Rabi season the main crops are Gram, Wheat, Pea, Lentil, Mustard, Barley and Linseed. The wheat and lentil crops are taken in the irrigated fields while the other crops are mostly taken in the rain fed conditions. In Zaid season the main crops are urd, moong, Maize and mentha. The Horticultural crops are occupied with well developed like mango, litchi, guava, banana and other fruits orchard. Only some vegetable crops are taken for domestic purpose.

Animal Husbandry is not in good condition because of local breeds. Their milk production is low due to poor feeding and management.

Natural vegetation of the watershed area is poor. The forest vegetation is predominant with Sisam , Teak, Sakhu . There is occasional occurrence of Neem plants, Pipal, Bargad. There is less grass land in the watershed. Grass patches are seen only on the bunds, road sides and other such places. The principal grass is Doob ghaas.

The problem of erosion of the watershed is to be tackled by harvesting additional water in existing water harvesting structures, which have lost most of their capacity due to siltation and creating new water bodies. Water stored in the water harvesting structures shall be properly recycled to provide supplemental irrigation at critical growth stages of crops and for the establishment of fruit orchards and forest trees. The agricultural land will be treated with bunding along with minor leveling. Waste land will be treated with the engineering measures like staggered trenches and aforestation 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, Deoria, 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, Deoria for integrated watershed management programme (IWMP) starting from the year 2010-11. The project will be completed in the year 2014-15.

SALIENT PROJECT ACTIVITIES

Watershed Development works including proposed engineering structures

Component	Area in Ha	Total (Lakhs) Amount	% of the bugdet
(A) (i)Construction of bunds (Field Bund, Contour Bund, Submergence Bund, Marginal Bund and Peripheral Bund)	2962.00	120.19	50%
(ii)Renovation of the Existing Bund for *in situ* soil Moisture Conservation	198.81	7.91	
(B) (i)Construction and renovation of Water Harvesting Structure/ Bundh, Farm Pond	590.00	70.68	
(ii) Drainage line treatment (Pucca structure/ Check Dam)	30 (Nos.)	4.99	
(C) Agro forestry & Horticulture (i) Rainfed horticulture with fencing	5.55	2.78	
(ii) Rainfed horticulture without fencing	200.00	30.00	
(iii) Aforestation & development of Silvi pastoral system	23.64	2.25	
Total	**3980.00**	**238.80**	**50%**

Livelihood Activities (community Based)

Component	Total Amount (in Lakh)	% of the Budget
(a) Establishment of Nadef-Compost Units	13.52	
(b) Dairy Work	15.00	10%
(b) Goat Farming	12.50	
(c) General Merchant Shop	3.0	
(d) Livestock Development Activities	3.74	
Total	**47.76**	**10%**

YEAR WISE PHASING PHYSICAL & FINANCIAL ITEM WISE: - RESOURCE CONSERVATION AND WATER MANAGEMENT IN LITTLE GANDAK, WATERSHED, BLOCK- BAITALPUR, DASAI DEORIA DISTRICT- DEORIA (UTTAR PRADESH)

S. No.	Item	Physical Year wise (area in ha.)						Financial Year wise (in Lakh)					
		2010-11	2011-12	2012-13	2013-14	2014-15	Total	2010-11	2011-12	2012-13	2013-14	2014-15	Total
1	Administrative 10%	-	-	-	-	-	-	-	9.552	12.656	12.656	12.896	47.760
2	D.P.R Preparation 1%	-	-	-	-	-	-	4.7760	-	-	-	-	4.7760
3	Monitoring 1%	-	-	-	-	-	-	-	0.955	0.955	0.955	1.911	4.7760
4	Evaluation 1%							-	1.432	0.835	0.835	1.674	4.776
5	Entry Point Activity4%	-	-	-	-	-	-	19.104	-	-	-	-	19.104
6	Institutional and Capacity building 5%	-	-	-	-	-	-	4.776	9.552	3.582	3.582	2.388	23.880
7	Watershed works 50%	-	477.60	1313.40	1313.40	875.60	3980.00	-	35.82	62.804	63.043	77.133	238.800
8	Livelihood & Income Generating 10%	-	-	-	-	-	-	-	4.776	19.104	14.328	9.552	47.76
8	Production System and Microenterprise 13%	-	-	-	-	-	-	-	4.776	19.104	23.880	14.328	62.088
10	Consolidation Phase 5%	-	-	-	-	-	-					23.880	23.880
	Total 100%	-	477.60	1313.40	1313.40	875.60	3980.00	**28.656**	**66.863**	**119.040**	**119.279**	**143.762**	**477.60**

Budget for the various components is given as below

S. No.	Budget Component	Total (in Lakh)
A	**1. Administrative** **2. Monitoring** **3. Evaluation**	47.760 4.776 4.776
B	**Preparatory Phases**	47.76
C.	**WATERSHED WORKS**	238.80
(i)	**Livelihood Programme**	47.76
(ii)	**Production System and Micro Enterprises**	62.08
D.	**CONSOLIDATION PHASE**	23.88
	GRAND TOTAL	**477.60**

TREATMENT AREA AND DETAILS

Economic condition, food production, Agro eco security were identified as the major issues to be addressed in the watershed area. Few area has undulating topography and steep unstable slopes, minor channel gradient and hence to check moderate soil erosion. Effective soil depth is limited and spatially highly variable hampering good crop growth. Lack of irrigation water was the greatest problem experienced by the people followed by low production of field crops, lack of fodder availability and low animal productivity. The runoff water transport the sediments which may block the channel head, 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 runoff water makes it way towards Little Gandak river carrying fertile soil which has nutrients and this decreases soil fertility, there is a decline in the productivity of cereals, pulses and vegetable crops, dependency of farmers on the rain water. Therefore it is an urgent need, that rainwater should be harvested for crops and re-charged to improve the quality of the water.

WATERSHED WISE TREATMENT AREA

S. No.	Watershed Code	Total Area (ha)	Treatment Area (ha)
1	2B1C3c2a	1761.82	1358.00
2	2B1C3c2b	3447.18	2622.00
	Total	**5209.00**	**3980.00**

FACE SHEET ABOUT BENCH MARK INDICATORS

Area Under Various LCC Classes

LCC class	Area ha
I	468.00
II	2790.00
III	1951.00
Total	**5209.00**

ACTION PLAN AT A GLANCE

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

CHAPTER-1

INTRODUCTION & BACKGROUND

PROJECT BACKGROUND

The Indo-Gangetic plains of U.P. have undergone stress for natural resources, which are witnessing degradation at an alarming rate. With the growing urge for decentralizing the practice of planning, it has become necessary to have a fresh look and scientific attitude for natural resources management. The watershed approach has conventionally aimed at treating degraded lands with the help of low cost and locality accessed technologies such as in-situ soil and moisture conservation measures, afforestation etc. and through a participatory approach that seeks to secure close involvement of the user communities. The broad objective was the promotion of the overall economic development and improvement of the socio-economic conditions of the resource poor sections of people inhabiting the programme areas. A comprehensive programme named Integrated Watershed Management Programme (IWMP-III) has been implemented under Common Guidelines on Watershed Development in 2008.

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

The Project area is a cluster of two (2) watersheds, with code nos. Gaura- 2B1C3c2a, 2B1C3c2b having area of 5209.00 ha is located in Mid-North Part of Deoria district of U.P. The area of watersheds is proposed to be taken up by Bhoomi Sanrakshan Adhikari, Department of land development & water resources Deoria for integrated watershed management programme (IWMP), started from the year 2010-11 and will be completed by 2014-15.

BASIC PROJECT INFORMATION

S No	Name of the project	Villages	Gram panchayat	Tehsil	District	Total area of the project (Ha)	Area proposed to be treated (Ha)	Total project cost (Rs in Lacs)	PIA
1	I.W.M.P-III	1.Kariahan 2.Barari 3.Mahuadih 4.Rampur 5.Ijrahimafi 6.,Araipar 7.Belwamafi 8.Dontkhas 9.Bhatauli 10.Baitakra 11.Sekhauna 12Bharwali khas 13.BarniKhas 14.Thakurpur 15.Sjhawa 16.Baitalpur 17.ArajiTenduhi 18.Choriha 19.Bhanda 20.Sirjamkhas 21.Jamuna 22.Itwa 23.Bankati 24.Gudri 25.Sopari Khurd 26.Biadhy 27.Bisunpur 28.Mathpalgir 29.kasbobai 30.Kharidi	1.Barari 2.Mahuadih 3.Rampur 4.Ijrahimafi 5.Baitakra 6.Bharwali khas 7. Baitalpur 8.Chhoriha 9.Sirjamkhas 10.Gudri 11.Biadhy 12.Sankarpur Bujurg, 13..Parsauna 14. Narainpur 15.Rampur 16.Barari 17.Bwelwar dubawar 18..Baliya 19..AwaraChoak 20.Govindpur 21Boriya Ananat 22..Mehara, 23.Boriya Sultan	**Deoria-Sadar**	Deoria	5209.00 ha.	4167.20 ha	477.60 Lacs	Bhoomi Sanrakshan Adhikari, Department of land Development and water resource, Deoria

		31.Sankarpur Bujurg, 32.Parsauna 33.Mundera 34Bankat 35.Narainpur 36.Rampur 37.Barari 38.,Basantpur 39.Bailpur 40.Bwelwar dubawar 41.,Jaitpura 42.Basantpur Buzarg 43.,Mundera 44.Baliya 45.Pandaychack 46.Bishunpur 47.Bhagwan 48.AwaraChoak 49.Balahi 50.Govindpur 51.Rociyapar 52.Mahuwa 53.Boriya Ananat 54.Mehara, 55.Boriya Sultan 56.Pokhabhinda 57.Parsa Barwa 58.Narainpur							

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 runoff of 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 runoff water makes its way towards Little Gandak river 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 and 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 depend on the rain water, which flows directly of Little Gandak River. Therefore there is an urgent need, that rainwater should be harvested for crops and re-charged to improve the quality of the water.

WEIGHTAGE FOR SELECTION OF WATERSHED

Problem Identification and prioritization

Economic condition, food production, Agro ecological security were identified as the major issues to be addressed in the watershed area. Few area has undulating topography and steep unstable slopes, minor channel gradient and hence to check moderate soil erosion. Effective soil depth is limited and spatially highly variable hampering good crop growth.

Problems identified and prioritized during the transact walk and PRA exercises in all villages namely Kariahan, Barari, Mahuadih, Rampur, Ijrahimafi, Araipar, Belwamafi, Dontkhas, Bhatauli, Baitakra, Sekhauna, Bharwali khas, Barni Khas, Thakurpur, Sjhawa, Baitalpur, Araji Tenduhi, Choriha, Bhanda, Sirjamkhas, Jamuna, Itwa, Bankati, Gudri, Sopari Khurd, Biadhy, Bisunpur, Mathpalgir, Kasbobai, Kharidi, Sankarpur Bujurg, Parsauna, Mundera,Bankat, Narainpur, Rampur, Narainpur, Barari, Basantpur, Bailpur, Bwelwar, dubawar, Jaitpura, Basantpur Buzarg, Mundera, Baliya, Pandaychack, Bishunpur, Bhagwan, Awara Choak, Balahi, Govindpur, Rociyapar, Mahuwa, Boriya Ananat, Mehara,Boriya Sultanpur, Pokhabhinda, Parsa Barwa, Narainpur were pooled and a list of nine problems representing the whole watershed was prepared. Problems were ranked as per their total weight age in these villages. Lack of irrigation water was the greatest problem experienced by the people followed by low production of field crops, lack of fodder availability and low animal productivity.

Problem identification and prioritization for watershed

S. No.	Problem	Rank
1.	Out migration of youth	3
2.	Resource poor farmers	2
3.	Poor water management	1

4	Heavy infestation of wild animals	10
5.	Fragmented land holding	5
6.	Fragile geography	4
7.	Problem of fuel and fodder	9
8.	Poor marketing and storage facility	8
9	Poor Nutrient Management	6
10	Lack of high yielding verities	7

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

SWOT analysis of the watershed

Strengths (S)	**Weakness (W)**
i. Cooperative work culture in traditional activities ii. Close ethic ties iii. Road at the top as well as outlet of the watershed iv. Hard working man power 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 x. Establishment of KVK	i. Poor water management ii. Resource poor farmers iii. Out migration of youth iv. Fragile geography v. Fragmented land holding vi. Heavy infestation of wild animals vii. Problem of fuel and fodder viii. poor marketing and storage facility ix. Imbalance use of fertilizers x. Lack of high yielding verities
Opportunities (O)	**Threats (T)**
i. Wide range of annual and perennial crops ii. Scope of regular employment opportunities to check out migration iii. Strengthening of existing irrigation system iv. Conducive climate for rainfed crop diversification v. Good scope for Agro forestry and dry land horticulture vi. Potential for collective action and management of CPR vii. Potential for public private partnership (PPP) viii. Scope of Introduction of new technology.	i. Prone to adverse climate like drought 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 vi. Falling of water table

WEIGHTAGE OF THE PROJECT

Project name	Project Type	Weightage													
IWMP II Deoria	IWMP	I	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	Total
		7.5	5	5	10	0	0	10	5	15	10	5	10	0	82.5

CRITERIA AND WEIGHTAGE FOR SELECTION OF WATERSHED

S.No.	Criteria	Maximum Score	Ranges & Scores			
i	Poverty index (% of poor to population)	10	Above 80 % (10)	80 to 50 % (7.5)	50 to 20 % (5)	Below 20 % (2.5)
ii	% of SC/ ST population	10	More than 40 % (10)	20 to 40 % (5)	Less than 20 % (3)	
iii	Actual wages	5	Actual wages are significantly lower than minimum wages (5)	Actual wages are equal to or higher than minimum wages (0)		
iv	% of small and marginal farmers	10	More than 80 % (10)	50 to 80 % (5)	Less than 50 % (3)	
v	Ground water status	5	Over exploited (5)	Critical (3)	Sub critical (2)	Safe (0)
vi	Moisture index/ DPAP/ DDP Block	 15	-66.7 & below (15) DDP Block	-33.3 to -66.6 (10) DPAP Block	0 to -33.2 (0) Non DPAP/ DDP Block	
vii	Area under rain-fed agriculture	15	More than 90 % (15)	80 to 90 % (10)	70 to 80% (5)	Above 70 % (Reject)

viii	Drinking water	10	No source (10)	Problematic village (7.5)	Partially covered (5)	Fully covered (0)
ix	Degraded land	15	High – above 20 % (15)	Medium – 10 to 20 % (10)	Low- less than 10 % of TGA (5)	
x	Productivity potential of the land	15	Lands with low production & where productivity can be significantly enhanced with reasonable efforts (15)	Lands with moderate production & where productivity can be enhanced with reasonable efforts (10)	Lands with high production & where productivity can be marginally enhanced with reasonable efforts (5)	
xi	Contiguity to another watershed that has already been developed/ treated	10	Contiguous to previously treated watershed & contiguity within the 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)	
xii	Cluster approach in the plains (more than one contiguous micro-watersheds in the project)	15	Above 6 micro-watersheds in cluster (15)	4 to 6 micro watersheds in cluster (10)	2 to 4 micro watersheds in cluster (5)	
xiii	Cluster approach in the hills (more than one contiguous micro-watersheds in the project)	15	Above 5 micro-watersheds in cluster (15)	3 to 5 micro watersheds in cluster (10)	2 to 3 micro watersheds in cluster (5)	
	Total	**150**	**150**	**90**	**41**	**2.5**

WATERSHED INFORMATION

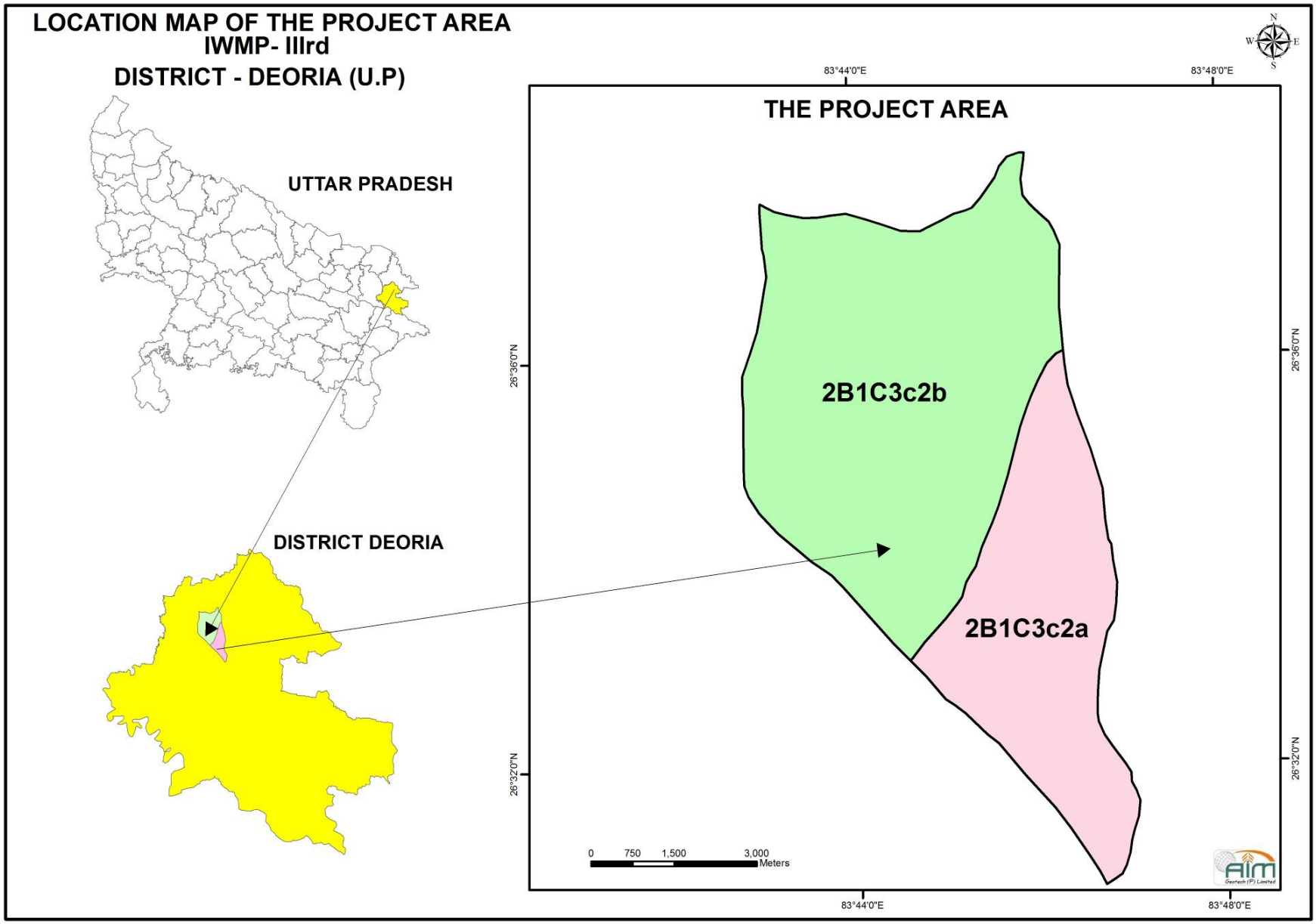
Name Of the Project	No. of Micro- watersheds to be treated	Micro-watershed Code	Watershed regime/type/order
IWMP III	02	Gaura- 2B1C3c2a, 2B1C3c2b	Micro Watershed

OTHER DEVELOPMENTAL PROJECTS/SCHEMES RUNNING IN THE VILLAGE

These villages being very back ward, has been on top priority of a number of developmental projects. These programmes are Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Swarnajayanti Gram Swarojgar Yojana (SGSY), Indira Awas Yojana (IAY). Integrated Watershed Management Programme in other areas of the district is under operation in the department of Agriculture.

CHAPTER – 2

GENERAL DESCRIPTION OF PROJECT AREA


LOCATION MAP OF THE PROJECT AREA
IWMP- IIIrd
DISTRICT - DEORIA (U.P)
UTTAR PRADESH
DISTRICT DEORIA
THE PROJECT AREA
2B1C3c2b
2B1C3c2a
83°44'0"E
83°48'0"E
26°36'0"N
26°32'0"N
0 750 1,500 3,000
Meters
N
S
E
W

LOCATION

The Little Gandak watershed in Baitalpur, Dasai Deoria Block of Deoria district (U.P.) is Located near 18-28 Km from district headquater. The Little Gandak river watershed comprises of Fifty eight villages namely, Kariahan, Barari, Mahuadih, Rampur, Ijrahimafi, Araipar, Belwamafi, Dontkhas, Bhatauli, Baitakra, Sekhauna, Bharwali khas, Barni Khas, Thakurpur, Sjhawa, Baitalpur, Araji Tenduhi, Choriha, Bhanda, Sirjamkhas, Jamuna, Itwa, Bankati, Gudri, Sopari Khurd, Biadhy, Bisunpur, Mathpalgir, Kasbobai, Kharidi, Sankarpur Bujurg, Parsauna, Mundera,Bankat, Narainpur, Rampur, Narainpur, Barari, Basantpur, Bailpur, Bwelwar, dubawar, Jaitpura, Basantpur Buzarg, Mundera, Baliya, Pandaychack, Bishunpur,Bhagwan, Awara Choak, Balahi, Govindpur, Rociyapar, Mahuwa, Boriya Ananat, Mehara,Boriya Sultanpur, Pokhabhinda, Parsa Barwa and Narainpur.

The project area is a cluster of two micro- watersheds with code No. 2B1C3c2a, 2B1C3c2b having an area of 5209.00 ha , out of which 4167.20 ha, has been undertaken to be treated under Integrated Watershed Management Programme (IWMP) starting year 2010-2011. It falls in the mid-north part of Deoria district of Uttar Pradesh. It lies between 26^0 30’ 52” to 26^0 37’ 57” N latitude and 83^0 42’49” to 83^0 47’ 02”E longitude. Altitude ranges from 58 to 74 m. from mean sea level (MSL). There are 23 Gram panchayat and 58 revenue villages in the project.

AREA

GENERAL LANDUSE PATTERN OF THE PROJECT AREA

S. No.	Name of District	No. of Villages	Geographical Area (Ha)	Rainfed Area (Ha)	Land under agricultural use (Ha)	Plantation	Forest (Ha)	Permanent Pastures (Ha)	Wasteland	
									Cultivable (Ha)	Non- Cultivable (Ha)
1	Deoria	58	5209.00	4688.00	4843.00	0.53	0.00	03	1020.00	35.00

DETAILS OF AGRO-CLIMATIC CONDITION

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

S. No.	Name of the Project	Name of the Agro-climatic zone covers project area	Area in ha	No. of the villages	Major soil types		Topography	Average rainfall in mm	Major crops	
					a)Type	b) Area in ha			a) Name	b) Area in ha
1	I.W.M.P-III	North Eastern Plain	5209.00	58	Sandy Loam	3365	Undulating with	995	Rice Wheat Sugarcane	4189.00

PHYSIOGRAPHY

The project area is a part of Little Gandak is an east central part of Ganga valley. In this plain, rainfall during monsoon season accounts for about 90 per cent of the annual rainfall. There are also some low lying lands called Chauras which remain submerged for considerable period of time. The river Little Gandak carry huge quantity of silt during the floods and deposit the same in its bed owing to poor slope and this results in the tendency to meander and consequent inundation of vast area. The height above sea level ranges from 74 meters in north-west to 58 meters in the south- east. The valleys of the larger rivers are not only depressed well below the general level of the country but are of considerable breadth. Thus there is a wide area of low land which is inundated in years of heavy rainfall. The study area is densely populated and most parts of the land are available for cultivation. Most of the agricultural land is dependent on monsoon. The mineral products are few and unimportant. The minerals of commercial value are the nodular limestone conglomerate known as kankar.

The soils of the area are Clay loam to Sandy loam. Middle portion of the watershed is relatively flat with Clay soil texture. These soils are light yellow in color with medium fertility status.

Location and Relief of the Project Area

S. No.	Details of the watershed	Villages	Location		Elevation of watershed from Mean Sea level		
			Latitude (N)	Longitude (E)	Highest in Meters	Lowest in Meters	Relief Height Difference
1	2B1C3c2a	Kariahan,Barari, Mahuadih, Rampur, Ljrahimafi, and others	26^0 30' 52" to 26^0 35' 59"	83^0 44'35" to 83^0 47' 02"	73	59	14
2	2B1C3c2b	Kharidi, Sankarpur Bujurg, Parsauna, and others	26^0 33' 03" to 26^0 37' 57"	83^0 42'49" to 83^0 46' 17"	74	58	16

CLIMATE

The watershed falls under the subtropical humid climate. The average annual rainfall is 995 mm. Most of the rainfall (about 70 % of rainfall occurred during June-August rainfall is of moderate to high intensity. The Area receives no or Scanty rainfall in winter seasons .The Temperature ranges from as high as 46 °c in the month of May June to as low as 5.5°c in December January.

The year may be divided into four seasons. The cold season from mid November to February is followed by the summer season from March to Mid June. The period from Mid June to the end of September is the south-west monsoon season and the October and the first half of November constitute the post-monsoon season.

RAINFALL

The south-west monsoon usually arrives over the project area by about the middle of June and withdraws by the end of September. The average rainfall of the project area is 869.14 mm. About 70 percent of the annual rainfall is recorded during the period June to September, July being the rainiest. The monsoon in the district generally advances from the south-west to the north-east. There is no large variation in the rainfall from year to year. In the 50 years period from 1901 to 1950 the heaviest annual rainfall which was 130 per cent of the normal was recorded in 1936, while the lowest annual rainfall was in 1907 when it amounted to 54 percent of the normal. In the same 50 year period, there were 14 years when the annual rainfall was less than 80 per cent of the normal. Two consecutive years of rainfall less than 80 percent of the normal occurred twice and three and four consecutive years of such low rainfall occurred only once each.

On an average there are 55 rainy days (i.e. days with rain 2.5 mm. or more) in a year, the variation in different parts of the district is not much.

TEMPERATURE

The data of Deoria observatory 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 22.8^0 C and the mean daily minimum temperature at 5.5^0 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 46^0 C and the mean daily minimum at 25.1^0 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.

HYDROLOGICAL DATA

GROUND WATER STRATA IN THE MONTH OF APRIL TO JUNE IN THE VILLAGES OF THE PROJECT AREA

S.No.	Name of villages	Ground water strata in month April to June	Particular place
1	58	6.0 -7.0 Meter	__

HUMIDITY

During the monsoon and the post monsoon seasons the relative humidity are high ranging between 85 to 90 per cent. In the winter months humidity decreases and in summer the air is comparatively drier.

WIND VELOCITY

The Wind velocity of the Project area ranges from 10-21 Km/hr.

WATERSHED CHARACTERISTICS

SHAPE AND SIZE

All the two watersheds (IWMP – III, Deoria) of the project area is cone in shape. The maximum length and width of IWMP - III watershed, are 12849 m and 5966 m, respectively with the length: width ratio 2.15/1

SHAPE AND SIZE OF WATERSHED

S. No.	Micro watershed Code	Area	Shape	Approximate size in meter		Ratio Length: width
				Length	Width	
1	2B1C3c2a	1761.82	Traingle	9144	3889	2.35:1
2	2B1C3c2b	3447.18	Square	7566	7071	1.07:1

GEOMORPHOLOGY

The area lies in the mid-north of the District- Deoria which lies in Little Gandak Basin. The soil is mainly sandy loam which is easily transportable after detaching causing soil erosion by water erosion and wind erosion.

DETAILS OF SOIL EROSION IN THE PROJECT AREA

Cause	Type of erosion	Area affected (ha)	Run off (mm/ year)	Average soil loss (Tones/ ha/ year)
Water erosion(IWMP-III)				
a	Sheet	2513	696 mm	16.55
b	Rill	1047		
c	Gully	629		
Sub-Total		4189		--
Wind erosion		--	NA	--
Total		4189	--	16.55

SOILS

The soils of the area are Clay loam to Sandy loam. Middle portion of the watershed is relatively flat with clay soil texture. These soils are light yellow in color with medium fertility status. Main crops are Wheat, Paddy which need more Nitrogen, Zinc & phosphorous. Therefore deficiency of Zinc occurs in this area.

DRAINAGE

Due to moderate to gentle slopes and presence of a number of drainage lines, drainage is adequate. The watershed forms part of the Little Gandak River.

CHAPTER-3

BASELINE SURVEY

SOCIO-ECONOMIC ANALYSIS OF THE PROJECT

Social Analysis

Social analysis refers to the sociological process of training individuals in a society to act or respond in a manner generally approved by the society in general and peer groups within society. The concept is stronger than that of socialization, which refers to the process of inheriting norms, customs and ideologies. Manifestations of social conditioning are vast, but they are generally categorized as social patterns and social structures including education, employment, entertainment, popular culture, religion, spirituality and family life. The social structure in which an individual finds him or herself influences and can determine their social actions and responses.

Social conditioning represents the environment and personal experience in the nature vs. nurture debate. Society in general and groups within society set the norms which shape the behaviour of actors within the social system.

Economic analysis

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

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

Sr. 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	26361	10576	-15039	32540	+6925
2	Pulses	3184	3665	+237	5650	+2222
3	Oil seeds	3673	2824	-752	4580	+1004
4	Vegetable	361	110	-268	550	+172

EMPLOYMENT GENERATION

Labour migration in search of gainful employment is one of the major problems in the remote watershed in particular. Causal employment opportunities to the more than 0.47 lakh 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 2.0 lakh in the watershed.

EMPLOYMENT GENERATION

S. No.	No. of the villages	Wage employment										Self employment				
		No. of mandays					No. of beneficiaries					No. of beneficiaries				
		SC	ST	Others	Women	Total	SC	ST	Others	Women	Total	SC	ST	Others	Women	Total
1	58	112000	-	89739	22261	224000	970	-	620	40	1630	310	-	183	82	575

HUMAN POPULATION

Total population of Fifty four villages under the watershed is 130968 with average family size of 8 persons.

HUMAN POPULATION IN THE WATERSHED

S.No	Name of village	Census Code	Population				SC_Population		
			THH	T_P	Male	Female	Male	Female	Total
1	2	3	4		6	7	8	9	10
1	Kariahan	08295500	561	5050	2450	2600	450	247	298
2	Barari	08296000	356	3200	1700	1500	107	199	66
3	Mahuadih	08296100	367	2200	1070	1130	170	177	347
4	Rampur	08296200	145	1300	590	710	138	60	198
5	Ljrahimafi	08296300	234	2100	1030	1070	245	229	474
6	Araipar	08296500	73	650	295	355	101	98	199
7	Belwamafi	08296400	62	550	270	230	108	126	234
8	Dontkhas	08297000	561	5050	2450	2600	450	247	697
9	Bhatauli	08297100	356	3200	1700	1500	107	199	306
10	Baitakra	08297200	134	1200	580	620	96	93	189
11	Sekhauna	08297300	412	3700	1840	1860	171	160	331
12	Bharwali khas	08297700	95	850	420	430	40	50	90
13	BarniKhas	08297900	84	750	370	380	121	130	251
14	Thakurpur	08298100	245	2200	1090	1110	57	51	108
15	Sjhawa	08298500	117	1050	520	530	141	123	264
16	Baitalpur	08298600	67	600	290	310	38	33	71

17	ArajiTenduhi	08300000	68	610	300	310	31	45	76
18	Choriha	08300100	217	1950	970	980	131	141	272
19	Bhanda	08300200	150	1050	510	540	61	64	125
20	Sirjamkhas	08300400	52	460	220	240	95	77	172
21	Jamuna	08300300	92	820	405	415	72	81	153
22	Itwa	08300700	189	1700	840	860	33	34	67
23	Bankati	08300800	89	800	395	405	135	140	275
24	Gudri	08300900	122	1090	530	540	84	82	166
25	Sopari Khurd	08301100	118	1060	520	540	46	32	78
26	Biadhy	08301200	778	7000	3470	3530	201	133	334
27	Bisunpur	08301300	542	4875	2390	2485	94	92	186
28	Mathpalgir	08290500	556	5000	2490	2510	139	148	287
29	Kasbobai	08290600	667	6000	2989	3011	223	214	437
30	Kharidi	08297400	234	2100	1040	1060	151	141	292
31	Sankarpur Bujurg	08297800	123	1100	520	580	155	152	360
32	Parsauna	08297500	56	500	245	255	56	40	96
33	Mundera	08297600	123	1100	245	265	95	97	192
34	Bankat	08298000	134	1200	590	610	30	32	62
35	.Narainpur	08298300	612	5500	2650	2850	102	99	201
36	Rampur	08298400	245	2200	1050	1150	136	144	280
37	Barari	08298700	334	3000	1425	1575	165	145	310
38	Basantpur	08298600	145	1300	620	680	80	74	154

39	Bailpur	08298800	63	560	270	290	67	59	126
40	Bwelwar dubawar	08298900	101	900	430	470	38	46	84
41	,Jaitpura	08298900	52	450	210	240	67	62	129
42	Basantpur Buzarg	08299000	112	1000	475	525	102	97	199
43	,Mundera	08299100	1112	10000	4980	5020	1122	1090	2212
44	Baliya	08299200	89	800	390	410	81	72	153
45	Pandaychack	08299300	556	5000	2455	2545	100	126	226
46	Bishunpur	08299400	267	2400	1190	1210	42	37	79
47.	Bhagwan	08299500	189	1700	840	860	67	59	126
48	AwaraChoak	08302600	88	790	380	410	156	158	214
49	Balahi	08302300	167	1500	720	780	60	67	127
50	Govindpur	08302400	356	3200	1580	1620	143	142	485
51	Rociyapar	08302500	556	5000	2455	2545	72	63	135
52	Mahuwa	08302700	67	600	290	310	92	89	181
53	Boriya Ananat	08303500	106	950	470	480	116	126	242
54	Mehara	083303600	34	350	160	190	25	14	39
55	Boriya Sultan	08303400	101	900	430	470	38	46	84
56	Pokhabhinda	08333600	52	450	210	240	67	62	129
57	Parsa Barwa	08333700	112	1000	475	525	102	97	199
58	Narainpur	**08333800**	1112	10000	4980	5020	1122	1090	2212
			14811	**130968**	**64475**	**66493**	**8542**	**8040**	**16089**

MIGRATION STATUS

Labour migration in search of gainful employment is one of the major problems in the remote watershed in particular. People migrate during summer season to different parts of the state as daily wagers, agricultural labours and construction workers. The detail is given below.

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

S.No.	No. of the villages	No. of persons migrating	No. of days per year of migration	Main reason for migration	Expected reduction in no. of persons migrating
1	58	338	About 180 days	Due to unemployment in village	270

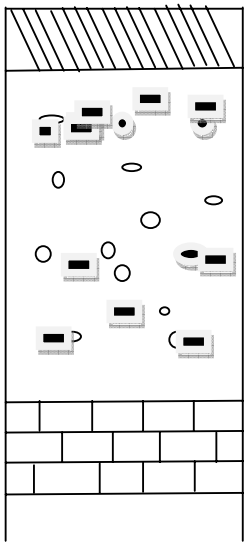
SOIL AND LAND CAPABILITY CLASSIFICATION

Soil morphology

The watershed is located south west corner of the Deoria district. The entire watershed is topographically divided into two major landforms. Accordingly, the soils of watershed have been grouped in two major categories.

i) Plain land
ii) Undulated land

Soil profile- A representative soil profile (Dominant soil)



1-20. cm (Medium texture soil- Lite yellowish in color)

21 to 151 cm

(Clay loam, midely alkaline in reaction)

More than 152 cm.

Quarts and mica dominant minerals

Morphology of a typical soil profile of the watershed (dominant soil)

Horizon	Depth (cm)	Morphology
A	0-20 cm	Lite yellowish in color, Clay and Sility loam faint friable non calcareous midly alkaline in reaction, lucky structure
B	21-152 cm	Clay loam midly alkaline in reaction sticky and plastic when wet, abundant medium pores
C	More than 152 cm	clay loam midly alkaline in reaction sticky and plastic when wet, abundant medium pores

Soil characteristics and fertility status

Soil characteristics pertaining to soil fertility of various classes occurring around different villages are given in Table Below.

Soil Characteristics and Fertility Status

Soil properties	LCC II	LCC IV	LCC VII/VIII
Sand (%)	26.70	53.00	72.90
Silt (%)	23.20	18.60	20.30
Clay (%)	47.90	25.18	6.68
Texture	Clay Loam	Loamy Sand	Sandy Loam
pH (1: 2)	7.30	7.25	7.15
EC (dS m^{-1})	0.17	0.12	0.15
Organic carbon (%)	0.38	0.31	0.20
Available N (kg ha^{-1})	370	308	238
Available P (kg ha^{-1})	11	9.00	7.95
Available K (kg ha^{-1})	308.10	291.80	264

*Values correspond to soil fraction < 2mm

LAND CAPABILITY CLASSIFICATION (LCC)

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

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

Class I lands have slight limitations that restrict their use.

Class II lands have moderate limitations that reduce the choice of plants.

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

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

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

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

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

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

‘w’ represents drainage difficulties including wetness or overflow,

‘s’ represents soil limitations for plant growth and

‘c’ represents climatic limitations.

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

– stony or rocky (0),

– erosion hazard/slope (1),

– coarse texture (2),

– fine texture (3),

– slowly permeable subsoil (4),

Land capability classification (LCC) is crucial for appropriate land use planting consisting of practiced like choice of vegetation /crops, tillage practices, use of scientific method of cultivation and desirous conservation practices.

The land capability classification of the watershed provides reasonable good information with regard to capability of soil, that could be used for agriculture, agro-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.

SLOPE ANALYSIS:

The Project area has an uneven terrain with higher elevations on the north- west side of the watershed. Since slope is the most important terrain characteristic and plays a vital role in geomorphological and runoff processes, soil erosion and land use

planning, it is very important to have an understanding of the spatial distribution for the development and management of both land and water resources. The general slope of the watershed is towards south - East. In the present study Seven (7) Slope classes were identified through the analysis of Aster Digital Elevation Model. One such map of Slope of the watershed is shown in Annexure Map.

PRESENT LAND USE IN THE WATERSHED

Spatial information on land use/land cover is a necessary prerequisite in planning, utilizing and management of natural resources. In the current days context of development planning, information on land use/land cover and the changes over a period of time attain prominence because of its primary requirement in all the planning activities. The present watershed has 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.

PRESENT LAND UNDER DIFFERENT CATEGORIES IN THE WATERSHED

S. No.	Micro-watershed Code no.	Name of Concern villages	Build –up Area	Agriculture	Wasteland all type	Plantation	Water bodies	Total
1	2B1C3c2b	Kariahan,Barari, Mahuadih, Rampur, Ljrahimafi, Araipar,Belwamafi, Dontkhas, Bhatauli, Baitakra, Sekhauna, Bharwali khas, BarniKhas, Thakurpur, Sjhawa, Baitalpur, ArajiTenduhi, Choriha,Bhanda, Sirjamkhas, Jamuna, Itwa, Bankati, Gudri, Sopari Khurd, Biadhy, Bisunpur, Mathpalgir, Kasbobai	90.33	1645.00	7.82	-	18.67	1761.82

2	2B1c3c2a	Kharidi, Sankarpur Bujurg, Parsauna, Mundera, Bankat, Narainpur, Rampur,Barar, Basantpur, Bailpur, Bwelwar dubawar, Jaitpura, Basantpur Buzarg, Mundera, Baliya, Pandaychack, Bishunpur, Bhagwan, AwaraChoak, Balahi, Govindpur, Rociyapar, Mahuwa, Boriya Ananat, Mehara, Boriya Sultan, Pokhabhinda, Parsa Barwa	168.61	3198.59	-	0.53	79.45	3447.18
		Total	**258.94**	**4843.59**	**7.82**	**0.53**	**98.12**	**5209.00**

PRESENT LANDUSE/LANDCOVER OF THE PROJECT AREA

S. No	Landuse	Area (ha)	%
1	Built-up land	258.94	4.97
2	Agricultural Land	4843.59	92.63
3	Plantation	0.53	0.01
4	Water Bodies	98.12	1.88
5	Wasteland	7.82	0.51
Total		**5209.00**	**100**

DESCRIPTION

The present LU/LC map has been depicted through the satellite data of January, 2010 (Google Earth). 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 258.94 Hectare which is 4.97 % of the total mapped area. Under this category road network and other built-up area has also been included.

AGRICULTRAL LAND

These are the lands primarily used for farming and for production of food. It includes land under the (irrigated and un-irrigated). Areas with standing crop as on the date of satellite overpass. Cropped areas are in varying shape and size in a contiguous and non contiguous pattern. They are widely distributed in different terrains; prominently appear in the irrigated areas irrespective of the source of irrigation. The study area is predominantly paddy producing area. In 2007-08 maximum production of paddy was recorded in this region under the double crop area. It is important to know that the project area has maximum two crop areas i.e. Kharif and Rabi. The average size of the agricultural field is less than 0.5 Hectare. The total area under this category comes about 4843.59 Hectare which is 92.63 % of the total mapped area.

WATER BODIES

This category comprises area with surface water either impounded in the form of ponds, lake & reservoirs. The total area under this category is about 98.12Hectare which is 1.88 % of the total mapped area.

PLANTATION

These areas are separable from crop land especially with the data acquired during Rabi/Zaid season. Plantations appear with different size and regular and sharp edges indication the presence of a fence around it. Depending on the location, they exhibit a disbursed or contiguous pattern. The total area under this category comes about 0.53 Hectare which is 0.01% of the total mapped area.

WASTE LAND

Land which is deteriorating for lack of appropriate water and soil on account of natural causes comes under this category. The total area under this category comes about 7.82 Hectare which is 0.51 % of the total mapped area. The sub categories are like Salt affected land, Gullied/Ravinous Land, Scrub Land etc.

AGRICULTURE

Generally agricultural land uses in the watershed are extended to diversified land capabilities starting from small to marginal lands. The watershed distinctly has three types of lands i.e. leveled, sloping and some undulating. The agriculture is practiced on all these soil types though the productivity considerably varies. The water (both irrigated and drinking) is most scarce natural resource in the watershed. The operation of tube wells for irrigation of agricultural crops frequently leads to the drinking water. The agricultural field bunds are common in the watershed, however, they frequently breach on heavy rains adversely affecting the *in situ* percolation of rain water in the soils.

The agriculture soils in the watershed have diversified texture i.e. loam sand, silty loam and mixed textures which are located in patches throughout the watershed. The irrigation water is conveyed in earthen channels and surface irrigation methods following mainly flood method of irrigation by the farmers in the watershed. These factors substantially reduce the water use efficiency of limited available and valuable irrigation water in the watershed. The quality of irrigation water needs to be tested for assessing fitness of the quality for irrigation and other purposes.

Rehabilitation of waste lands with appropriate drought hardy species like Prosopis juliflora, introduction of suitable multi-purpose trees, promoting agro-forestry 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 upliftment of farmers in the watershed.

RAINFED AGRICUTURE

Single cropping

Wheat / Gram/Pea/ Lentil/ Winter Vegetables, Arhar

Double cropping

Wheat/Mustard/Sugarcane/Moong/Urd/ Winter Vegetables/ Paddy

IRRIGATED AGRICULTURE

One year rotation

Sugarcane/Greengram-Wheat/Paddy-Lentil/Arhar/ Paddy-Wheat

CROP PRODUCTIVITY

The food crop productivity is primarily driven by the amount and distribution of rain water specifically during two cropping seasons i.e. Rabi and Kharif. Productivity of kharif crops is also affected by the late onset or early withdrawal of monsoon as well as intermittent droughts of variable duration and intensity. Traditional cultivation practices coupled with poor quality seeds result in low crop yield. The farmers also do not have suitable cropping systems to deal aberrant weather. Weeds impose considerable constraint in productivity of kharif crops under irrigated as well as rain-fed production system.

The mixed cropping is in some rabi crop like lentil and mustered while in practice in limited area with kharif crops like Arhar and Jowar but it is not only irrational but also unscientific and beset with low productivity. Imbalanced use of fertilizers is common in rabi and kharif crops both 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 plowing tractor drawn tillage implements are available with the farmers in the watershed but deep plowing implements yet need to be introduced.

The soil fertility/health restoration practices like green manuring, crop rotations and intercropping specifically with legumes, use of FYM/ compost, Vermi compost, bio fertilizers, 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 plowing across the slope, weed mulching, agro-forestry, vegetative barriers etc also completely lack in the watershed.

INDIGENOUS TECHNOLOGICAL KNOWLEDGE (ITK)

Agriculture is an old traditional occupation, farmers in the watershed who have improved themselves with passage of the time according to their domestic need and technological reforms in the nearby areas. The villagers have their traditional village ponds, practice of field bunding which typically constitute agriculture related ITKs in the watershed.

FOREST AND OTHER VEGETATION

Forests

There is no considerable forest area in the watershed.

Horticulture /Agro-forestry

Less horticulture and no Agro forestry practices were observed in the watershed.

AGRO FORESTRY

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

HORTICULTURE

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

LIVESTOCK POPULATION

Total livestock population of the watershed is 33948. Cows are preferred as milk animal, but milk yield is very low. Goats are also kept for milk as well as for meat purpose. The breakup of livestock population is as follows.

Livestock population in watershed

S. No.	Name of Village	livestock Resolution					
		Buffaloes	Cows	Bullocks	Goat	Poultry	Total
1	Kariahan	342	32	7	400	155	936
2	Barari	150	40	2	240	150	582
3	Mahuadih	60	50	20	250	130	510

4	Rampur	30	20	4	150	90	294
5	Ljrahimafi	100	60	0	250	109	519
6	Araipar	60	50	2	550	180	842
7	Belwamafi	60	55	0	470	20	605
8	Dontkhas	110	80	4	410	194	798
9	Bhatauli	100	75	6	250	75	506
10	Baitakra	150	40	0	240	150	580
11	Sekhauna	50	10	4	200	90	354
12	Bharwali khas	35	20	12	125	110	302
13	BarniKhas	25	15	8	75	180	303
14	Thakurpur	60	30	10	250	20	370
15	Sjhawa	50	12	2	200	196	460
16	Baitalpur	50	50	10	250	75	435
17	ArajiTenduhi	25	20	4	260	150	459
18	Choriha	70	60	8	200	90	428
19	Bhanda	40	30	4	200	110	384
20	Sirjamkhas	4	5	0	50	180	239
21	Jamuna	25	30	6	220	110	391
22	Itwa	26	35	4	210	180	455
23	Bankati	27	30	5	200	20	282
24	Gudri	50	56	6	300	196	608
25	Sopari Khurd	20	20	0	200	75	315
26	Biadhy	40	50	6	400	150	646
27	Bisunpur	100	80	40	150	90	460
28	Mathpalgir	25	15	6	1000	110	1156
29	Kasbobai	50	40	6	200	180	476
30	Kharidi	10	15	0	400	20	445
31	Sankarpur Bujurg	30	25	10	300	196	561
32	Parsauna	10	40	0	30	75	155
33	Mundera	80	10	0	300	150	540
34	Bankat	150	60	4	500	90	804

35	.Narainpur	150	156	10	1000	110	1426
36	Rampur	95	65	4	500	180	844
37	Barari	100	75	4	300	20	499
38	Basantpur	70	9	5	289	196	569
39	Bailpur	35	20	0	125	75	255
40	Bwelwar dubawar	50	30	6	100	150	336
41	,Jaitpura	25	20	4	100	90	239
42	Basantpur Buzarg	35	60	10	280	180	565
43	Mundera	100	150	20	500	20	790
44	Baliya	20	40	12	200	196	468
45	Pandaychack	150	100	15	1010	75	1350
46	Bishunpur	200	230	4	640	150	1224
47.	Bhagwan	140	90	9	198	90	527
48.	AwaraChoak	90	40	4	165	180	479
49	Balahi	20	50	10	200	196	476
50	Govindpur	150	200	6	354	75	785
51	Rociyapar	455	410	51	458	150	1524
52	Mahuwa	41	36	6	152	90	325
53	Boriya Ananat	240	210	2	440	90	982
54	Mehara	25	20	12	210	180	447
55	Boriya Sultan	25	15	6	1000	110	1156
56	Pokhabhinda	50	40	6	200	180	476
57	Parsa Barwa	10	15	0	400	20	445
58	Narainpur	30	25	10	300	196	561
	Total	**4520**	**3366**	**416**	**18551**	**7095**	**33948**

LAND HOLDINGS

Distribution of farm families according to their size of land holding

S. No.	Name of Villages	Land holding classification				
		Marginal	Small	Others	Landless	Total
1	Kariahan	346	173	38	4	561
2	Barari	251	101	5	1	356
3	Mahuadih	216	108	42`	1	367
4	Rampur	84	42	17	2	145
5	Ljrahimafi	138	74	22	0	234
6	Araipar	44	23	5	1	73
7	Belwamafi	40	16	6	0	62
8	Dontkhas	346	173	38	4	561
9	Bhatauli	251	101	5	1	356
10	Baitakra	91	40	3	0	134
11	Sekhauna	278	122	18	2	412
12	Bharwali khas	64	28	3	0	95
13	BarniKhas	54	25	4	1	84
14	Thakurpur	169	73	3	0	245
15	Sjhawa	66	31	18	2	117
16	Baitalpur	41	16	9	1	67
17	ArajiTenduhi	41	17	8	2	68
18	Choriha	136	64	16	1	217
19	Bhanda	96	43	9	2	150
20	Sirjamkhas	32	14	6	0	52
21	Jamuna	62	24	5	1	92
22	Itwa	123	52	10	2	189
23	Bankati	56	16	14	3	89
24	Gudri	83	34	4	1	122
25	Sopari Khurd	71	29	16	2	118
26	Biadhy	468	231	72	7	778
27	Bisunpur	376	153	12	1	542
28	Mathpalgir	386	163	6	1	556

29	Kasbobai	454	187	22	4	667
30	Kharidi	154	64	14	2	234
31	Sankarpur Bujurg	79	38	5	1	123
32	Parsauna	34	17	3	2	56
33	Mundera	78	39	5	1	123
34	Bankat	89	37	7	1	134
35	Narainpur	411	165	30	6	612
36	Rampur	166	71	7	1	245
37	Barari Rajdha Chhapara	232	89	11	2	334
38	Basantpur	95	41	8	1	145
39	Bailpur	39	18	5	1	63
40	Bwelwar dubawar	68	26	6	1	101
41	Jaitpura	34	14	4	0	52
42	Basantpur Buzarg	74	26	11	1	112
43	Mundera	734	312	48	18	1112
44	Baliya	51	21	15	2	89
45	Pandaychack	381	146	21	8	556
46	Bishunpur	170	73	21	3	267
47	Bhagwan	121	53	13	2	189
48	AwaraChoak	52	23	11	2	88
49	Balahi	109	47	10	1	167
50	Govindpur	241	98	14	3	356
51	Rociyapar	384	156	14	2	556
52	Mahuwa	39	19	8	1	67
53	Boriya Ananat	68	29	7	2	106
54	Mehara	21	9	4	0	34
55	Boriya Sultan	68	26	6	1	101
56	Pokhabhinda	34	14	4	0	52
57	Parsa Barwa	74	26	11	1	112
58	Narainpur	734	312	48	18	1112
	Total	**9697**	**4182**	**722**	**131**	**14807**

LIVELIHOOD

Out of the total population of 130968 in the watershed, a majority *i.e.* more than 65 % has farming as their major source of livelihood followed by 30% laborers and 5 % service + business class.

SUMMARY OF LIVELIHOODS

S. No.	No. of the villages	Existing livelihood activities	Possible livelihood interventions under the project	Current status of migration (No. of people)	Main reasons for migration
2	58	Agriculture Labour	Agriculture husbandry in project work, mandays generation & Self help group etc	360 per year	Due to unemployment & poverty

INFRASTRUCTURE SOCIAL FEATURES

The watershed has moderate communication facilities near about all Fifty eight villages and concern majra are approachable through motorable road. Mostly villages are electrified and have TV & telephonic connection. Nearest big market Ram Gaunaria is about 1-8 km from the watershed. Religious and ritual features are almost common as in other part of the UP. Small land holding (average less than 0.46 ha) with large family size (average 8 person) and more than 25 % of the labor force of the total population living below poverty line indicate poor socio economic status of the watershed community. However, strong community spirit among the villager's show positive indication for the success of any programmed to be implemented in participatory mode. Traditionally the entire village community participates in the individual works. Map of the watershed villages drawn by villagers themselves, depicting various village features is shown in Table as below.

S. No.	Name of village	Pukka Road	Electricity	Primary School	Jun. high School	Inter college	Post Office	P.H.C.	Bank	Vetnary hospital	Co-op. Society	Market	Agri. Service centre.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Kariahan	√	√	√	2 km.	1 km.	3 km.	3 km.	4 km.	3 km.	7 km.	1.5 km.	6 km.
2	Barari	√	√	√	√	4 km.	2 km.	5 km.	6 km.	3 km.	2 km.	1 km.	5 km.
3	Mahuadih	-	√	√	√	4 km.	√	4 km.	5 km.	4 km.	5 km.	1 km.	5 km.
4	Rampur	√	√	√	√	1.5 km.	√	3 km.	3 km.	4 km.	5 km.	0.5 km.	5 km.
5	Ljrahimafi	√	√	√	√	.5 Km	3 km.	√	√	4 km.	5 km.	1 km.	5 km.
6	Araipar	√	√	√	√	1 km.	3 km.	√	1 km.	4 km.	5 km.	1 km.	5 km.
7	Belwamafi	√	√	√	2 km.	1 km.	3 km.	3 km.	4 km.	3 km.	7 km.	1.5 km.	6 km.
8	Dontkhas	√	√	√	√	4 km.	2 km.	5 km.	6 km.	3 km.	2 km.	1 km.	5 km.
9	Bhatauli	-	√	√	1 km.	2 km.	3 km.	4 km.	3 km.	5 km.	5 km.	1 km.	5 km.
10	Baitakra	√	√	√	√	3 km.	√	4 km.	3 km.	4 km.	3 km.	1.2 km.	5 km.
11	Sekhauna	√	√	√	√	5 km.	3 km.	3 km.	2 km.	4 km.	2 km.	2 km.	6 km.
12	Bharwali khas	-	√	√	1.5	2.5 km.	4 km.	2 km.	6 km.	3 km.	4 km.	2 km.	5 km.
13	BarniKhas	√	√	√	√	2 km.	4 km.	5 km.	6 km.	4 km.	5 km.	1 km.	5 km.
14	Thakurpur	√	√	√	2 km.	4 km.	3 km.	√	6 km.	4 km.	3 km.	1.5 km.	5 km.
15	Sjhawa	√	√	√	√	3 km.	3 km.	3 km.	6 km.	3 km.	2 km.	2 km.	4 km.
16	Baitalpur	√	√	1.2 km	√	2 km.	3 km.	2.5 km.	6 km.	4 km.	3 km.	1 km.	5 km.
17	ArajiTenduhi	√	√	√	√	4 km.	√	4 km.	3 km.	3 km.	3.2 km.	1.2 km.	5 km.

18	Choriha	√	√	2 km.	√	4 km.	3 km.	3 .2km.	6 km.	5 km.	2 km.	2.1 km.	5 km.
19	Bhanda	√	√	√	3 Km	3 km.	4 km.	√	5 km.	2 km.	4 km.	1km.	8 km.
20	Sirjamkhas	√	√	2 Km.	4 Km	3 km.	3 km.	5 km.	4.2 km.	√	5 km.	1 km.	5 km.
21	Jamuna	√	√	√	√	3 km.	2 km.	4 km.	6 km.	3 km.	7 km.	1.2 km.	5 km.
22	Itwa	√	√	√	√	2 km.	√	5 km.	10 km.	4 km.	10 km.	2 km.	8 km.
23	Bankati	√	√	√	√	2 km.	4 km.	4 km.	3 km.	3 km.	4 km.	0.5 km.	5 km.
24	Gudri	√	√	√	1.5 Km.	1 km.	3 km.	4 km.	5 km.	2 km.	4 km.	1.5 km.	4 km.
25	Sopari Khurd	√	√	√	√	2 km.	1 km.	5 km.	3km.	3 km.	5 km.	2 km.	4 km.
26	Biadhy	√	√	√	3 km	2 km.	3 km.	4 km.	5 km.	2 km.	5 km.	1km.	1 km.zxxxxxxxx
27	Bisunpur	√	√	√	√	3 km.	√	√	3 km.	√	4 km.	1 km.	7 km.
28	Mathpalgir	√	√	√	√	3 km.	3 km.	5 km.	4 km.	4 km.	1 km.	1.2 km.	7 km.
29	Kasbobai	√	√	√	√	5 km.	4 km.	5 km.	3km.	3 km.	5 km.	1 km.	5 km.
30	Kharidi	√	√	√	1 km.	2 km.	3 km.	5 km.	4 km.	5 km.	4 km.	1.5 km.	5 km.
31	Sankarpur Bujurg	√	√	√	√	4km.	√	4 km.	3 km.	4 km.	4 km.	2 km.	7 km.
32	Parsauna	√	√	√	√	3 km.	5 km.	4 km.	3 km.	5 km.	4 km.	1 km.	6 km.
33	Mundera	√	√	√	√	5 km.	4 km.	5 km.	6 km.	4 km.	3 km.	1.1 km.	6 km.
34	Bankat	√	√	√	√	4 km.	5 km.	5 km.	7 km.	5 km.	6 km.	1.7 km.	6 km.
35	.Narainpur	√	√	√	√	3 km.	3 km.	5 km.	6 km.	6 km.	9 km.	13 km.	6 km.
36	Rampur	√	√	√	√	4 km.	√.	4 km.	7 km.	3 km.	6 km.	1 km.	7 km.
37	Barari Rajdha Chhapra	√	√	√	√	5 km.	3 km.	√	6 km.	5 km.	6 km.	1.2 km.	6 km.
38	Basantpur	√	√	√	1.5 Km	5 km.	4 km.	5 km.	5 km.	√	6 km.	1 km.	7 km.
39	Bailpur	√	√	√	1.2 Km	3 km.	5 km.	6 km.	5 km.	4 km.	4 km.	1.3 km.	6 km.

40	Bwelwar dubawar	√	√	√	√	4 km.	3 km.	5 km.	4 km.	4 km.	5 km.	1.6 km.	7 km.
41	Jaitpura	√	√	√	√	5 km.	√.	4 km.	7 km.	6 km.	5 km.	1.4 km.	6 km.
42	Basantpur Buzarg	√	√	√	√	4 km.	5 km.	6 km.	8 km.	5 km.	7 km.	1 km.	7 km.
43	Mundera	√	√	√	1.2	3 km.	4 km.	5 km.	5 km.	3 km.	5 km.	2 km.	4 km.
44	Baliya	√	√	√	√	5 km.	5 km.	√	5 km.	√	5 km.	1.3 km.	5 km.
45	Pandaychack	√	√	√	√	4 km.	√	4 km.	3 km.	5 km.	4 km.	1 km.	4 km.
46	Bishunpur	√	√	√	√	3 km.	5 km.	4 km.	4 km.	5 km.	5 km.	1 km.	16 km.
47	Bhagwan	√	√	√	1.2 Km	5 km.	4 km.	3 km.	6 km.	3 km.	5 km.	1 km.	7 km.
48	AwaraChoak	√	√	√	√	6 km.	5 km.	√	5 km.	√.	6 km.	2 km.	7 km.
49	Balahi	√	√	√	√	3 km.	4 km.	5 km.	5 km.	4 km.	3 km.	1 km.	2 km.
50	Govindpur	√	√	√	1.5 km	2 km.	√.	6 km.	1 km.	6 km.	13 km.	2 km.	6 km.
51	Rociyapar	√	√	√	√	6 km.	5 km.	6 km.	4 km.	5 km.	3 km.	1.3 km.	7 km.
52	Mahuwa	√	√	√	√	3 km.	4 km.	5 km.	4 km.	3 km.	4 km.	1 km.	5 km.
53	Boriya Ananat	√	√	√	√	2 km.	5 km.	√	5 km.	√	4 km.	2 km.	6 km.
54	Mehara	√	√	√	√	4 km.	√	4 km.	5 km.	5 km.	1 km.	1.3 km.	7 km.
55	Boriya Sultan	√	√	√	1.2 Km	5 km.	4 km.	3 km.	6 km.	3 km.	5 km.	1 km.	7 km.
56	Pokhabhinda	√	√	√	√	6 km.	5 km.	√	5 km.	√.	6 km.	2 km.	7 km.
57	Parsa Barwa	√	√	√	√	3 km.	4 km.	5 km.	5 km.	4 km.	3 km.	1 km.	2 km.
58	Narainpur	√	√	√	1.5 km	2 km.	√.	6 km.	1 km.	6 km.	13 km.	2 km.	6 km.

HISTORICAL TIME LINE OF VILLAGES OF THE PROJECTABLE

Village- Kariahan

S.N.	Activities	Year
1	Village was Established,	1755
2	Construction of first road	2004
3	First Radio was purchased in the village.	1950
4	First Television was purchased in the village.	1988
5	First Tube well was installed.	1962
6	First Motorcycle was purchased in this village.	1989
7	First Tractor was purchased in this village.	1978
8	Village was Electrified	1996

Village - Barari

S.N.	Activities	Year
1	Village was Established	1760
2	Construction of first road	1998
3	First Radio was purchased in the village.	1971
4	First Television was purchased in the village.	1997
5	First Tube well was installed.	1972
6	First Motorcycle was purchased in this village.	1997
7	First Tractor was purchased in this village.	1996
8	Village was Electrified	1998

Village - Mahuadih

S.N.	Activities	Year
1	Village was Established,.	1770
2	Construction of first road	1997
3	First Radio was purchased in the village.	1999
4	First Television was purchased in the village.	2006
5	First Tube well was installed.	1990
6	First Motorcycle was purchased in this village.	1991
7	First Tractor was purchased in this village.	1984
8	Village was Electrified	2004

Village - Rampur

S.N.	Activities	Year
1	Village was Established.	1710
2	Construction of first road	2002
3	First Radio was purchased in the village.	1998
4	First Television was purchased in the village.	2006
5	First Tube well was installed.	1995
6	First Motorcycle was purchased in this	1999
7	First Tractor was purchased in this village.	1985
8	Village was Electrified	2005

Village- Ljrahimafi

S.N.	Activities	Year
1	Village was Established.	1750
2	Construction of first road	1960
3	First Radio was purchased in the village.	1999
4	First Television was purchased in the village.	2002
5	First Tube well was installed.	1988
6	First Motorcycle was purchased in this village	1999
7	First Tractor was purchased in this village.	1992
8	Village was Electrified	2007

Village - Araipar

S.N.	Activities	Year
1	Village was Established.	1770
2	Construction of first road	1960
3	First Radio was purchased in the village.	1982
4	First Television was purchased in the village.	1988
5	First Tube well was installed.	1990
6	First Motorcycle was purchased in this village.	1978
7	First Tractor was purchased in this village.	1988
8	Village was Electrified	2007

Village - Belwamafi

S.N.	Activities	Year
1	Village was Established,.	1740
2	Construction of first road	1972
3	First Radio was purchased in the village.	1970
4	First Television was purchased in the village.	1992
5	First Tube well was installed.	1988
6	First Motorcycle was purchased in this village.	1977
7	First Tractor was purchased in this village.	1970
8	Village was Electrified	1993

Village- Dontkhas

S.N.	Activities	Year
1	Village was Established.	1760
2	Construction of first road	1976
3	First Radio was purchased in the village.	1968
4	First Television was purchased in the village.	1993
5	First Tube well was installed.	1997
6	First Motorcycle was purchased in this village.	1978
7	First Tractor was purchased in this village.	1979
8	Village was Electrified	1994

Village Bhatauli

S.N.	Activities	Year
1	Village was Established.	1750
2	Construction of first road	1995
3	First Radio was purchased in the village.	1970
4	First Television was purchased in the village.	2000
5	First Tube well was installed.	1970
6	First Motorcycle was purchased in this village.	1980
7	First Tractor was purchased in this village.	1995
8	Village was Electrified	2000

Village Math Baitakra

S.N.	Activities	Year
1	Village was Established.	1740
2	Construction of first road	1978
3	First Radio was purchased in the village.	1967
4	First Television was purchased in the village.	1991
5	First Tube well was installed.	1967
6	First Motorcycle was purchased in this village.	1979
7	First Tractor was purchased in this village.	1973
8	Village was Electrified	2007

Village Sekhauna

S.N.	Activities	Year
1	Village was Established.	1740
2	Construction of first road	1977
3	First Radio was purchased in the village.	1972
4	First Television was purchased in the village.	1994
5	First Tube well was installed.	1962
6	First Motorcycle was purchased in this village.	1967
7	First Tractor was purchased in this village.	1975
8	Village was Electrified	2007

Village Bharwali khas

S.N.	Activities	Year
1	Village was Established.	1700
2	Construction of first road	1978
3	First Radio was purchased in the village.	1967
4	First Television was purchased in the village.	1990
5	First Tube well was installed.	1967
6	First Motorcycle was purchased in this village.	1978
7	First Tractor was purchased in this village.	1971
8	Village was Electrified	2005

Village BarniKhas

S.N.	Activities	Year
1	Village was Established.	1800
2	Construction of first road	1994
3	First Radio was purchased in the village.	1965
4	First Television was purchased in the village.	1996
5	First Tube well was installed.	1965
6	First Motorcycle was purchased in this village.	1973
7	First Tractor was purchased in this village.	1973
8	Village was Electrified	2007

DEPENDENCY ON FOREST FOR FUEL WOOD AND FODDER

a) Fuel wood

Most of the Villagers do not use 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-byproduct and cow dung cake. Rest is met out from the forest outside the village and watershed boundary.

b) Fodder:

Villagers do not have any significant dependency on forest based fodder as these resources are not available in the forests.

LOW AND IMBALANCE USE OF FERTILIZER

Farmers do not use sufficient fertilizer due to lack of water, scarcity of fertilizer in market and insufficient money for fertilizer. Many a times they don't get fertilizer at the right time. There is also about the importance of balance use of fertilizer in the farming.

TRADITIONAL FARMING METHODS

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 optimum output. So these factors contribute to low productivity.

LACK OF ADEQUATE FARM MACHINERY

A large number of farmers in water shed area use cultivator. They don't have adequate machinery like seed drill. rotavater , Paddy transplanter, Lazier guided land leveler extra So, old machineries take more time in tillage practices.

LACK OF FINANCES FOR FARMERS

In watershed 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 inputs leads to higher soil 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. Second, mostly farmers use nitrogenous fertilizers especially urea. This has resulted in disproportionate use of fertilizer depleting the quality of land.

LACK OF OTHER FACILITIES SUCH AS STORAGE AND MARKETING

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

HYDROLOGY AND WATER RESOURCE CATEGORIES

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

description of the run-off cycle, which is a part of the hydrologic cycle, will help us to understand the origin & the interdependence of these two categories of water resources.

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

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

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

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

The total run-off in the stream channel includes the snow-melt, the surface run-off the sub-surface run-off, the ground-water run-off & the channel precipitation, i.e. the precipitation falling directly on the water surface of streams, lakes, etc. It constitutes what is known as the surface-water resources. The portion of the precipitation which, after infiltration, reaches the ground-water-table, together with the contribution made to ground water from a neighbouring basin, influent rivers, natural lakes, ponds, artificial storage reservoirs, canals, irrigation,& constitutes the ground-water resources. That quantity of water in the ground-water reservoir, which is not annually replenishable, is not taken into account, as it is a sort of dead storage which cannot be used on a continuing basis from year to year.

The above phase of the run-off cycle pinpoints the inflow components for the surface-as well as for the ground-water resources. It has to be appreciated that there is always a balance between the inflow factors making up water resources of a region, whether surface or ground, & the outflow components. The surface water resource of a given basin in excess of the withdrawal use is accounted for on the outflow side by one or more of the following factors:
*(i)*Stream outflow from the basin;
*(ii)*Loss through evaporation and
*(iii)*The influent recharge to the ground water.
Similarly, the unutilized ground-water resource of a basin is accounted for by the following outflow factors:
*(i)*Evapo-transpiration from the ground-water-table;
*(ii)O*utflow to the neighbouring ground-water basin;
*(iii)*the effluent discharge to the streams and
*(iv)*the addition to the ground-water storage.

The interrelationship between the surface-water & the ground-water resources is evident from the above analysis. The surface-water resources contribute to the ground-water recharge in various ways:
(i)by influent recharge from the streams;
(ii)by seepage from natural lakes, ponds, etc;
(iii)seepage from artificial storage reservoirs, canal systems, etc, &
(iv)return flow from irrigation. These factors presently contribute to about 25 percent of the country's total ground-water resources.

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

Factors Affecting Water Resources

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

1. Climatic Factors

A. Rainfall : its intensity, duration & distribution.

B. Snow

C. Evapo-transpiration

2.Physiographic Factors

A. Basic characteristics

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

B. Channel characteristics: carrying capacity & storage capacity.

3.Geological Factors

A. Lithology including composition, texture, sequence of rock types & the thickness of rock formations.

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

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

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

SOIL AND MOISTURE CONSERVATION AND EFFICIENT USE OF WATER

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

A variety of essential soil moisture and water conservation technologies must be adopted to reduce the cost of irrigation, extend it throughout and promote sustainable small-scale irrigation on a watershed basis. These technologies are essential especially in drought-prone areas. Even though drought is a purely natural calamity caused by the failure of (monsoon) rain, it can be minimized by careful planning and operation. During good rainy years, excess rainwater should be stored in the soil and also underground using suitable soil moisture conservation measures and water harvesting structures on a watershed basis. This stored water can subsequently be used for irrigation. Total area in work proposed in the project area is 3980.00 ha.

Conceptual approach

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

The concept of integrated watershed development refers to the development and management of the resources in the watershed to achieve higher sustainable production without deterioration in the resource base and any ecological imbalances. This concept requires the formulation and implementation of a package of programmes with activities for optimum resource use in the watershed without adversely affecting the soil and water base or life supporting system. The concept assumes more importance in the context of planning for sustained development. Watershed development aims at preventing watershed degradation resulting from the interaction of physiographic features. It eliminates unscientific land use, inappropriate cropping

patterns and soil erosion, thereby improving and sustaining productivity of resources leading to higher income and living standards for the inhabitants in the watershed area. It therefore involves restoration of the ecosystem, protecting and utilizing the locally available resources within a watershed to achieve sustainable development.

Rainfall failure occurs once every 3 to 5 years and is usually below 50% of the average annual rainfall of the region. During periods of rainfall failure, the groundwater level lowers since fluctuations in the water table levels depend on the rainfall when both surface and groundwater availability becomes critical. Drought begins to prevail and there is difficult to cope up with the water demand during this period. Similarly, in some locations or areas water shortage is observed just before the rainy season commences. These two situations can be managed if suitable soil and moisture conservation measures are systematically implemented on a small watershed basis.

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

Appropriate structures and their functions

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

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

Soil and water conservation measures on a watershed basis

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

can also be constructed for every 4-5 ha in the watershed to provide protective/supplemental irrigation. Total above work proposed in project area are 3980.00 Ha.

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

Functions of the structures

Contour bunds will not only prevent soil erosion but also obstruct the flow of runoff water. Consequently, the obstructed water will increase the soil moisture and recharge the groundwater in the area.

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

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

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

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

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

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

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

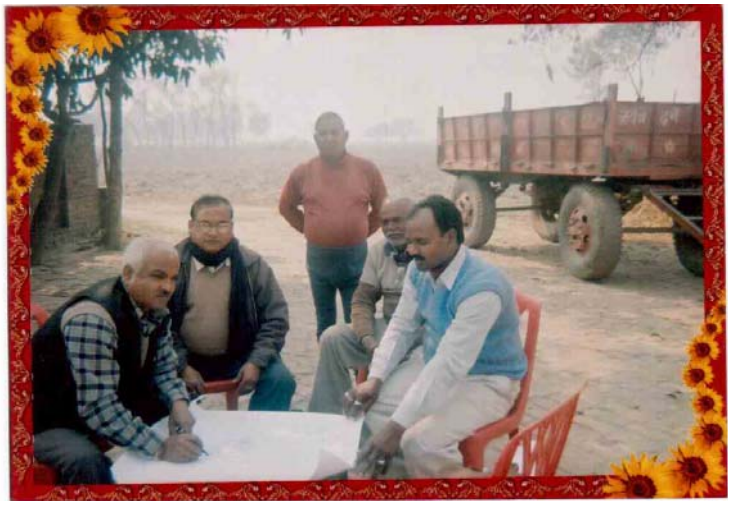
PROBLEMS AND NEEDS

The main problem in a watershed is the soil erosion by rainfall. The runoff 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 runoff water makes it away towards Little Gandak river carrying fertile soil which has nutrients and this decreases soil fertility, there is a decline in the productivity of cereals, pulses and vegetable crops, dependency of farmers on the rain water. Therefore it is an urgent need, that rainwater should be harvested for crops and re-charged to improve the quality of the water.

PRA Exercise of Village- Piparhiya

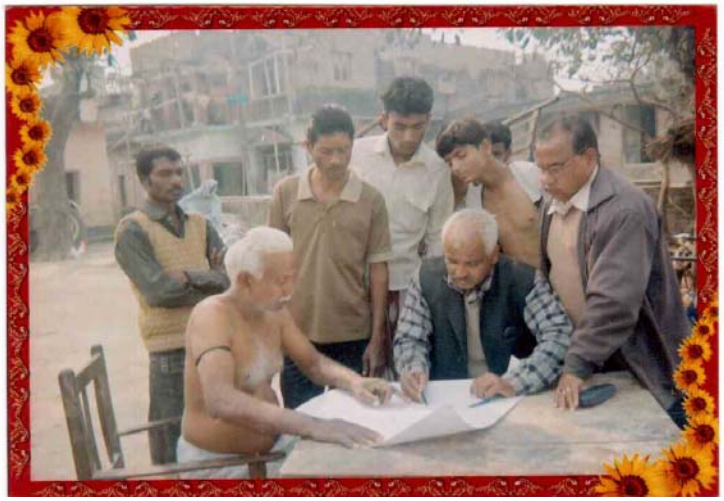
PRA Exercise of Village- Pipra

PRA Exercise of Village- Varuhi Khas



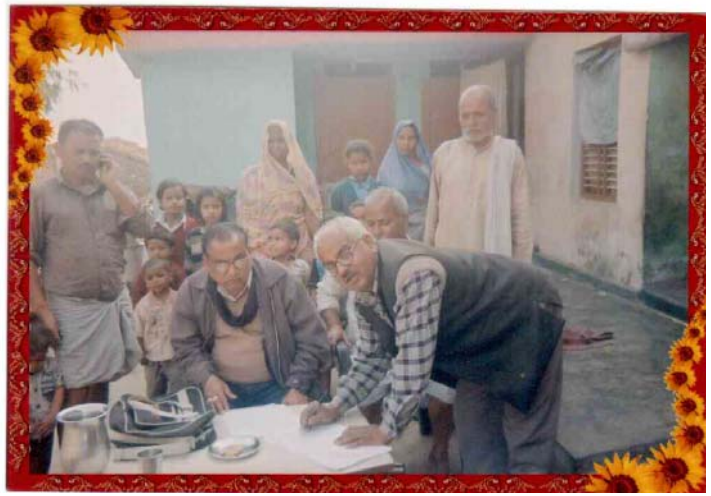
PRA Exercise of Village- Bhatauli

PRA Exercise of Village- Thakurpur

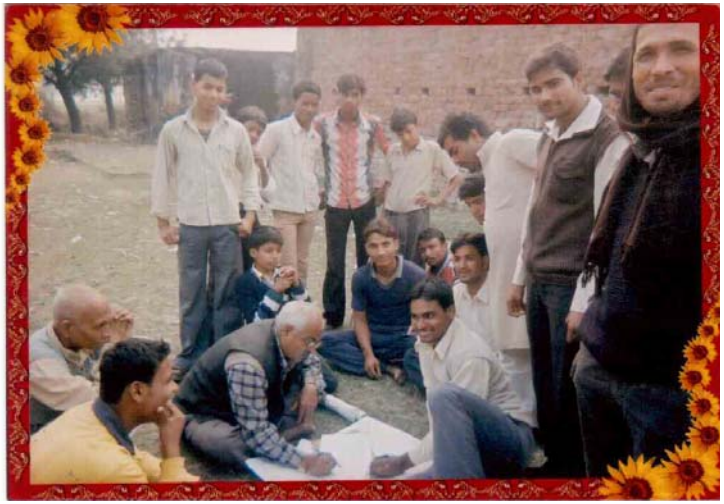


PRA Exercise of Village- Belwa mafi

PRA Exercise of Village- Barwa



PRA Exercise of Village- Mahuadih



PRA Exercise of Village- Yamuna

PRA Exercise of Village- Sanjhwa

CHAPTER - 4

INSTITUTION BUILDING & PROJECT MANAGEMENT

PARTICIPATORY RURAL APPRAISAL (PRA)

In order to realize these numerous benefits from multiple cycle archival data, judicious organization and management of the voluminous village level special database in the watershed that steadily grows with each year is very crucial. Recent state – of-the-art technology solutions and emerging trends contribute a great deal in designing and implementing highly functional geo-databases.

An attempt has been made to strengthen the planning of the study area. Remotely sensed data have been used for the mapping of various themes like landuse, drainage, base map etc. All the thematic layers have been converted into the GIS environment. All these layers could be overlaid on the base layer including village boundary. Various PRA techniques like resource mapping, social mapping and season calendar were used to understand the physical and social condition of the village in the project area.

WATERSHED COMMITTEE

Watershed committee has been constituted in all 02 nos. of micro watershed separately by W.D.T. & Gram Sabha village of micro watershed. Detail of W.C. is given below :

S. No.	Micro watershed code	Name of President	Name of Seceratary	No. of WDT Member
1.	2B1C3e2a	Sri Vechan s/o Sri Jwala	Smt. Kiran Singh W/o Mukesh Singh	11

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, Focussed 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, (Deoria)

S.No.	Code No. (M.W.S.)	Name of S.H.G.	Name of Members	Occupation of S.H.G.	Name of President & Secretary	Cast	Male/Female
1.	2B1C3c2a	Jal Dhara (Mahuawan)	11	Goat Keeping	Maya Devi (President) Gyanti Devi (Secretary)	SC/ST	Female Female
2.	2B1C3c2a	Hastkalan (Ruchhapar)	10	Carpentary	Rameshwar (President) Loha Singh(Secretary)	SC/ST	Male Male
3.	2B1C3c2a	Pahchan (Basantpur)	11	Goat Keeping	Basarthi (President) Kiran Devi (Secretary)	SC/ST	Female Female
4.	2B1C3c2b	Darshan (Barnai)	11	Candle Making	Kaushalya Devi (President) Akbar(Secretary)	SC/ST	Female Female
5	2B1C3c2b	Asha (Dhaturakhas)	11	Sewing	Rita (President) Anita (Secretary)	GENERAL	Female Female
6.	2B1C3c2a	Abhilasha (Bodia Anant)	11	Sewing	Sharmila Devi (President) Marium Khatun (Secretary)	MINOR	Female Female

7	2B1C3c2a	Laksha (Bodia Anant)	11	Goat Keeping	Noorjahan (President) Shalma (Secretary)	MINOR	Female Female
8	2B1C3c2a	Karwan (Narainpur)	12	Goat Keeping	Lal Bahadur (President) Chandrabhan (Secretary)	SC	Male Male
9	2B1C3c2b	Amber (Dhaturakhas)	11	Goat Keeping	Mahesiya Devi (President) Indravati (Secretary)	SC	Female Female
10	2B1C3c2b	Narayan (Tenehai)	11	Barmy Compost	Harekrishna (President) Dinesh (Secretary)	SC	Male Male

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 DEORIA

S. No.	Code No. (M.W.S.)	Name of U.G.	Name of Group leader & No. of Cultivators.
1	2B1C3c2b	No. 1	Smt Savita W/o Sri Mukuand Prasad
		No. 2	Smt Durgawati W/o Sri Mohan lal
		No. 3	Smt. Kamla F/o Sri Mohan Prasad
		No. 4	Smt Kamalwati W/O Sri Ramdhar
		No. 5	Smt. Chandrawati W/0 mukhlal
2	2B1C3c2a	No. 1	Smt Ramjit Gautam W/O Sri Ramcharan
		No. 2	Smt Puspha W/O Sri Rampayare Prasad

		No.3	Smt Sandhya W/O Sri Surajbhan Prasad
		No. 4	Smt Sumita W/O Sri DinDayal Prasad
		No. 5	Smt Prinkaya Gautam W/O Sri Lalan Prasad
		No. 6	Smt Saroje Devi W/O Sri Changuar Prasad
		No.7	Smt Kismati W/O Sri Rajnath
3.	2B1C3c2b	No. 1	Smt Munari S/O Sri Nagina
		No. 2	Sri Kedar S/O Sri Rajdev
		No. 3	Sri Tilwa S/O Sri Rajdeva
		No.4	Sri Rajdhani S/o Sri Jagat
		No.5	Sri Ram Kishuna s/o Sri Jagtat
		No.6	Sri Jhagru s/o Sri Munnar
		No.7	Sri Ramashankar s/o Sri Munnar
4	2B1C3c2b	No. 1	Sri Pream chand s/o Sri Vindhayal
		No. 2	Sri Pauhari s/o Sri Vindhayal
		No. 3	Sri Dhanusdehari s/o Sri Munshi
		No. 4	Sri Brashman s/o Sri Tilak
		No. 5	Sri Swaminath s/o sri Ramnaryan
		No.6	Sri Bachan s/o Sri Suryanath
5.	2B1C3c2a	No. 1	Sri Nanda s/o Sri Sampat
		No. 2	Sri Maukatdhan s/o Sri bhutwal
		No. 3	Sri Jaiprakash s/o Sri Vibhuati
		No. 4	Sri Pramoad s/o Sri Vibhuati

		No. 5	Sri Manoj s/o Sri Dhanusdhari
6	2B1C3c2a	No. 1	Sri Raju/o Sri Rampat
		No. 2	Sri Mauka Prasad s/o Sri Bhutawal
		No. 3	Sri Jaiprakash s/o Sri Vibhuati
		No. 4	Sri Pramoad s/o Sri Vibhuati
		No. 5	Sri Manoj s/o Sri Dhanusdhari
		No.6	Sri Nanda s/o Sri Sampat

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.

DETAILS OF WATERSHED DEVELOPMENT TEAMS (WDTS) IN THE PROJECT AREA

S.No.	Name of the PIA	Names of WDT members	M/F	Age	Qualification / Experience	Description of professional training	Role/ Function	Date of Appointment of WDT member
1	B.S.A.,	Shri Y.Singh	M	52	Civil Engg.	IWDP	Enclosed	22-12-10

	I.W.D.P., Deoria				30 Years			
2		Sri S K Mishra	M	53	Ag. Engg. 28 Years	IWDP	Enclosed	22-12-10
3		Sri Tarun Chandra Mishra	M	56	M.Sc. , Agricultural	IWDP	Enclosed	22-12-10
4		D.H.O.	M	42	M.Sc. , Horticulture/ 30 Years	NHM Horticulture	Enclosed	22-12-10
5		Dr. Vinay Kumar	M	40	M.Sc. Agriculture, Ph.d 10Years	IWDP	Enclosed	22-12-10
6		Smt. Purnima Srivastava	F	35	B.A. (Socal Science)/ 10Years	Socal Worker	Enclosed	22-12-10
7		Dr Archana Dixit	F	37	Ph.D. ,M.Sc in Animal Science	Lecturer	Enclosed	22-12-10
8		Sri Rakesh Tiwari	M	38	M.S.W.	Socal Worker	Enclosed	22-12-10

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 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.

PROJECT IMPLEMENTING AGENCY (PIA)

U.P. Government, Land Development And Water Resources Department section -1 Lucknow has nominated as PIA to Bhoomi Sanrakshan Adhikari, Land development and water resources Department Dist- Deoria for IWMP-III provide letter no-666(10)/54-1-10-1(9)02008 Dated 28-5-2010.

Detail Staffing Pattern of PIA

S.No.	Name	Designation	Qualification
1-	Shri Yugendra Singh	Bhoomi Sanrakshan Adhikari	Intermediate, Civil Engg.
2-	Sri S.K. Mishra	Junior Engineer	Intermediate, Ag. Engg. Diploma.
3-	Sri Bhola nath	Accountant	B.Com.
4-	Sri Shiv Badhuar Singh	Sr.Cleark	B.Sc.
5-	Sri Vinay Kumar Mishra	Sr.Cleark	M.B.A.
6-	Sri Ram Nihal Verma	ASCI	B.Sc.(Agri)
7-	Sri Tarun Chand Mishra	ASCI	M.Sc. (Agri.)
8-	Dr. Vinay Kumar	A.S.C.I.	Ph.d.
9-	Sri Narendra kumar trivedi	Work Incharge	B.Com.
10-	Sri Aditya Subrat segar	Work Incharge	B.A.
11-	Shri. Lal Sahab	Work Incharge	M.A.,B.Ed.
12-	Sri chit Bahal yaday	Work Incharge	Inter

13-	Sri Rajendra Nath divedi	Tracer	Intermediate
14-	Sri Vishuan Nath Jaiswal	Work Incharge	Inter
15-	Sri Saroje Kumar Mishra	Work Incharge	Inter
16-	Sri Ram tej Gupta	Work Incharge	Intermediate
17-	Sri Fojadar Ram	Work Incharge	Intermediate
18-	Sri Risal	IVth Class	Intermediate
19-	Sri Dildar Panday	IVth Class	Intermediate
20-	Sri Hare Ram	IVth Class	Intermediate
21-	Sri Rammurti	IVth Class	Intermediate

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 programmes, such as NREGA, BRGF, SGRY, National Horticulture Mission, Tribal, Welfare Schemes, Artificial Ground Water Recharging, Greening India, etc.

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 as Autonomous

organizations under State/Central Governments, Government Institutes/Research bodies, Intermediate Panchayats, Voluntary Organizations (VOS).

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

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

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

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

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

CHAPTER – 5

MANAGEMENT / ACTION PLAN

PROBLEM AND NEED OF THE AREA

Integrated Watershed Development Programme [is] aimed at the socio-economic upliftment of the dwellers of watershed area and to create trust about the programme to be implemented so that they can coordinate in participatory mode for success of the programme. As per the New Common Guidelines total financial outlay for entry point activities is 4% of the total project cost. To increase the per capita availability of drinking water, older wells of the village will be renovated as well as the chabootra will be constructed, to increase the irrigation water availability, older Bund which already exists but not functioning will be reconstructed /renovated. Repairing and maintenance of water bodies have been proposed on priority basis. Schools lies in the watershed area will be equipped with drinking water facility and extracurricular activities will be promoted among the children's of the water by supplying sport goods to the schools. For environmental purpose in the villages, tree planting will be done. Construction of Bathroom, Krishak Vikas Munch, and Soaking Pit will be completed. Total estimated cost for these activities is Rs. 19.104 Lakh.

ENTRY POINT ACTIVITY (EPA)

EPA activities are taken up under watershed projects to build a rapport with the village community at the beginning of the project; generally, certain important works which are in urgent demand of the local community are taken up. A group Discussion was conducted with watershed Development Committee regarding the EPA activity, It was conveyed to the WC that an amount of Rs. 19.104 Lakhs 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, (in lakh)

Name of Villages	Amount earmarked for EPA	Entry Point Activities Planned	Estimated Cost (in Lakhs)
1.Kariahan 2.Barari 3.Mahuadih 4.Rampur 5.Ijrahimafi 6.,Araipar 7.Belwamafi 8.Dontkhas 9.Bhatauli 10.Baitakra 11.Sekhauna 12Bharwali khas 13.BarniKhas 14.Thakurpur 15.Sjhawa 16.Baitalpur 17.ArajiTenduhi 18.Choriha 19.Bhanda 20.Sirjamkhas 21.Jamuna 22.Itwa 23.Bankati 24.Gudri 25.Sopari Khurd 26.Biadhy 27.Bisunpur 28.Mathpalgir 29.kasbobai	19.104 Lakhs	(A) Krashak Vikash Manch	12.367
		(B) Soak PIt	3.737
		(C) Bathroom	3.00

30.Kharidi 31.Sankarpur Bujurg, 32.Parsauna 33.Mundera 34Bankat 35.Narainpur 36.Rampur 37.Barari 38.,Basantpur 39.Bailpur 40.Bwelwar dubawar 41.,Jaitpura 42.Basantpur Buzarg 43.,Mundera 44.Baliya 45.Pandaychack 46.Bishunpur 47.Bhagwan 48.AwaraChoak 49.Balahi 50.Govindpur 51.Rociyapar 52.Mahuwa 53.Boriya Ananat 54.Mehara, 55.Boriya Sultan 56.Pokhabhinda 57.Parsa Barwa 58.Narainpur			

WATERSHED DEVELOPMENT WORK

Watershed Development works are proposed to be taken up from 2nd year of the initiation of the project .These work are proposed to be taken up from ridge to village and allocation of Rs. 238.80 & 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, Aforestation & development of silvi pastoral system in denuded land unfit for cultivation, following works are proposed under watershed Development works.

1. Contractions of bunds (Field bund, contour bund, Marginal & peripheral).
2. Renovation of Existing Bund for in-situ moisture conservation.
3. Rain fed Horticulture with and without fencing.
4. Construction of new & renovation of Existing talab and water bodies.
5. Aforestation and development of silvi pastoral system.
6. Drainage line treatment (pucca structures, Inlet, outlet and spillway).

Detail of activities of preparatory phase

Name of villages	**Institutional and capacity buildings**	**Detailed project report**	**Total estimated cost**
58	23.880	4.7760	28.656

Other Activities of watershed works phase – Proposed Target

Micro-watershed Code	Construction of bunds (Field bund, contour bund, Marginal bund & Peripheral bund).		Renovation of Existing bund for un –sites soil moisture conservation		Rain fed Horticulture with fencing		Rain fed Horticulture without fencing		New and renovation of existing water harvesting structures such as talab and water bodies etc.		Aforestation and development of silvi pastoral System		Drainage line Treatment Pucca structure inlet, outlet and Spillway	
	Area (ha)	Cost Rs. (In Lakh)	Area (ha)	Cost Rs. (In Lakh)	Area (ha)	Cost Rs. (In Lakh)	Area (ha)	Cost Rs. (In Lakh)	Area (ha)	Cost Rs. (In Lakh)	Area (ha)	Cost Rs. (In Lakh)	Nos.	Cost Rs. (In Lakh)
2B1C3c2a,2B1C3c2b	2962.00	120.19	198.81	7.91	5.55	2.78	200.00	30.00	590.00	70.68	23.64	2.25	30	4.99

PASTURE MANAGEMENT

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

The importance of grasses for protection and production, the two aspects of soil and water conservation is well known. Grass is unique in that it is the only resource utilized in situ by grazing. 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 for grazing, for gay and silage making or for both.

Intensive Fodder Production: In areas where the major enterprise of the farmers centers on 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 is 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 Silvi-Pastoral system.

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

Potentials of Semi-arid region for different forage production systems

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

ROLE OF GRASSLAND IN SOIL CONSERVATION

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

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

1- To condition the soil to make it resistant to determent and transportation and create more absorptive surface layer.

2- To cover the soil so that it is protected from the impact of wind and rain drops.

3- To decrease the velocity of wind or runoff water.

4- To provide safe disposal outlet for surplus run off.

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

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

HORTICULTURE DEVELOPMENT FOR WATERSHED MANAGEMENT

Horticulture is an important component of land use management. Now India is the second largest producer of fruits in the world after Brazil.

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

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

(A) Basic constraints

1- Lack of suitable agro-techniques for degraded lands
2- Lack of trained resource persons
3- Inadequate dissemination of the technologies
4- Lack of community approach
5- High biotic interference
6- Lack of infrastructure including marketing.

(B) Soil constraints

1- Poor nutrient status of the soil

2- Physical impediment

3- Moisture stress / water logging / inadequate drainage.

(C) Plant related constraints

1- Problem of plant establishment

2- Physiological disorders

3- Fruit drop and poor productivity

4- Incidence of insects-pests.

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

CONCEPTS AND ADVANTAGES OF CONSERVATION HORTICULTURE

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

The fruit trees grown with crops can provide fuel from pruned shoots and dried branches, leaf fodder for animals and leaf litter that can be utilized as mulch material and organic matter the leaf litter of deciduous fruit trees not only protects the top soil from the impact of raindrops but also improve soil structure, reduces evapo transpiration, 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 sloppy 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 dry farming conditions to increase the productivity by minimizing evapo transpiration losses.

6-Drip Irrigation:

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

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

S.No.	Particular	No.	L	B	D/H	Quantity	Rate	Amount
1	Earth work in digging	1	1.0	1.0	1.00	1.00	37.00	37.00
2	Cost of FYM, in Kg/pit	1	-	-	-	10Kg	10.00	100.00
3	Filling of pits mixed with FYM and soil	1	1.0	1.0	1.0	1.00	37.00	37.00
4	Cost of plants	1	-	-	-	1	26.00	26.00
Total								**200.00**
Say								**Rs. 200.00**

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

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

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

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

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

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

DRAWING AND DETAIL ESTIMATE OF LIVELIHOOD PROGRAMME IN WATERSHED WORK PHASE

DAIRYING AND LIVESTOCK DEVELOPMENT

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

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

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

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

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

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

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

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

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

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

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

Financial Component

S.No.	Component	Amount
1.	Cost of 10 goats of improved breed (not less than 6 months of age) @ Rs. 3200.00 each	32000.00
2.	Cost of 1 buck of improved breed @ Rs. 5000.00	5000.00
3.	Cost of insurance @ 11.63 / unit	4070.00
4.	Feed cost for 3 months @ 250 gm/ day for goats @ Rs. 11.84/ 250 gm	2930.40
5.	Provision of deworming, mineral and vitamin supplement, treatment, vaccination @ Rs.160/ animal	1760.00
6.	The expense including monitoring expenses, register and records @ Rs. 170.00/ unit	170.00
	Total	**Rs. 45,930.40**
		Say Rs. 46,000.00

Estimate of Livestock Development Activities

Total number of animals: Buffalo - 4520

Cow - 3366

Total - 7886

1. Artificial Insemination (A.I.): 33% of total animals per year, i.e., 9650 (say 9700 nos.)

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

Total Amount - Rs. 9,70,000

2. Vaccination: Total number of animals in I.W.M.P. III- 33948

1. H.S. + B.Q.	@ 5.50	186714.00
2. F.M.D.	@10.50	356454.00
	(Twice in a year)	

Total Amount - Rs. 5,43,168.00

3. Deworming: Adult animals -27948

Child animals - 6000

Albendazole for	27948 animals	@ 40.56	11,33,570.00
	6000 child animals	@20.28	1,21,680.00

Total Amount - Rs. 12,55,250.00

DRAWING AND DETAIL EATIMATE OF LIVLIHOOD WATERSHED WORK PHASE

PREPARATION OF COMPOST BY NADEF & BURMY 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 during, 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 'BARMY' COMPOST PIT'S

	DETAIL'S OF MEASURMENT	
Brick Work In Bed	3.50 x 1.50 x 0.11	= 0.577 Cmt.
,, ,, ,, Long Wall	2 x 3.50 x 0.23 x 0.32	= 0.515 ,,
,, ,, ,, Short Wall	2 x 1.00 x 0.23 x 0.23	= 0.147 ,,
	Total B.W.	**= 1.239 Cmt.**
Plaster Work In Bed	3.00 x 1.00	= 3.000 Sq.mt.
,, ,, ,, Long Wall	2 x 3.00 x 0.32	= 1.920 ,, ,,
,, ,, ,, Long Wall	2 x 3.50 x 0.23	= 1.610 ,, ,,
,, ,, ,, Long Wall	2 x 3.50 x 0.40	= 2.800 ,, ,,
,, ,, ,, Short Wall	2 x 1.00 x 0.32	= 0.640 ,, ,,
,, ,, ,, Short Wall	2. x 1.00 x 0.23	= 0.460 ,, ,,
,, ,, ,, Short Wall	2 x 1.50 x 0.40	= 1.200 ,, ,,
	Total P.W.	**=11.630 Sq.mt.**

MATERIAL & LABOUR ANALYSIS

S. No.	Name Of The Work	Quantity	Unit	Brick's (In No.'s)		Cement(In Bag's)		Moram(In Cmt.)		Messon(In No.'s)		Labour(In No.'s)	
				Rate Per Cmt./ Sq.mt.	No.'s Of Brick	Rate Per Cmt./ Sq.mt.	No.'s Of Bag	Rate Per Cmt./ Sq.mt.	Cmt.	Rate Per Cmt./ Sq.mt	No.'s Of Messon	Rate Per Messon	No.'s Of Labour
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1.	Brick Work	1.239	Cmt.	500	620	1.80	2.23	0.275	0.340	1.00	1.23	2.00	2.46
2.	Plaster Work	11.630	Sq. mt.	-	-	0.11	1.27	0.015	0.174	8.00	1.45	1.50	2.17
Total		-	-	-	**620**	-	**3.50**	-	**0.514**	-	**2.68**	-	**4.63**

Say Bricks 650 Nos. Cement 3.5 Bags, Moram 0.50 cmt, Messon 3 Nos., Labour 5 No.s

COST ANALYSIS

1. Brick	650 No.'s	@ 4600/-	Per Thousand	= Rs.2,990.00
2. Cement	3.50 Bag's	@ 320/-	Per Bag's	= Rs. 1120.00
3. Moram	0.50 Cmt.	@ 2600/-	Per Cmt.	= Rs. 1300.00
4. Messon	3.00 No.'s	@ 250/-	Per Messon	= Rs. 750.00
5. Labour	5.00 No.'s	@ 100/-	Per Labour	= Rs. 500.00
			Total Cost	**= Rs.6,660.00** **Say Rs.6,700.00**

ESTIMATE OF ‘NADEP' COMPOST PIT’S

DETAIL’S OF MEASURMENT

Brick Work In Bed		4.00 x 2.50 x 0.11 = 1.100 Cmt.
,, ,, ,, Long Wall		2 x 4.00 x 0.23 x 1.00 = 1.840 ,,
,, ,, ,, Short Wall		2 x 2.00 x 0.23 x 1.00 = 0.920 ,,
		Total B.W. = 3.860 ,,
Deduction Of BrickWork		2 x 3 x 8 x 0.15 x 0.23 x 0.08 = 0.132 ,,
		2 x 3 x 4 x 0.15 x 0.23 x 0.08 = 0.066 ,,
		Total Deduction = 0.198 ,,
		Total Net B.W. =3.662 Cmt.
Plaster Work In Bed	3.50 x 1.90	= 6.650 Sq.mt.
		Total P.W = 6.650 Sq.mt.

MATERIAL & LABOUR ANALYSIS

S. No.	Name Of The Work	Quantity	Unit	Brick's (In No.'s)		Cement(In Bag's)		Moram(In Cmt.)		Messon(In No.'s)		Labour(In No.'s)	
				Rate Per Cmt./ Sq.mt.	No.'s Of Brick	Rate Per Cmt./ Sq.mt.	No.'s Of Bag	Rate Per Cmt./ Sq.mt.	Cmt.	Rate Per Cmt./ Sq.mt.	No.'s Of Messon	Rate Per Messon	No.'s Of Labour
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1.	Brick Work	3.662	Cmt.	500	1831	1.80	6.59	0.275	1.007	1.00	3.66	2.00	7.32
2.	Plaster Work	6.650	Sq. mt.	-	-	0.11	0.73	0.015	0.099	8.00	0.83	1.50	1.24
Total		-	-	-	**1831**	-	**7.32**	-	**1.106**	-	**4.49**	-	**8.56**

Say Bricks 1850 Nos. Cement 7 Bags, Moram 1.20 cmt, Messon 5 Nos., Labour 9 No.s

COST ANALYSIS

1. Brick 1850 No.'s @ 4600/- Per Thousand = Rs. 8510.00
2. Cement 7.00 Bag's @ 320/- Per Bag's = Rs. 2240.00
3. Moram 1.20 Cmt. @ 2600/- Per Cmt. = Rs. 2,860.00
4. Messon 5.0 No.'s @ 250/- Per Messon = Rs. 1,250.00
5. Labour 9. 0 No.'s @ 100/- Per Labour = Rs. 900.00

Total Cost = Rs. 15,760.00 Say Rs. 15,800.00

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

DEMONSTRATION OF WHEAT

1- Variety recommended for District-Deoria
Irrigated-W.H-542
Un irrigated –K-8027, k-5351(Mandakini)
Kathia-Raj 1555

2- Seed rate -100 -125 Kg/hectare

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

ESTIMATE OF DEMONSTRATION OF WHEAT IN WATERSHED (PER ha)

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

Hence demonstration cost of wheat /ha is Rs. 5700.00

DEMONSTRATION OF GRAM IN WATERSHED AREA (per ha)

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

2- Seed rate/ha -50-55kg

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

4-

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)

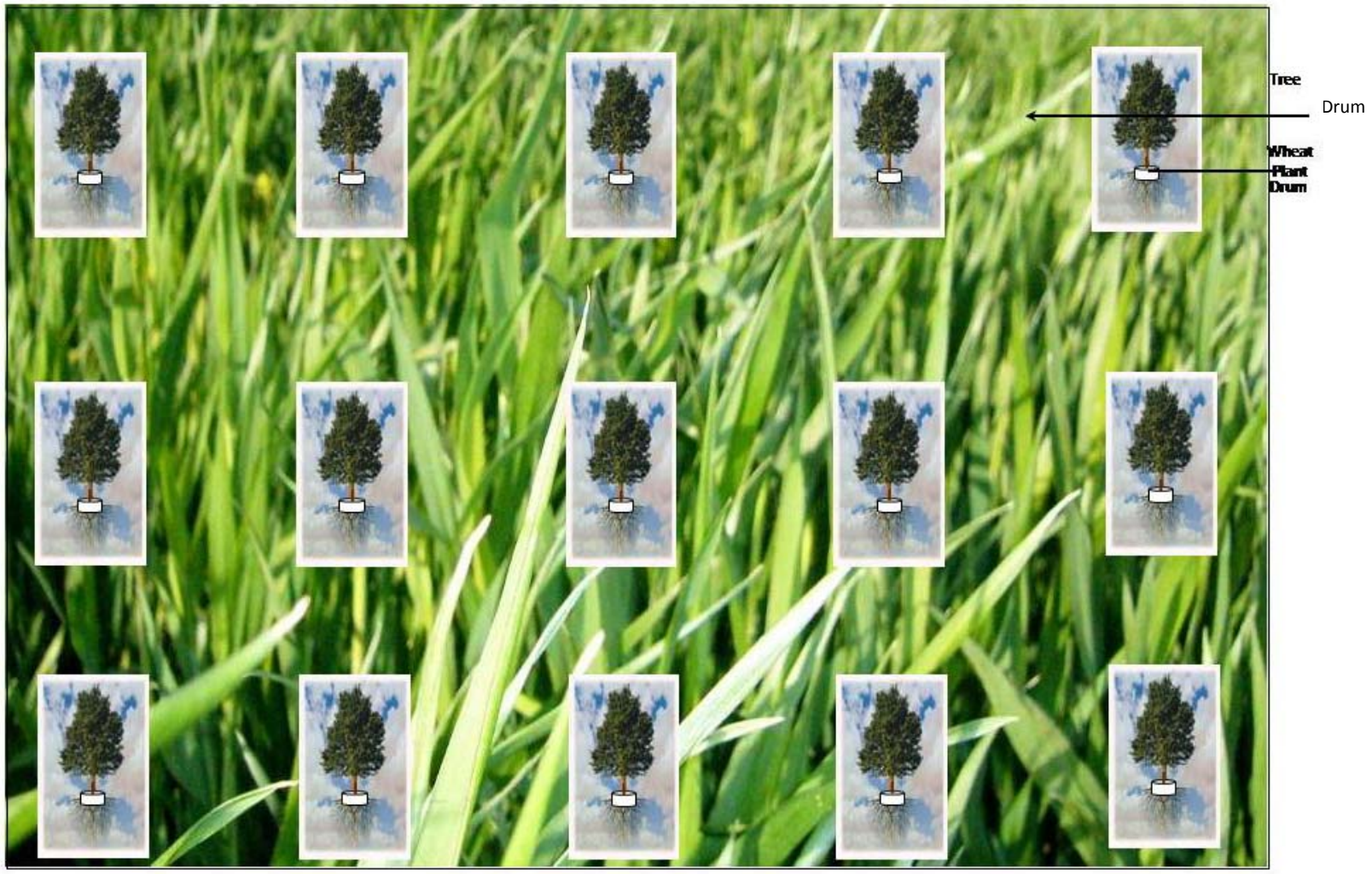
1- Variety - Malviya-13, narendra-1, Amar
2- Seed rate/ha -30 kg
3- Requirement of fertilizers/ha N-20.0 kg, P-50 kg, K-40 kg

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 M0de, 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 AGRO-FORESTRY / HORTICULTURE



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

District Deoria is situated in Eastern U.P. region where there is scarcity of water and in summer temperature rises up to 51°c causing upper layer of fields dry and therefore mortality rate of plants is very high. Farmers usually like to grow grain crops only. They are not interested in horticulture because of less holding. The production of crops decreases below the tree.

Therefore to promote horticulture with crops a demonstration model using plastic drums for horticulture is made. Mainly crops roots go in to the soil up to "4-5" in cereal crops and "6-9" in pulses. Using plastic drums the plants will be planted 50-60 cm below the ground level which is below the root zone of crops. Therefore trees will not able to take nutrients from upper layer of fields and there will no effect of plants on crops.

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

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 (no)
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**	**240.00**	**1200.0 m**	**156**

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Farm yard manure	1560.0 kg	15.00/kg	23400.00
2.	Barbed wire	1200.0 m/120.0 kg	80.00/kg	9600.00
3.	Angle iron	240.00 m/840 kg	50.00/kg	42000.00
4.	Plastic drum	156 nos	800.00 each	124800.00
5.	Cement	6.50 bags	320.00/bag	2080.00
6.	Coarse sand	0.450 cum	2600.00/cum	1170.00
7.	G.S.Grit 10-20 mm	0.900 cum	1600.00/cum	1440.00
8.	Plants	156 nos	26.00 each	4056.00
Total				**Rs. 2,08,546.00**

LABOUR CHARGES

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth work	1514.02 cum	37.00/cum	56018.74
2.	C.C.W. 1:2:4	1.064 cum	520.00/cum	553.28
3.	Fixing of angle iron	10 Man Days	370/Man Day	3700.00
4.	Fixing of barbed wire	15 Man Days	120/Man Day	1800.00
Total				**Rs. 62,072.02**

Total Expenditure	
1. Cost of materials	**2,08,546.00**
2. Labour Charges	**62,072.02**
Total	**Rs. 2,70,618.02**
Say	**Rs. 2,70,600.00 only**

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. In I.W.M.P. - II , Deoria, financial outlay of Rs. 26.208 lakhs have been proposed for capacity building, which is 5% of the total project cost.

Scope of capacity building at Project Area

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

CHAPTER -7
PHASING OF PROGRAMME & BUDGETING

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, Deoria project consist of 2 micro watersheds Gaura- 2B1C3c2a, 2B1C3c2b.

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 Gram Panchayat Adhikari. 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, and 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	Yes
Ridge to Valley treatment	Yes

Online IT connectivity between	Yes
(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	
Bio-pesticides	Yes
Organic manures	Yes
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

YEAR WISE FINANCIAL OUTLAYS (IN LAKH) PHASING OF WORK (FINANCIAL & PHYSICAL)

S.No.	Component	Unit	Quantity	Unit Cost (Lakhs)	1st Year (Lakhs) 2010-11	2nd Year (Lakhs) 2011-12	3rd Year (Lakhs) 2012-13	4th Year (Lakhs) 2013-14	5th Year (Lakhs) 2014-15	Total (Lakhs)
A.	**MANAGEMENT COSTS**									
	Administrative cost- TD & DA, POL/ Hiring of vehicles/ Office and payment of electricity and phone bill, etc. computer, stationary and office consumable and contingency				-	9.552	12.656	12.656	12.896	**47.760**
	Expert for monitoring and evaluation.	No.	NA	NA	-	2.387	1.790	1.790	3.585	**9.552**
	Sub Total					**11.939**	**14.446**	**14.446**	**16.481**	**57.312**
B.	**PREPARATORY PHASES**									
	(1.) Entry point Activities									
	A. Krishak Vikas Manch	No.	25	0.5082	12.604	-	-	-	-	**12.604**
	B. Soak Pit	No.	10	0.150	1.50	-	-	-	-	**1.50**
	C. Bathroom	No.	10	0.5	5.00	-	-	-	-	**5.00**
	Sub Total				**19.104**					**19.104**
	(2.) Institutional and Capacity Building	-	NA	-	4.776	9.552	3.582	3.582	2.388	**23.88**
	(3.) Detail Project Report	-	-	-	4.776	-	-	-	-	**4.776**

	Sub Total				**9.552**	**9.552**	**3.582**	**3.582**	**2.388**	**28.656**
C.	**WATERSHED WORKS**									
	(1.) Watershed Development Works									
	a. Construction of Bunds (Field Bund, Contour Bund, Marginal Bund and Peripheral Bund)	Ha	2962.00	0.04058	-	17.0475	33.0475	34.0475	36.0475	**120.19**
	b. Renovation of the Existing Bund for *insitu* soil Moisture Conservation	Ha	198.81	0.0398	-	1.0975	1.9775	1.9775	2.8575	**7.91**
	c. Rain fed Horticulture with Fencing	Ha	5.55	0.50	-	0.695	0.695	0.695	0.695	**2.78**
	Rain fed Horticulture without Fencing	Ha	200.00	0.15	-	7.5	7.5	7.5	7.5	**30.00**
	d. New and Renovation of Existing Water Harvesting Structure such as talab and water bodies	Ha	590.00	0.1198	-	7.67	17.774	17.013	28.223	**70.68**
	f. Aforestation and Development of Silvi-pastoral System	Ha	23.64	0130	-	0.5625	0.5625	0.5625	0.5625	**2.25**
	g. Drainage Line Treatment (Pucca Structure inlet ,outlet and spillway)	Nos.	30	-	-	1.2475	1.2475	1.2475	1.2475	**4.99**
	Sub Total				-	**35.82**	**62.804**	**63.043**	**77.133**	**238.80**
	(2.) Livelihood Programme (Community Based)									
	Income Generating Activities through S.H.G.'s for Landless and Marginal									

	Farmers									
	a. Establishment of Nadef-Compost Units	Nos	130	0.104	-	1.38	5.38	4.93	1.83	**13.52**
	b. Dairy Work	Nos	15	1.00	-	0.75	6.75	3.75	3.75	**15.00**
	c. Goat-keeping	Nos	25	0.5	-	0.125	5.289	3.961	3.125	**12.50**
	d. General Merchant Shop	Nos	12	0.25	-	0.75	0.75	0.75	0.75	**3.0**
	e. Livestock Development Activities	Detail Attached				1.771	0.935	0.935	0.099	**3.74**
	Sub Total				**-**	**4.776**	**19.104**	**14.326**	**9.554**	**47.76**
	(3.) Production System and Micro-Enterprises									
	a. Crop Production, Diversification of Agriculture	Ha	260	0.0625	-	2.0625	5.8725	6.2525	2.0625	**16.2500**
	b. Introduction of Agro-forestry / Horticulture	Ha	13.90	2.2345	-	1.637	7.155	10.63255	11.635	**31.05955**
	c. Demonstration of Green Manuring	Ha	520	0.0286	-	1.0765	6.0765	6.99495	0.6305	**14.77845**
	Sub Total					**4.776**	**19.104**	**23.880**	**14.328**	**62.088**
D.	**CONSOLIDATION PHASE**				-	-	-	-	**23.880**	**23.880**
	GRAND TOTAL				**28.656**	**66.863**	**119.040**	**119.279**	**143.762**	**477.60**

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

S.No.	No. of Groups				Total Groups	Proposed outlay (Rs. In lakh)	Expected annual income per SHG (Rs. In lakh)	Remark
	Dairy	General Merchent Shop	Goat Farming	Candle Making				
2B1C3c2d	2	2	3	2	9			
	3	3	3		9			
2B1C3c2c	5	1	3		9	47.76	0.30 to 0.45	---
	2	2	5		9			
2B1C3b2c	3	2	4		9			
Total	**15**	**10**	**18**	**2**	**45**	**47.76**	--	

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 organization 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 organization. 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

As per 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.

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.

Labor 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 0.47 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 2.0 lacs in the watershed.

EXPECTED EMPLOYMENT RELATED OUTCOMES

S. No.	No. of the villages	Wage employment										Self employment				
		No. of mandays					No. of beneficiaries					No. of beneficiaries				
		SC	ST	Others	Women	Total	SC	ST	Others	Women	Total	SC	ST	Others	Women	Total
1	58	112000	-	89739	22261	224000	970	-	620	40	1630	310	-	183	82	575

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

S.No.	No. of the villages	No. of persons migrating	No. of days per year of migration	Main reason for migration	Expected reduction in no. of persons migrating
1	58	338	About 180 days	Due to unemployment in village	270

VEGETATION/ CROP RELATED OUTCOMES

It is expected that after compilation of the project, the crop productivity of Rice-Wheat will certainly enhance, It would be around 25.00 qt/ha for Paddy, and 35.00 qt/ha for Wheat. There will be an improvement in soil health of the study area after conservation measures.

MAJOR CROPS GROWN AND THEIR PRODUCTIVITY IN THE PROJECT AREA

S. No.	Name of the Crop	Current status		Expected post project status	
		Area (ha)	Productivity (kg/ ha)	Area (ha)	Productivity (kg/ ha)
IWMP-III	Kharif	2700	1710	3500	2500
2	Rabi	3000	2510	4500	3500
	Sugarcane	50	11200	1000	35000
3	Zaid/Other season	600	650	1000	1000

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

Sr. 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	68800	57500	-11300	72000	+ 3200
2	Pulses	22000	20100	- 1900	23500	+ 1500
3	Oil seeds	2750	2060	-690	2880	+ 130
4	Vegetable	33000	30400	- 2600	35000	+ 2000

WATER RELATED OUTCOMES

The ground water quality of the project area is found to be suitable as per drinking water standard (IS: 10500) the average pH value ranges from 7.2 to 7.8, the Electric conductivity of the ground water varies from 957 to 1125 us/cm . The overall analysis of the ground water shows that the water is suitable 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	54	10 months	12 months	General	Good

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	54	Open wells	6.60	5.40	-

LIVESTOCK RELATED OUTCOMES

The village has quite a good of livestock population. These include cows, bullocks, buffaloes, goats. The interventions like provision of good quality cows and buffaloes, the establishment of a fodder bank and other such related activities would spur up

the dairy development in the village. It is expected that the post project period would see a substantial increase in livestock population and yield from them.

FOREST/VEGETATIVE COVER RELATED OUTCOMES

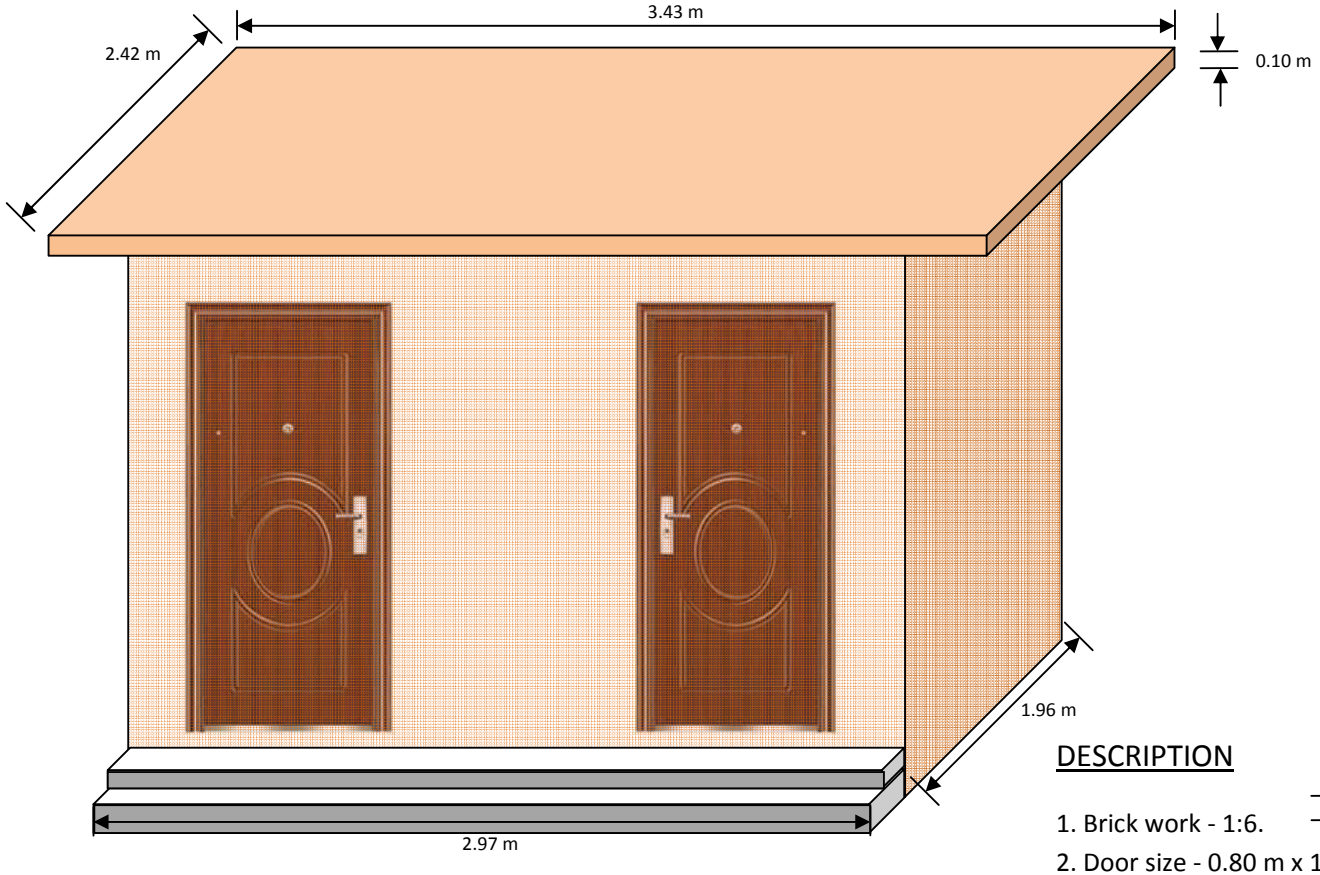
There is negligible area under tree cover. The village has a negligible forest area which consists of only *Prosopis Juliflora* (babool). Trees like Neem and *Alianthus* are seen just here and there, not concentrated in any area. It is planned that land to be covered under new plantation.

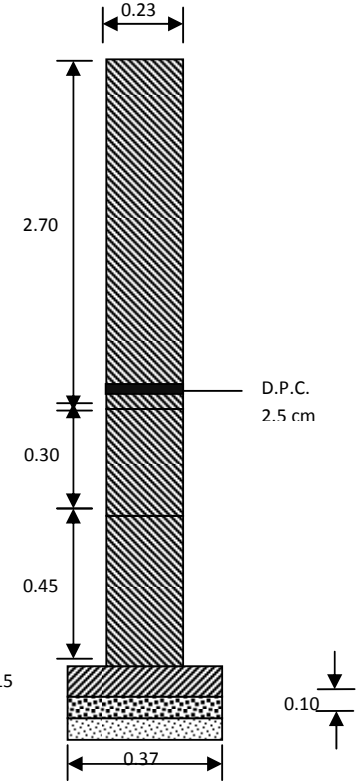
EXPECTED /ESTIMATED OUTCOMES OF IWMP-III (2010-2011), DEORIAS.No.	**Name of the District**	**Item**	**Unit of Measurement**	**Pre-project Status**	**Expected Post-project Status**
1	**2**	**3**	**4**	**5**	**6**
1.	DEORIA	Status of water table	Meter	6.60	5.40
2.		Grand water structure repaired/ rejuvenated	-	-	-
3.		Quality of drinking water	-	General	Good
4.		Availability of drinking water	-	10 months	12 months
5.		Increase in irrigation potential			
		Change in cropping/land use pattern	-	Paddy & others	Double Cropping
6.		Area under agriculture crop	Hector	4843	5200
		i- Area under single crop	Hector	2785	3209

		ii- Area under double crop	Hector	1700	2114
		iii- Area under multiple crop	Hector	221	518
		iv-Cropping Intensity	Ha	-	-
7.		Increase in area under vegetation	Hector	190	270
8.		Increase in area under horticulture	Hector	170	315
9.		Increase in area under fuel & fodder	Hector	3.50	9.0
10.		Increase in milk production	%	3	4
11.		No. of SHGs	No.	10	23
12.		Increase in no. of livelihoods	No.	45	54
13.		Migration	%	18	10
14.		SHG Federation formed	No.	-	-
15.		Credit Linkage with banks	-	-	-

CHAPTER -10
COST NORMS & DESIGN
STRUCTURE PROPOSED

DRAWING OF BATHROOM (Cloth Changing Room)





DESCRIPTION

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

DETAIL ESTIMATE OF PROPOSED BATHROOM (Cloth Changing Room)

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

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

		2	**1.96**	**-**	**3.00**	**11.76**
		4	**1.20**	**-**	**2.70**	**12.96**
		4	**1.50**	**-**	**2.70**	**16.20**
		2	**1.20**	**1.50**	**-**	**3.60**
	Total					**63.18 sq.m**
	Deduction for doors	2	0.80	-	1.80	2.88 sq.m
	Net white washing	**63.18 - 2.88**				**60.30 sq.m**
11	**Roof R.C.C. 1:2:4**	1	3.57	1.96	0.10	0.699 cum

CONSUMPTION OF MATERIALS

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

COST OF MATERIALS

S. No.	Particulars	Quantity	Rate	Amount
1.	Cement	27 bags	255.00/bag	6885.00
2.	Coarse sand	3.87 cum	910.00/cum	3521.70
3.	Bricks	3360 Nos.	4050.00/thousand	13608.00
4.	M.S. Bar 8 mm Ø	61.15 Kg.	345.00/qtl	2109.67
5.	G.S.B 25-40 m	0.576 cum	855/cum	492.48
6.	G.S. Grit 10-20 mm	0.742 cum	1250/cum	927.50
7.	Doors with frame	2 Nos.	3850.00 each	7700.00
8.	White lime	6 Kg.	8.00/kg	48.00
Total				**Rs. 35,292.35**

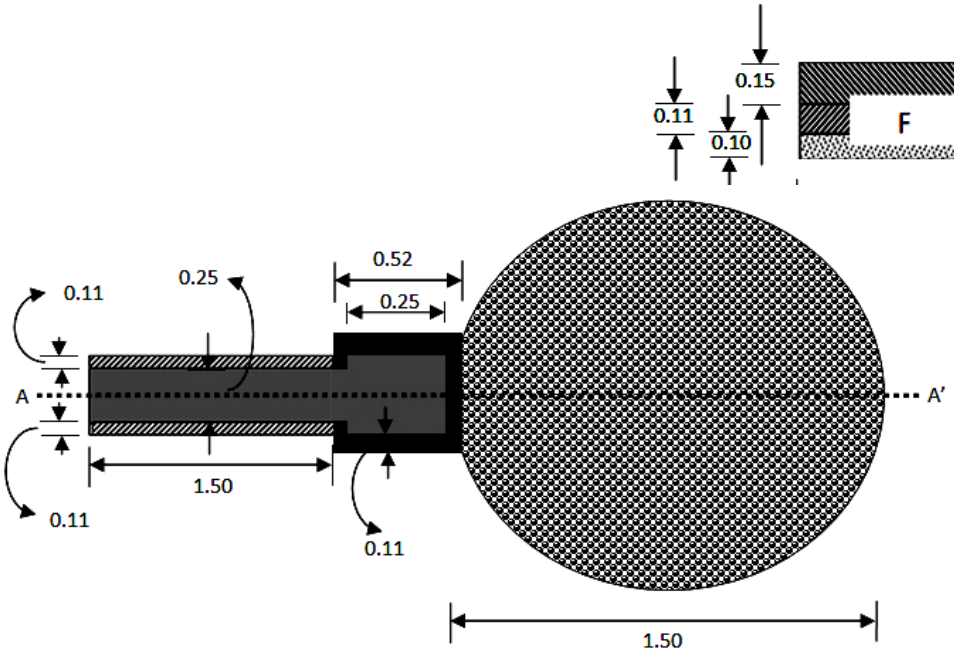
LABOUR CHARGES

S. No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	4.76 cum	33.33/cum	158.65
2.	Sand laying	0.350 cum	33.33/cum	11.66
3.	C.C.W. 1:4:8	0.620 cum	492.00/cum	305.04
4.	C.C.W. 1:2:4	0.095 cum	492.00/cum	46.74
5.	R.C.C.1:2:4	0.779 cum	560.00/cum	436.24
6.	Brick work	7.295 cum	370.00/cum	2699.15
7.	Plastering	60.300 m^2	40.00/m^2	2412.00
8.	White washing	60.300 m^2	2.70/m^2	162.81
9.	Curing	7.295 cum	25.00/cum	182.37
10.	Chowkidar	6 Man days	100.00/Man day	600.00
Total				**Rs. 7,014.66**

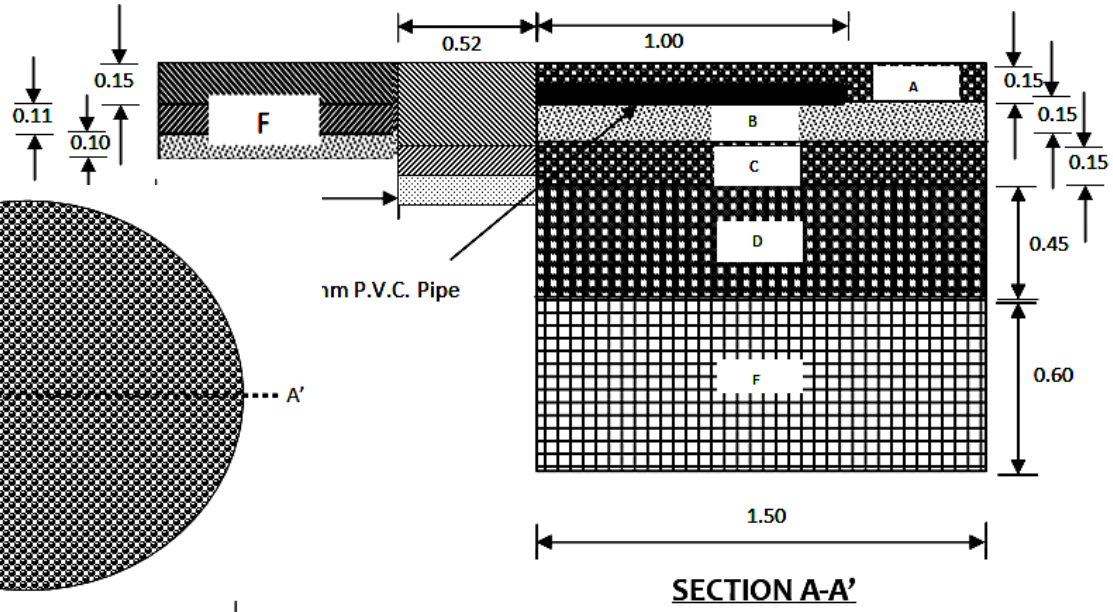
Total Cost	
1. Cost of materials	35,292.35
2. Labour charges	7,014.66
Total	**Rs. 42,307.01**
	Say Rs. 42,310.00 only .

DRAWING OF SOAKING PITS WITH SILTING TANK

All Dimensions Are in Metre



PLAN OF SOAKING PITS WITH SILTING TANKS



SECTION A-A'

DESCRIPTION :

A- 0.10 x 0.20 Grit.

B- Coarse Sand.

C- 0.10 x 0.20 Grit

D- 0.25 x 0.50 Grit

E- Cut Stone/Random Rubble.

F- Brick wall 0.11m x 0.25m Width channel

DETAIL ESTIMATE OF SOAKING PIT

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

ABSTRACT OF MEASUREMENT

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

CONSUMPTION OF MATERIAL

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

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Khanda	1.059 cum	1025.00/cum	1085.47
2.	Cement	0.35 Bags	255.00/Bag	89.25
3.	Brick	60 nos	4050.00/Thousand	243.00
4.	Coarse Sand	0.389 cum	910.00/cum	353.99
5.	G.S.B. 25-50 mm	1.058 cum	855.00/cum	904.59
6.	G.S.Grit	0.264 cum	1250.00/cum	330.00
	Total			**Rs. 3006.30**

LABOUR CHARGES

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

Total Expenditure	
1. Cost of materials	3006.30
2. Labour Charges	315.22
Total	**Rs. 3,321.52**
Say	**Rs. 3,325.00 only**

DETAIL ESTIMATE OF SILTING TANK

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

CONSUMPTION OF MATERIALS

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

COST OF MATERIALS

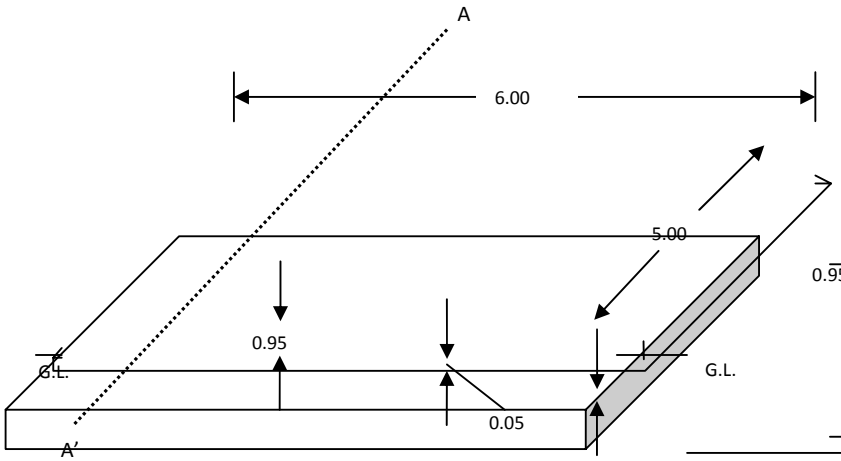
S.No.	Particulars	Quantity	Rate	Amount
1.	Coarse Sand	0.055 cum	910.00/cum	50.05
2.	Cement	0.17 bags	255.00/Bag	43.35
3.	Brick	39 nos.	4050.00/Thousand	157.95
4.	Steel Filter 4” Ø	1 nos.	25.00 each	25.00
5.	P.V.C. Pipe 110 mm Ø	1.00 m	150.00/m	150.00
Total				**Rs. 426.35**

LABOUR CHARGE

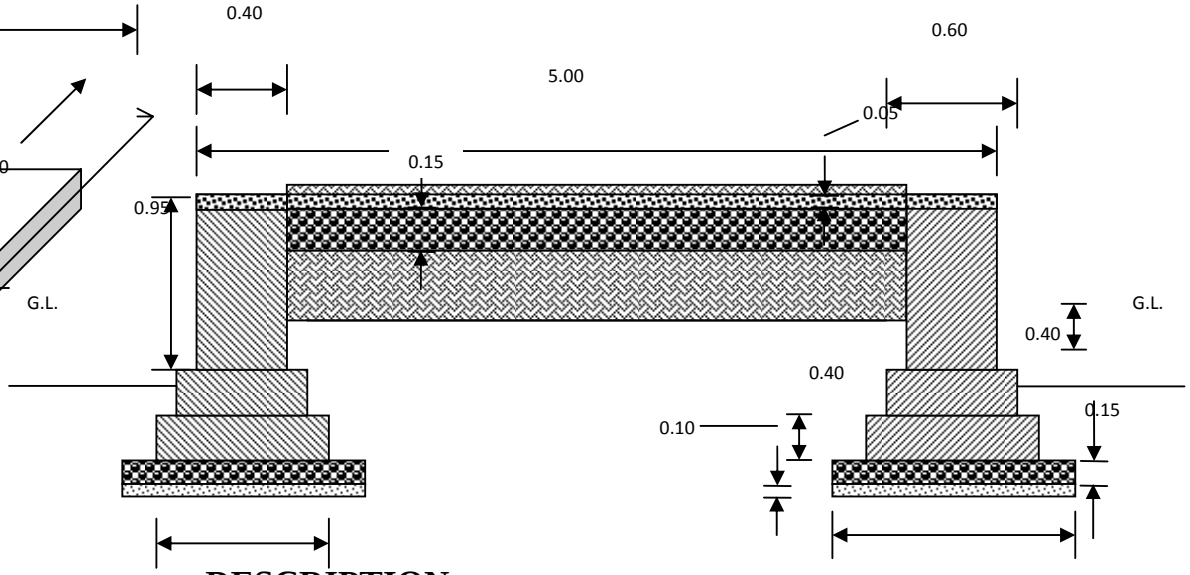
S. No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	0.24 cum	36.66/cum	8.79
2.	Sand Laying	0.027 cum	33.33/cum	0.89
3.	Brick Work	0.082 cum	370.00/cum	30.34
4.	Plastering	0.63 m^2	40.00/m^2	25.20
5.	Fixing of pipe & filter	-	-	25.00
	Total			**Rs. 90.22**

Total Expenditure	
1. Cost of materials	426.35
2. Labour Charge	90.22
Total	**Rs. 516.57**
	Say Rs. 520.00 only
TOTAL EXPENDITURE OF SOAKING PIT & SILTING TANK	
1. Soaking Pits	3325.00
2. Silting Tank	520.00
Total	**Rs. 3,845.00**
	Say Rs. 3845.00 only

DRAWING OF KRISHAK VIKAS MANCH



ISOMETRIC VIEW OF PLATFORM (CHABUTRA)



SECTION AT A-A'

DESCRIPTION

DESCRIPTION

1. C.C.W. - 1:4:8.
2. R.R. Stone masonry- 1:4
3. Plastering- 1:4
4. Raised Pointing- 1:3.

DETAIL ESTIMATE OF KRISHAK VIKAS MANCH

S.No.	Description of Work	No.	L.	B.	D/H	Quantity
1.	Earth work in foundation					
	Long Wall Short	2	8.00	1.20	1.10	21.12
	Wall	2	4.00	1.20	1.10	10.56
	Total					**31.68 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.	Stone 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	2	6.00	0.40	0.90	4.320
	Short Wall	2	4.20	0.40	0.90	3.024
	Total					**18.768 cum**

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

ABSTRACT OF WORK

1.	Earth Work	31.68 + 16.38	48.06 cum
2.	Sand Laying		2.040 cum
3.	C.C.W. 1:4:8	3.060 + 3.276	6.336 cum
4.	Stone masonry 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)	Khanda (cum)	G.S.B. 25-40 mm (cum)	Stone 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.	Stone Masonry	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	255/Bag	19635.00
2.	Coarse Sand	12.00 cum	910.00/cum	10920.00
3.	Khanda	18.768 cum	1025.00/cum	19237.20
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. 56,436.20**

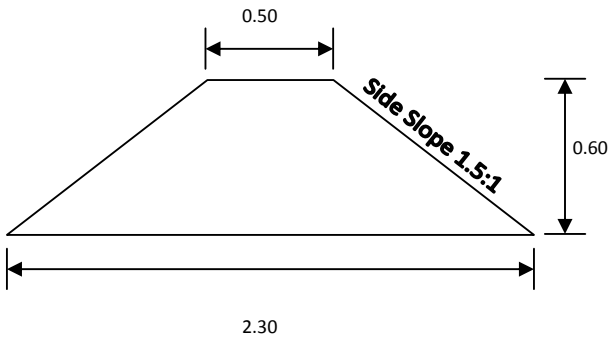
LABOUR CHARGES

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	48.06 cum	36.66/cum	1761.87
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.	R/R Stone Masonry 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. 14,736.73**

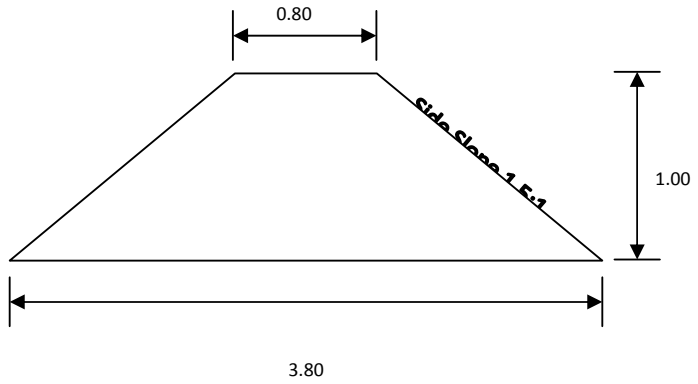
Total Expenditure	
1. Cost of Materials	56,436.20
2. Labour Charges	14,736.73
Total	**Rs. 71,172.93**
Say	**Rs. 71,200 only**

DETAILS ESTIMATE OF WATERSHED DEVELOPMENT WORK PHASE

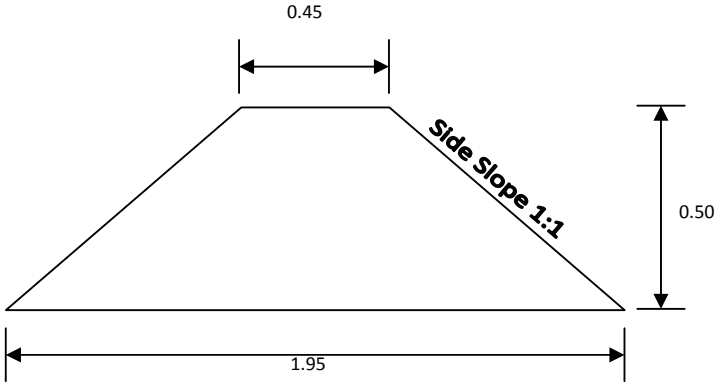
DRAWING OF C.B., S.B., P.B., AND M.B. *(Not to Scale)*



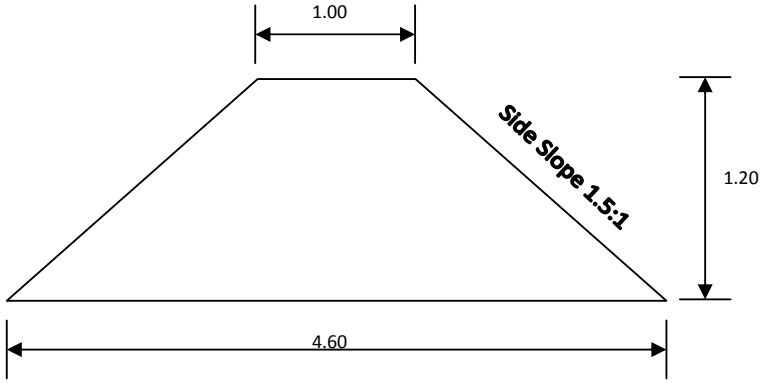
(C.B., Cross-Section – 0. 84 m^2)



(M.B., Cross-Section – 3.36m^2)



(Field Bund, Cross-Section – 0.60 m^2)



(S.B. /P.B., Cross-Section – 2.30 m^2)

(All dimensions in Metre)

Technical specification of watershed works

Technical Specification of field Bund.

Particular	Value	Unit
Top Width	0.50	M
Height	0.50	M
Bottom width	1.50	M
Cross section	0.50	M ²
Length /Ha	200	M
Earth work	100	CUM
Cost/ Ha	3257	Rs.

Technical Specification of contour bund.(1% slope land)

Particular	Value	Unit
Top Width	0.5	m
Height	0.7	m
Side Slop	1.5:1	-
Base of bund	2.60	m
Cross section	1.085	m ²
Length of bund/ha	150	m
Earth work	162.75	m
Cost/ Ha	5300	cum
		Rs..

Technical Specification of Submergence bund

Particular	Value	Unit
Top Width	0.80	m
Height of Bund	1.00	m
Side Slope	1.5:1	-
Base width	3.80	m
Cross section	2.30	m^2
Length of bund/ha	100.00	m
Earth work	230.00	cum
Cost/ Ha	7491.00	Rs.

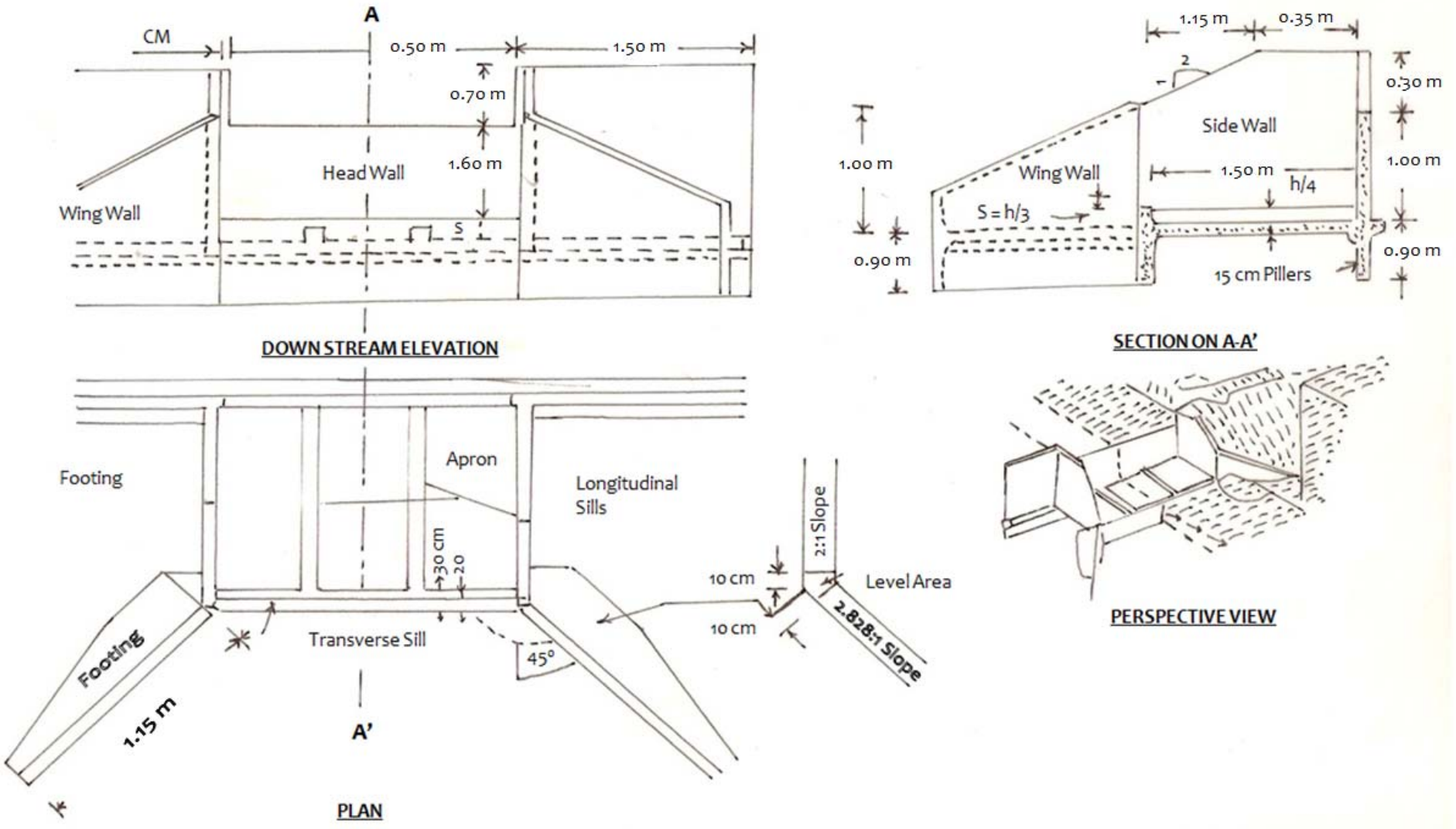
Technical Specification of Marginal bund

Particular	Value	Unit
Top Width	1.00	m
Height of bund	1.20	m
Side Slop	1.5:1	-
Bottom width	4.60	m^2
Cross section	3.36	m^3
Cost/ metre	109.43 say Rs. 110.00	Rs..

Technical Specification of water harvesting Bundhi /water bodies

Particular	Value	Unit
Top Width	2.50	m
Side Slop	2:1	-
Height	2.75	m
Bottom width	13.50	m
Cross section	22.00	m^2
Cost/ metre	968.00	Rs.

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 m (since width of gulley is 1.00 m)

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

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

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

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

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

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

3. Structural design –

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

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

E = 2.10 m or 0.75 m

Adopted 2.10 m

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

$= 0.50 \times 2.74 = 1.37$ m says 1.40 m

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

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

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

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

$= 1.0$ or $[1.16 - 0.735]$

$= 1.0$ or 0.425

adopt $J = 1.00$ m

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

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

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

$= 1.47 - 0.335$

$= 1.135$ m

Toe and cut off walls

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

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

$= 0.473 \times 0.464$

$= 0.219$

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

$= 1.5 \times 0.219$

$= 0.328$ m

says 0.35 m

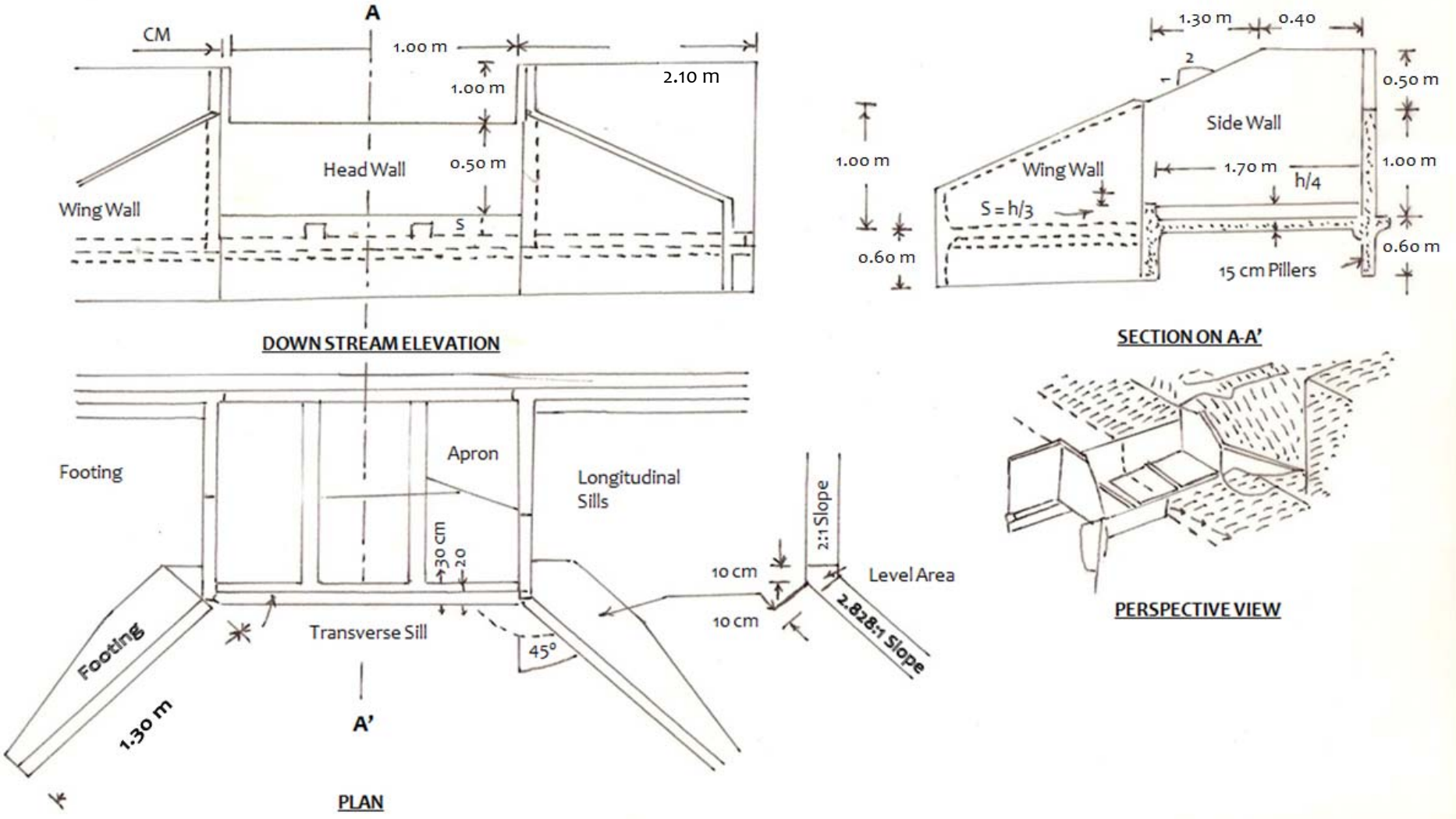
Depth of cutoff /Toe wall = 0.35 m

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

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

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

DRAWING OF SPILLWAY OF CREST LENGTH 1.0 m



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 Formula is given as :

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

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

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

To find suitable value of L & H

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

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

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

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

$$1.711 \times 4$$

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

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

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

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

$$E = 3 \times 0.50+0.6 \text{ or } 1.5 \times 1$$

$$E = (1.5 + 0.60) \text{ or } 21.50 \text{ m}$$

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

Adopted = 2.10 m

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

$= 1.14 + 0.54 = 1.68$ m

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

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

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

$= 2 \times 0.50$ or $[1.0+0.50+0.16 - (1.68+0.10)/2]$

$= 1.0$ or $[1.66 - 0.89]$

$= 1.00$ or 0.77

adopt $J = 1.00$ m

5- $M = 2 (f + 1.33 h - J) = 2 (1.0 + 1.33 \times 0.50 - 1.00) = 2 (1.665 - 1.00)$

$= 1.33$ m

6- $K = (L_B + 0.1) - M = (1.68 + 0.1) - 1.33$

$= 0.45$ m

Toe and cut off walls

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

$= 0.473 \times (0.5/1.0)^{1/3}$ taking $f = 1$

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

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

= 1.5 x 0.375

= 0.56 m

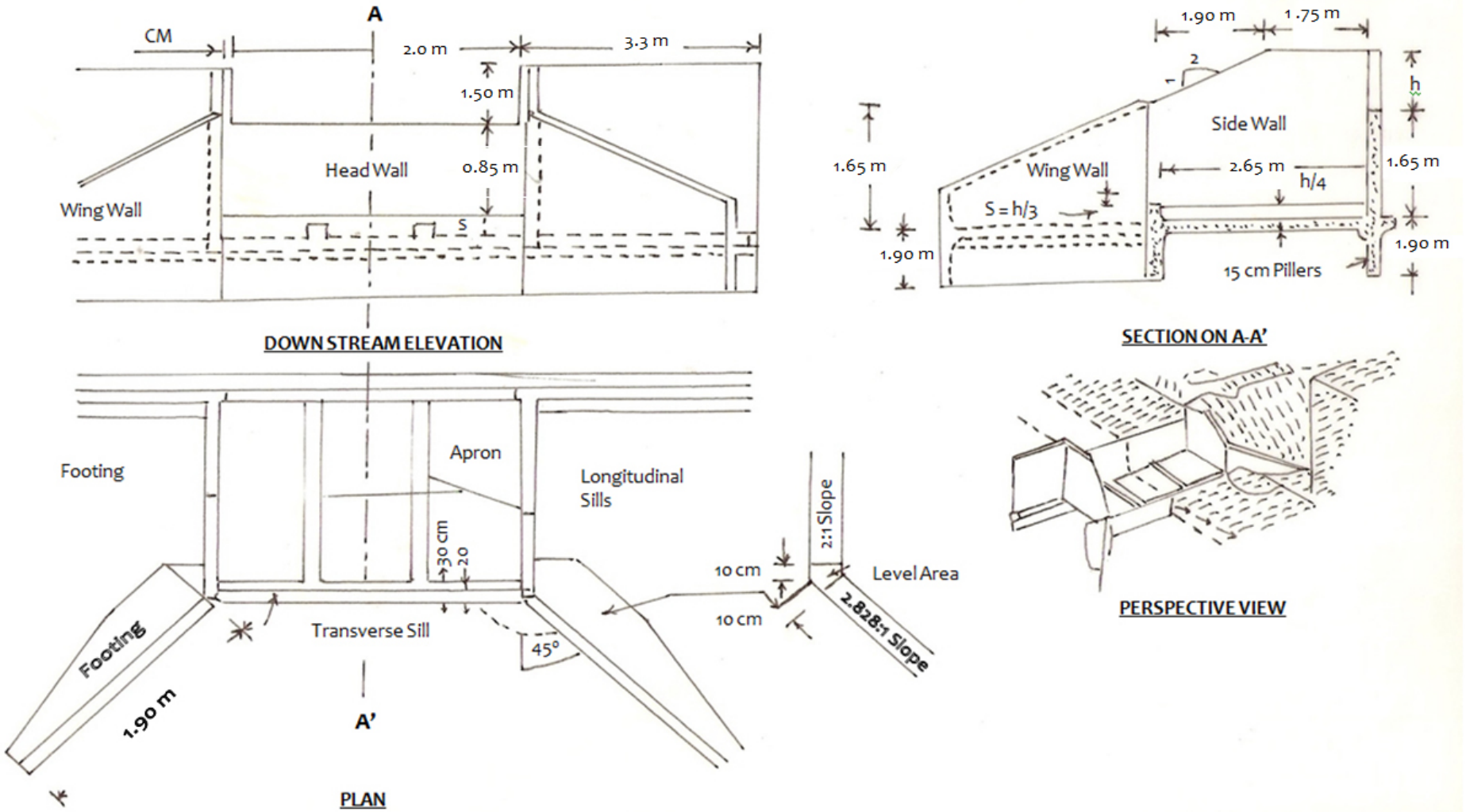
Depth of cutoff /Toe wall = 0.56 m **Say 0.60 M**

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

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

DRAWING OF SPILLWAY OF CREST LENGTH 2.00 m



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:

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

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

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

To find suitable value of L & H

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

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

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

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

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

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

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

Hence the designed hydraulic dimensions of the Spillway are:

Crest Length (L) = 2.00 m

Weir depth (h) = 0.81 m

3. Structural design –

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

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

E = 3.03 m or 2.25 m

Adopted 3.03 m

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

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

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

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

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

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

$= 1.62$ or $[2.58 - 1.35]$

$= 1.62$ or 0.123

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

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

$= 1.90\ \text{m}$

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

$= 0.81\ \text{m}$

Toe and cut off walls

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

$= 0.473 \times (2/1)^{1/3}$

$= 0.473 \times 1.259$

= 0.595 m

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

= 1.5 x 0.595

= 0.89 m

Depth of cutoff /Toe wall = 0.89 m

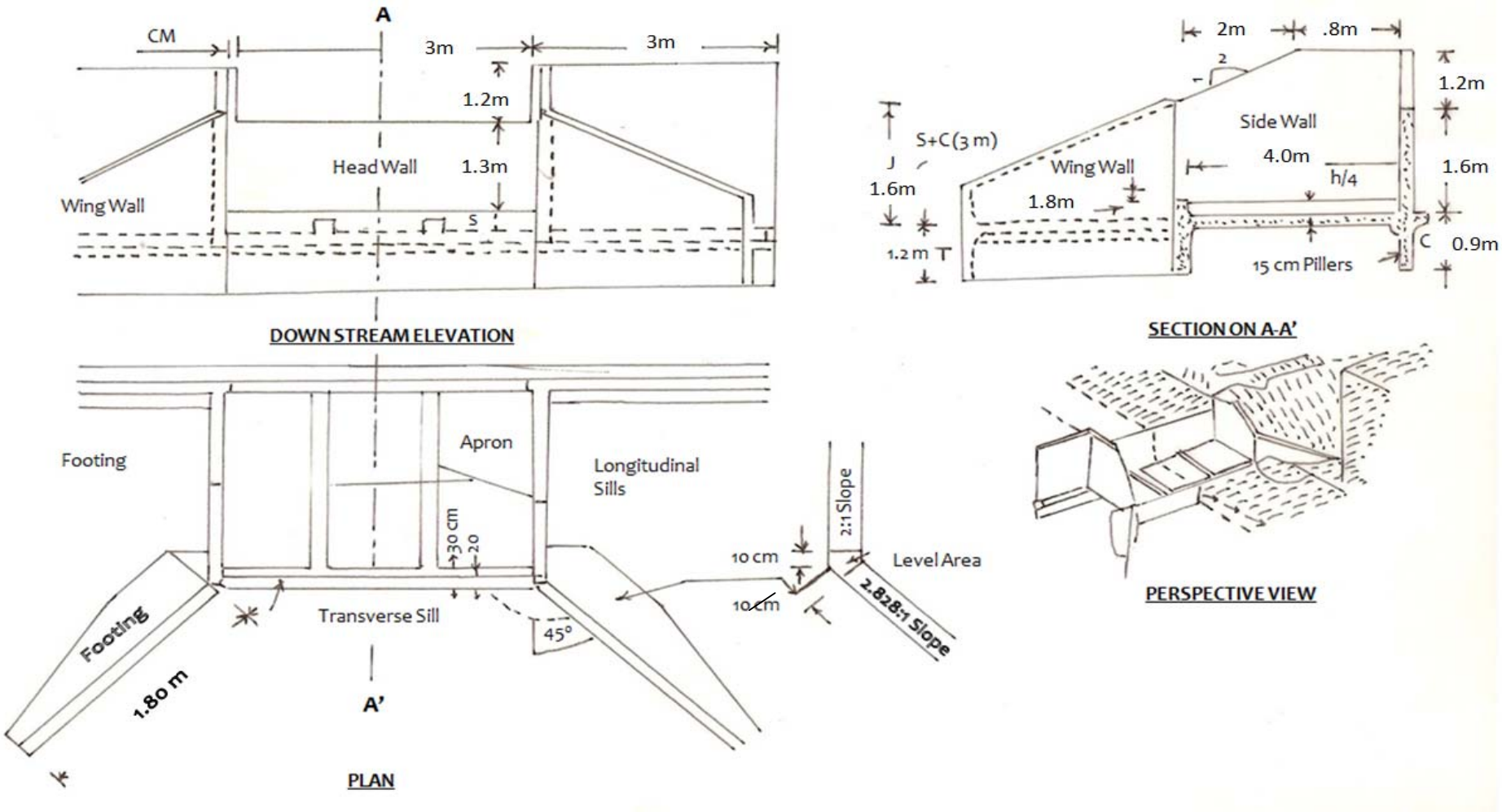
Apron thickness: For as over fall of 1.50 m is concrete construction is 0.30 m since the structure is constructed in masonry, the Apron thickness will be 0.30 x 1.50 = 0.45 m

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

Description	**Thickness of wall**	
	Top width	**Bottom width**
Head wall	0.45	1.33
Side wall	0.30	1.10
Wing wall and head wall extension	0.30	0.80

DRAWING OF SPILLWAY OF CREST LENGTH 3.0 m

Not to Scale



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:

$$Q = \frac{C.I.A.}{360} = \frac{0.3x120x30.0}{360} = 3.0\ m^3/s$$

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

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

To find suitable value of L & H

Let us assume L = 3.0 m (since width of gulley is 4.00 m)

$$3.0 = \frac{1.711\ L\ H^{3/2}}{(1.1+0.01x1.5)} = \frac{1.711\ L\ H^{3/2}}{(1.1+0.15)}$$

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

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

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

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

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

Hence the designed hydraulic dimensions of the Spillway are:

Crest Length (L) = 3.00 m

Weir depth (h) = 0.80 m

3. Structural design –

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

$E = 3x0.80+0.6$ or $1.5x1.50$

$E = 3.0$ m or 2.25 m

Head wall extension = 3.0 m

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

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

$= 2.634$ m says 2.63 m

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

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

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

$= 2 \times 0.80$ or $[1.50+0.80+0.26 - (2.63+0.10)/2]$

$= 1.6$ or $[2.56 - 1.365]$

$= 1.6$ or 1.195

adopt $J = 1.60$ m

5- $M = 2 (f + 1.33 h - J) = 2 (1.50 + 1.33 \times 0.80 - 1.60) = 2 (2.564 - 1.60)$

$= 1.928$ m

6- $K = (L_B + 0.1) - M = (2.63 + 0.1) - 1.93$

$= 0.80$ m

Toe and cut off walls

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

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

= 0.473 x 1.442

= 0.68 m

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

= 1.5 x 0.68

= 1.02 m

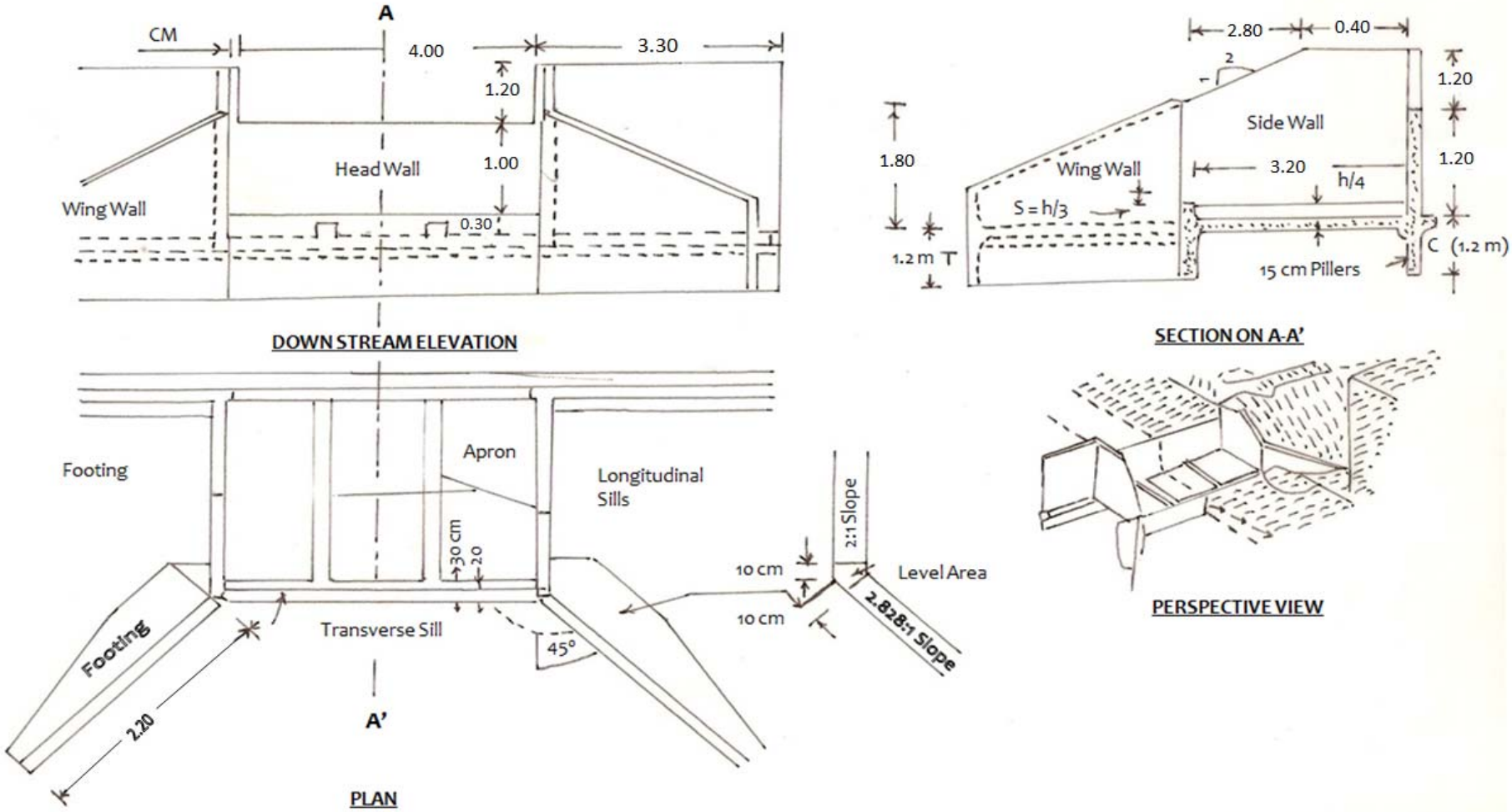
Depth of cutoff /Toe wall = 1.02 m

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

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

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

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 has 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:

$$Q = \frac{C.I.A.}{360} = \frac{0.3x120x50}{360} = 5.00 m^3/second$$

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 gulley is 5.0 m)

$$5 = \frac{1.711x4.0x\ h^{3/2}}{(1.10+0.01x2)}$$

$$h^{3/2} = \frac{5.0x1.12}{} = \frac{5.60}{} = 0.818$$

$$h = \frac{6.844}{(0.818)^{2/3}} = \frac{6.844}{}$$

$$= 0.874 \text{ m} \quad \text{says} \quad 0.90 \text{ m.}$$

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:

Crest Length (L) = 4.0 m

Weir depth (h) = 0.90 m

3. Structural design –

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

E = 3x0.9+0.6 = 3.3 or 1.5x2 = 3.00 m

E = 3.30 m

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

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

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

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

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

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

$= 1.8$ or $[3.20 - 1.58]$

$= 1.8$ or 1.62 hence adopt $J = 1.8$ m

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

$= 2 \times 1.397 = 2.794$ Says 2.80 m

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

$= 0.36$ m

Toe and cut off walls

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

$= 0.473 \times (5/1)^{1/3}$

$= 0.473 \times 1.7099$

$= 0.808$

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

$= 1.5 \times 808$

= 1.212 says 1.21 m

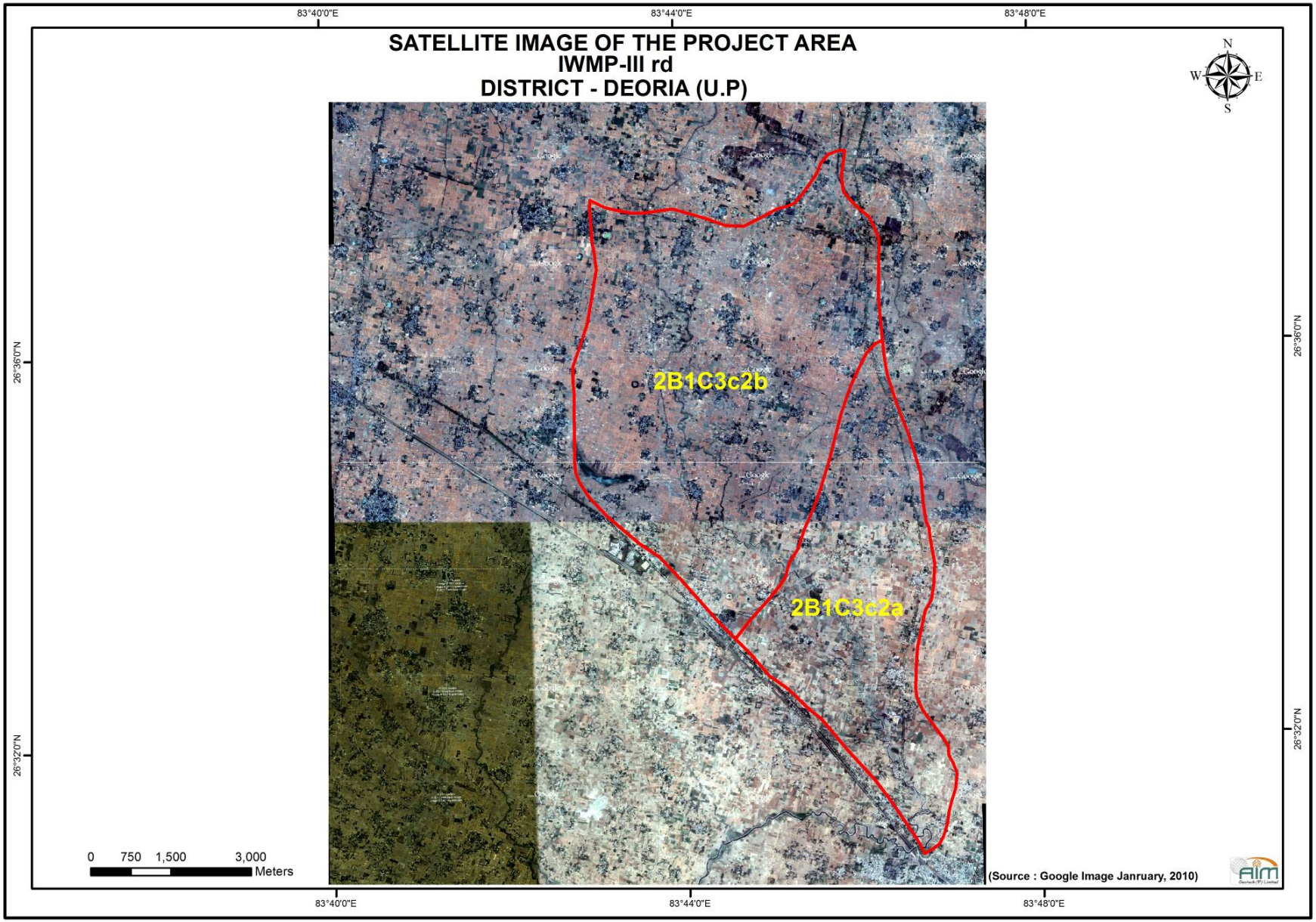
Depth of cutoff /Toe wall = 1.21 m

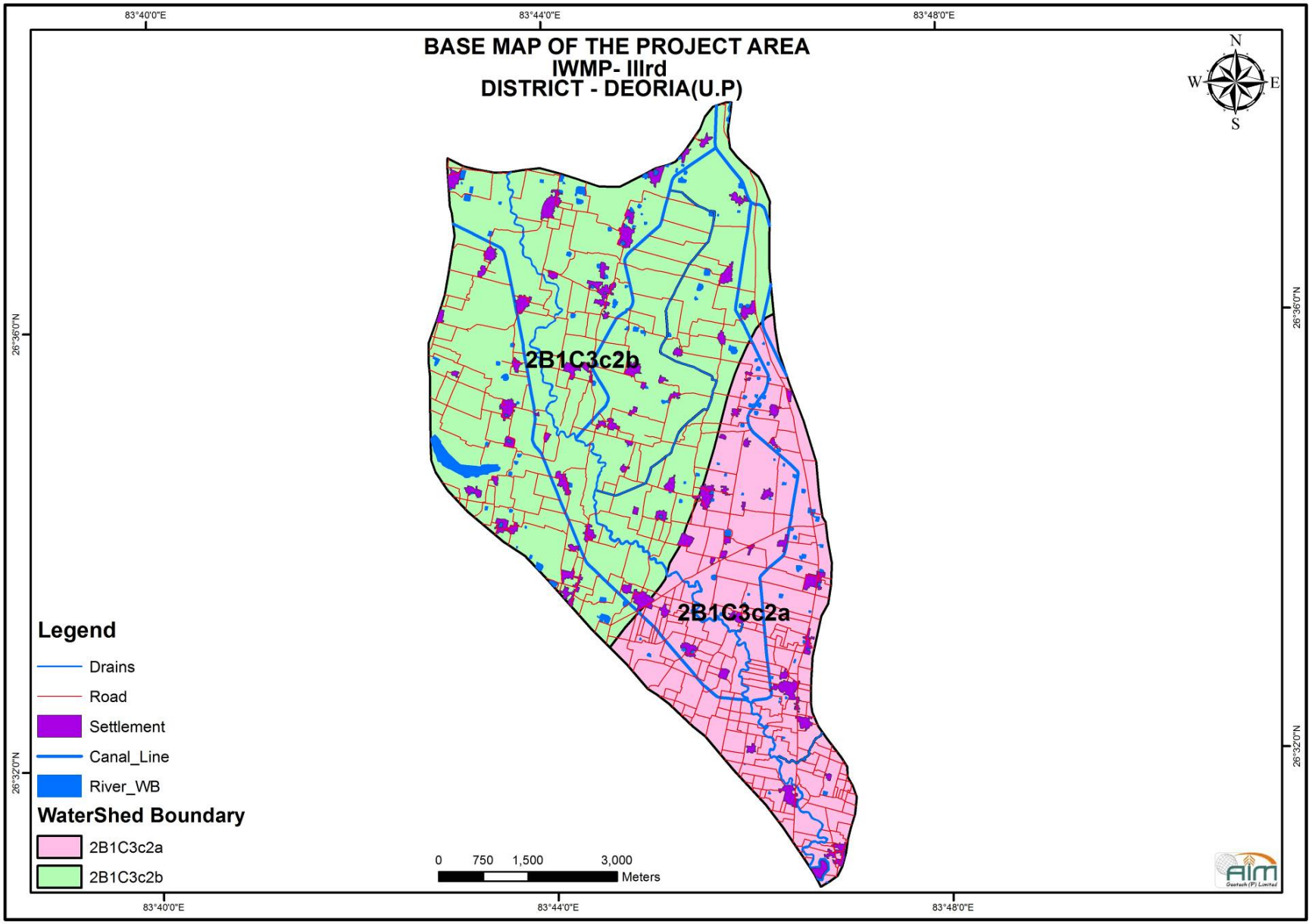
Apron Thickness : For an over fall of 2.0 m in concrete construction is 0.3 m, since the structure is constructed in masonry , the Apron thickness will be 1.5 x 0.30 = 0.45 m

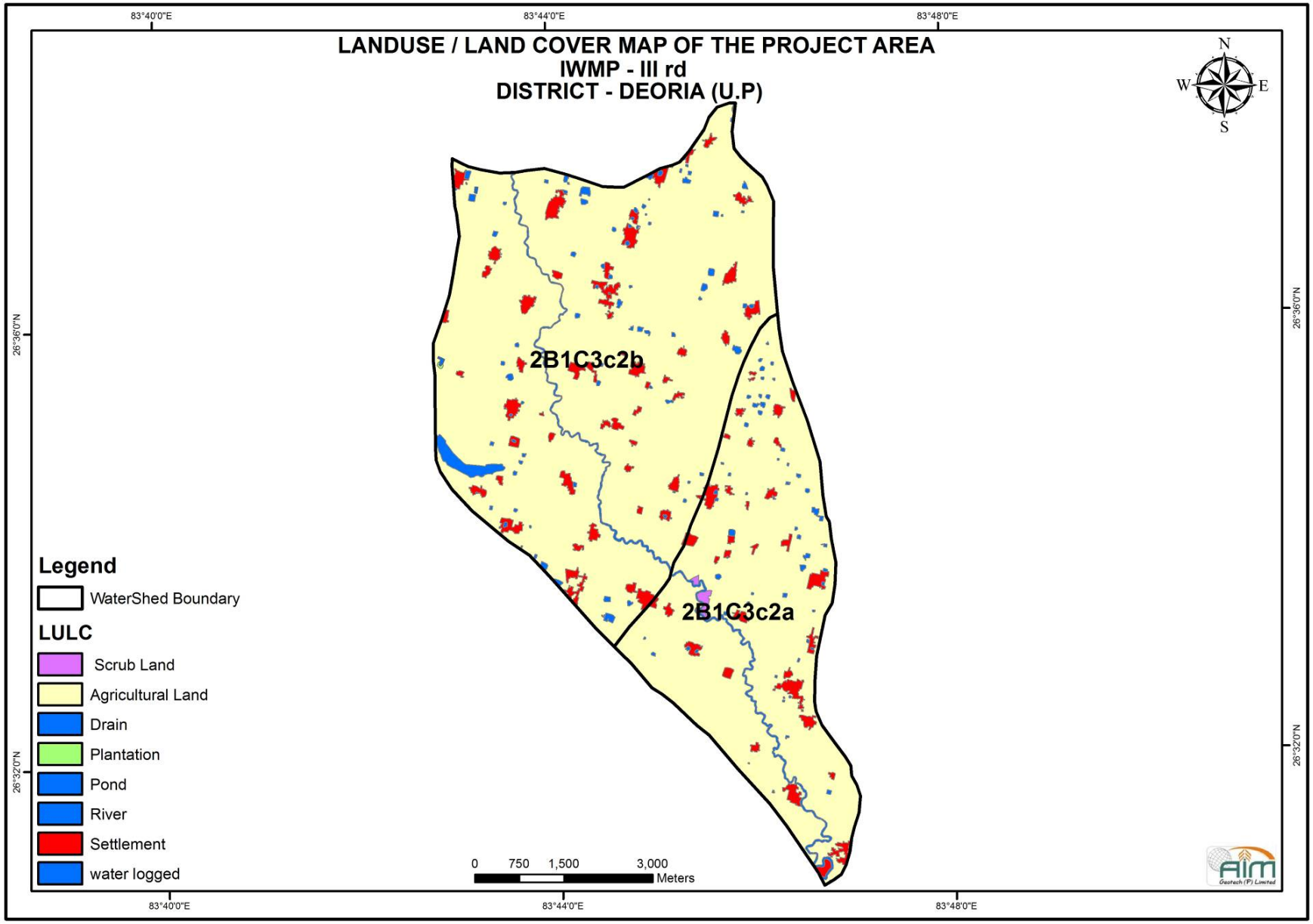
Wall Thickness : The thickness of different wall of the structure (masonry construction) is given below:

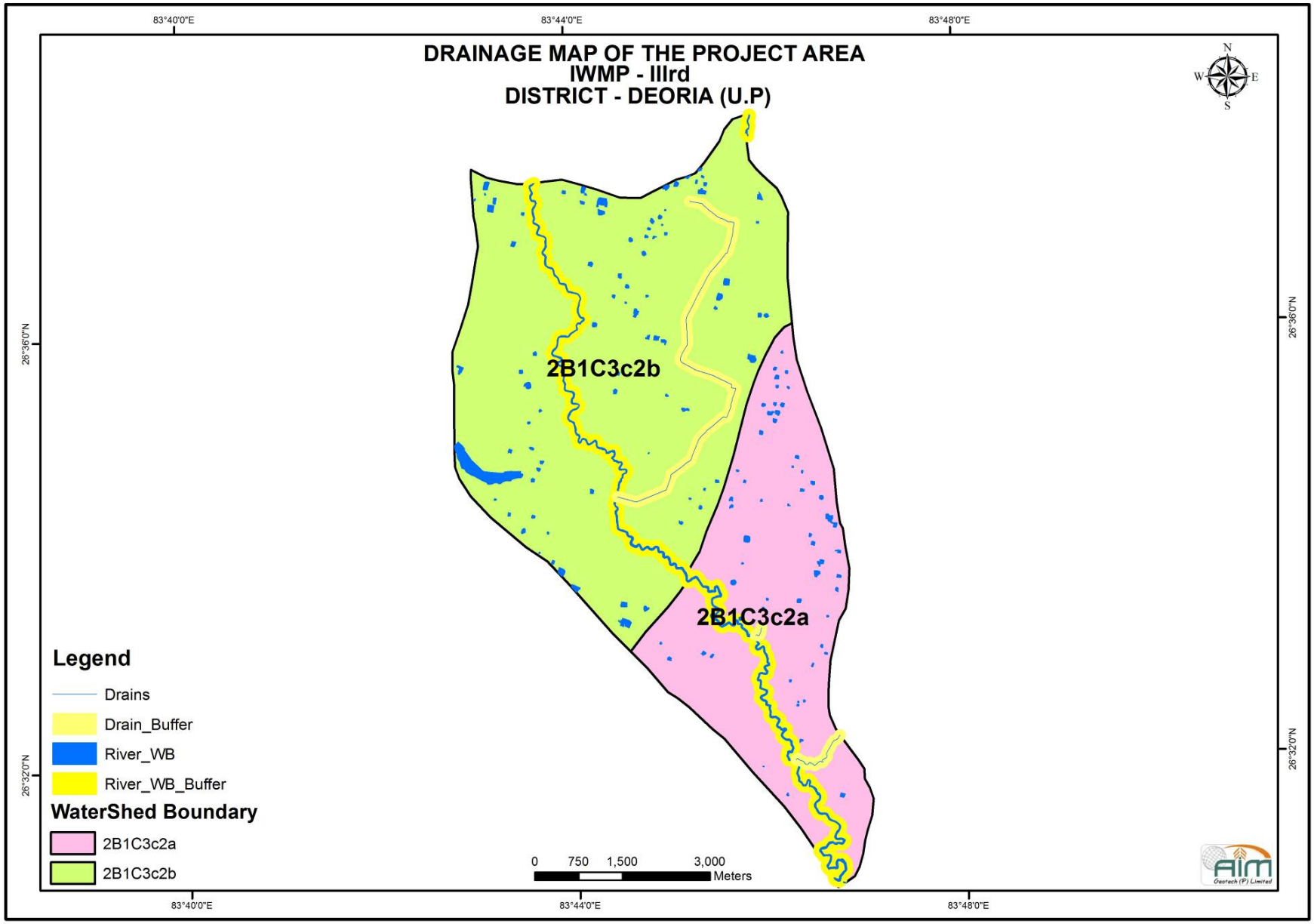
Description	**Thickness of wall**	
	Top width	**Bottom width**
Head wall	0.45	1.33
Side wall	0.30	1.10
Wing wall and head wall extension	0.30	0.80

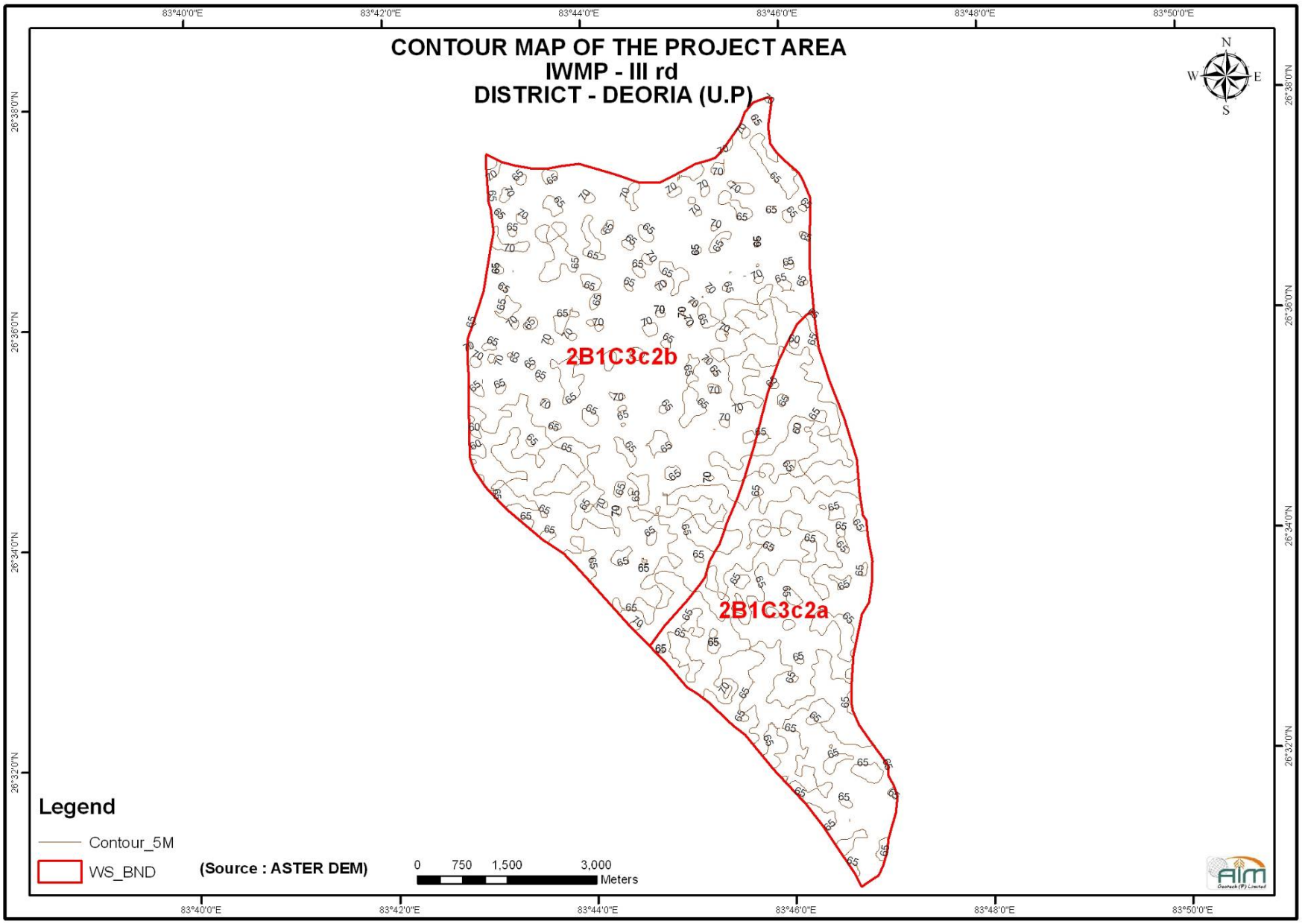
MAPS

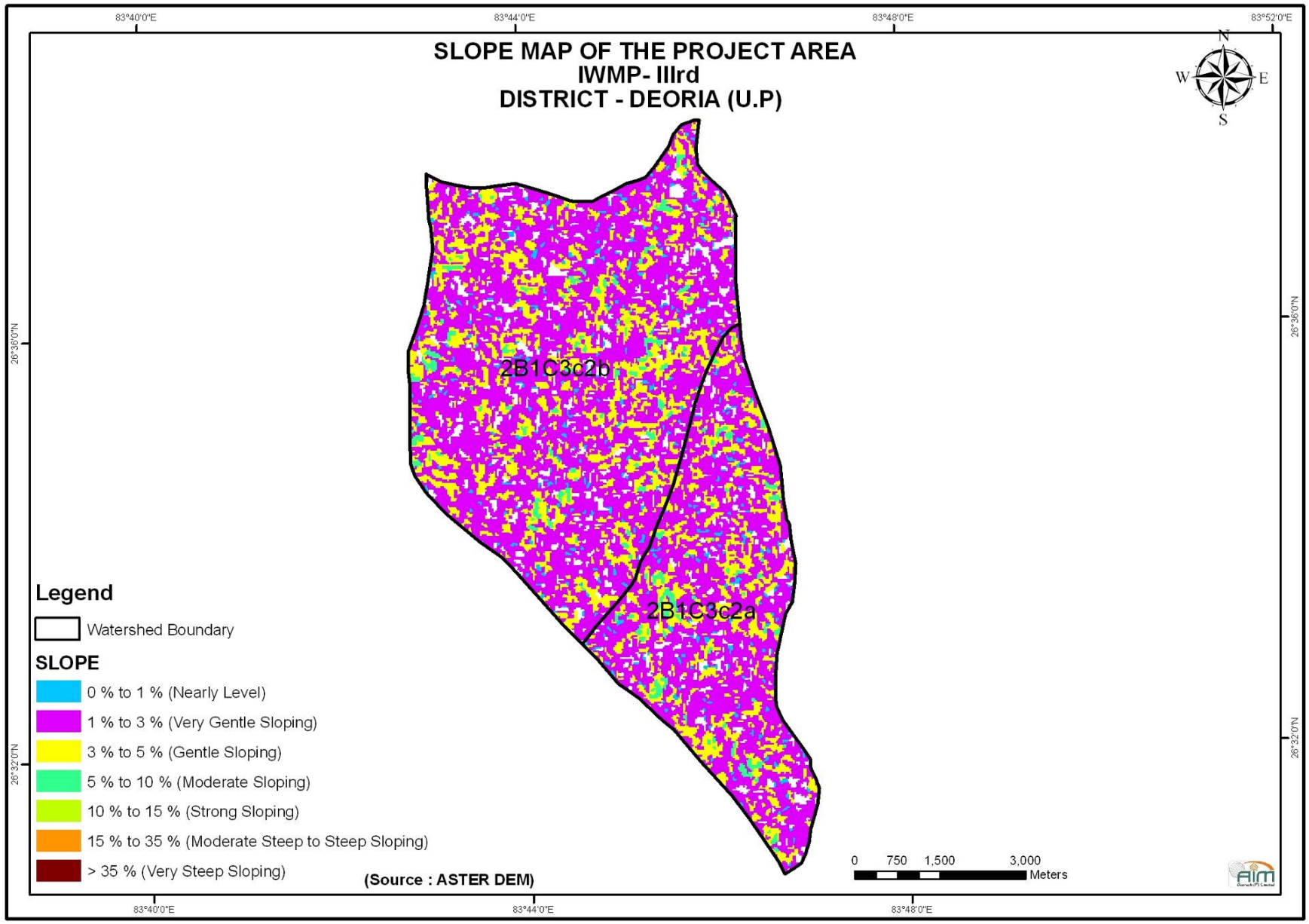

SATELLITE IMAGE OF THE PROJECT AREA
IWMP-III rd
DISTRICT - DEORIA (U.P)
83°40'0"E
83°44'0"E
83°48'0"E
26°36'0"N
26°32'0"N
N
W
E
S
2B1C3c2b
2B1C3c2a
0 750 1,500 3,000
Meters
(Source : Google Image Janruary, 2010)


BASE MAP OF THE PROJECT AREA
IWMP- IIIrd
DISTRICT - DEORIA(U.P)
83°40'0"E
83°44'0"E
83°48'0"E
26°36'0"N
26°32'0"N
N
S
E
W
2B1C3c2b
2B1C3c2a
Legend
Drains
Road
Settlement
Canal_Line
River_WB
WaterShed Boundary
2B1C3c2a
2B1C3c2b
0 750 1,500 3,000
Meters


LANDUSE / LAND COVER MAP OF THE PROJECT AREA
IWMP - III rd
DISTRICT - DEORIA (U.P)
N
W
E
S
83°40'0"E
83°44'0"E
83°48'0"E
26°36'0"N
26°32'0"N
2B1C3c2b
2B1C3c2a
Legend
WaterShed Boundary
LULC
Scrub Land
Agricultural Land
Drain
Plantation
Pond
River
Settlement
water logged
0 750 1,500 3,000
Meters


DRAINAGE MAP OF THE PROJECT AREA
IWMP - IIIrd
DISTRICT - DEORIA (U.P)
83°40'0"E
83°44'0"E
83°48'0"E
26°36'0"N
26°32'0"N
N
S
E
W
2B1C3c2b
2B1C3c2a
Legend
Drains
Drain_Buffer
River_WB
River_WB_Buffer
WaterShed Boundary
2B1C3c2a
2B1C3c2b
0 750 1,500 3,000
Meters


CONTOUR MAP OF THE PROJECT AREA
IWMP - III rd
DISTRICT - DEORIA (U.P)
N
S
E
W
83°40'0"E
83°42'0"E
83°44'0"E
83°46'0"E
83°48'0"E
83°50'0"E
26°38'0"N
26°36'0"N
26°34'0"N
26°32'0"N
2B1C3c2b
2B1C3c2a
Legend
Contour_5M
WS_BND
(Source : ASTER DEM)
0 750 1,500 3,000
Meters


SLOPE MAP OF THE PROJECT AREA
IWMP- IIIrd
DISTRICT - DEORIA (U.P)
83°40'0"E
83°44'0"E
83°48'0"E
83°52'0"E
26°36'0"N
26°32'0"N
N
S
E
W
2B1C3c2b
2B1C3c2a
Legend
Watershed Boundary
SLOPE
0 % to 1 % (Nearly Level)
1 % to 3 % (Very Gentle Sloping)
3 % to 5 % (Gentle Sloping)
5 % to 10 % (Moderate Sloping)
10 % to 15 % (Strong Sloping)
15 % to 35 % (Moderate Steep to Steep Sloping)
> 35 % (Very Steep Sloping)
(Source : ASTER DEM)
0 750 1,500 3,000
Meters

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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District – Deoria