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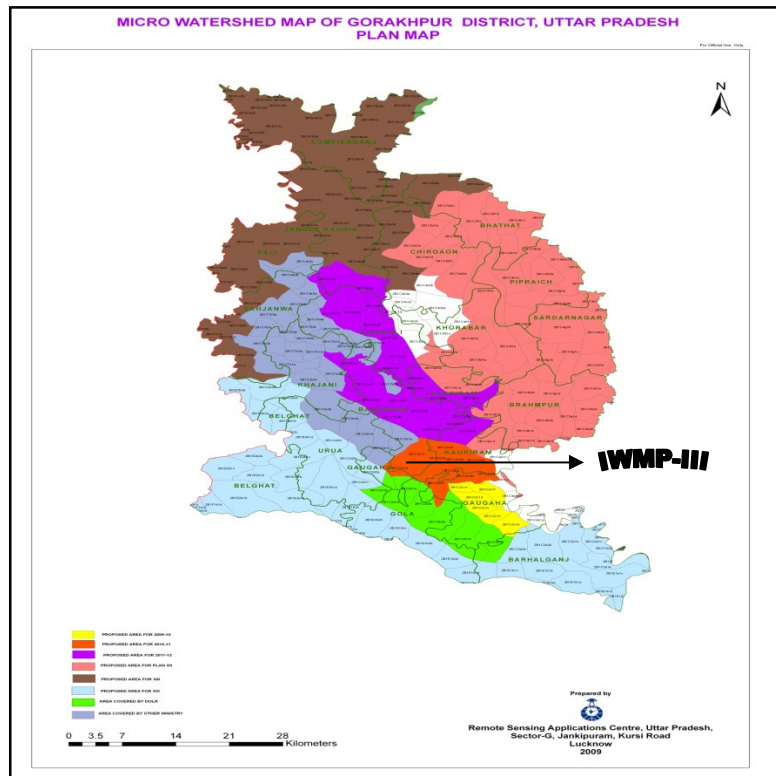
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I.W.M.P.-III (2010-11) DISTRICT- GORAKHPUR (U.P.)

Name of the project	Weightage	No.of MWS	Geographical Area (ha)	Rainfed Area(ha)	Treatable area (ha)
I.W.M.P.III	87.5	4	5101.40	4800	4675

PROJECT AT A GLANCE

1.	Name of Block	Kaudiram , Gagaha, Gola & Bangsao
2.	No. of Gram Panchayats	48
3.	Four reasons for selection of Watershed	1. Population are poor 80% to 50% 2. Rain fed area more then 90% 3.% of small and Morginal farmer>80% 4. Land with moderate production
4.	Date of approval of watershed Development Plan by DRDA/DPC	19-10-2010
5.	Area proposed to be treated (ha.)	4675
6.	Date of sanction of PPR & Date of release of Ist Instalment	10-03-2010 & 15-06-2010
7.	Project duration	2010-2011 to 2014-2015
8.	Project Cost (in lac.)	561.00
9.	Proposed mandays	238400



PROJECT AT A GLANCE

1.	Name of Project	-	I.W.M.P. -III Gorakhpur
2.	Name of Block	-	Kaudiram , Gagaha, Gola & Bangao
3.	Name of District	-	Gorakhpur
4.	Name of State	-	Uttar Pradesh
5.	Name of watershed	-	Taraina
6.	No. Of Gram Panchayat	-	48
7.	Name of Concern villages -		Kohra Khurd, Kast Bhavani Datt, Dudhawan, Math Ayodhya, Kalani, Kanwar Babu, Kanwar Raja, Ahirauli, Sasana, Ashapar, Chakmali Urf Bithuwa, Narrey Khurd, Harha Bhar, Tinduhani, Ghorsaon, Dumari Manjhariya, Bela, Narrey Bujurg, Rajgarh, Araideeh, Khajuri, Akusi, Lahidari Bujurg, Lahidari khurd, Nauwadeeh Khurd, Nauwadeeh Bujurg, Badepar, Jagdishpur, Janipur, Musaili, Musaila, Newara, Kanjarpar, Parsia, Bansipar, Kalechak, Mathiya, Palhipar, Deokali, Bhitari, Gangwal, Bharwaliya, Sidhari, Bhoopgarh, Balliya, Khakhari, Keshawapar, Belahi, Genuadeeh, Baikunthpur, Chari, Foolpur, Jangal Saray Belwariya, Sahado Dand, Dubauli, Harauli, Lakushi Nifsi Babu, Sakardeiya , Narayanpur Bujurg, Narayanpur Khurd, Bhagta, Barha Bujurg, Singaha, Sarsopar/Parasapar, Sajiwan, Leruabari Bujurg, Kanayeel, Lakushi Nifsi Rai, Matihaniya, Tauwa, Leruwa Bari Khurd, Baisahi Bujurg, Bhaisahi Khurd, Manjhariya, Kanayeecha, Pali Khas, Harigana, Mau Bujurg, Mahatha, Atarauli, Kanapar, Pipar Patti, Lakhanaura, Soharadeeh, Jadopali, Harikhora, Kalani Urf Tarwa, Mitanpur Khurd, Mitanpur Bujurg, Baniyapar, Mahuja, Pakari Dubey, Tiyaar, Dumari, Bisunpura, Dadikhas, Charediya, Raj Garh, Bardeeha, Shivrajpur and Kohara Buzurg
8.	Code of Micro Watershed	-	2B1C2b2c, 2B1C2e1b, 2B1C2e1f, 2B1C2c2e
8.	Total area of Project.	-	5101.40 ha
9.	Proposed area for treatment-		4675.00 ha
10.	Cost per hectare	-	Rs. 12000.00
11.	Project period	-	2010-11 to 2014-15
12.	Total Cost of Project	-	Rs. 561.00 Lacs
13.	Mandays Generated	-	238400 Nos.

EXECUTIVE SUMMARY

BRIEF ABOUT AREA

Most of the Asian countries are rapidly coming to the recognition that land degradation is reaching serious proportions, causing damage to the national economy and lowering living standards. The consequences of inappropriate cultivation practices and other exploitative forms of land use are becoming manifest in the form of deep erosion gullies, bare and eroded grazing lands, over-clearing of vegetation, rising water tables, salinized soils and the movement and accumulation of sediment and erosion debris in streams and river channels.

The effects of land degradation are cumulative and far-reaching. Not only do they affect rural communities, but they also affect urban populations. Reduced agricultural productivity is often accompanied by an increase in the impact of water-related natural disasters which devastate rural and urban and communities alike.

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

If land degradation is to be checked, there is a need for careful planning in the approach to the development and use of the land. Land and water are the two prime resources which are mainly responsible for the development of an area. If these are managed properly and judiciously, then sustainable development could be achieved in that particular area.

The Taraina river watershed, with micro-watershed code No. **2B1C2b2c, 2B1C2e1b, 2B1C2e1f, 2B1C2c2e**, having an area of 5101.40 Ha, is located in South –East of the Gorakhpur district, U.P. These micro watersheds are situated in the catchment of river Taraina River. It lies between 26⁰ 23'57'' N to 26⁰ 31'04'' N Latitude and 83⁰ 19' 06'' E to 83⁰ 24' 39'' E Longitude. Its altitude ranges from 54 to 84 metre above the mean sea level (MSL). The total area of watershed is 5101.40 ha.

The study area comprises of **101 villages** namely Kohra Khurd, Kast Bhavani Datt, Dudhawan, Math Ayodhya, Kalani, Kanwar Babu, Kanwar Raja, Ahirauli, Sasana, Ashapar, Chakmali Urf Bithuwa, Narrey Khurd, Harha Bhar, Tinduhani, Ghorsaon, Dumari Manjhariya, Bela, Narrey Bujurg, Rajgarh, Araideeh, Khajuri, Akusi, Lahidari Bujurg, Lahidari khurd, Nauwadeeh Khurd, Nauwadeeh Bujurg, Badepar, Jagdishpur, Janipur, Musaili, Musaila, Newara, Kanjarpar, Parsia, Bansipar, Kalechak, Mathiya, Palhipar, Deokali, Bhitari, Gangwal, Bharwaliya, Sidhari, Bhoopgarh, Balliya, Khakhari, Keshawapar,

Belahi, Genuadeeh, Baikunthpur, Chari, Foolpur, Jangal Saray Belwariya, Sahado Dand, Dubauli, Harauli, Lakushi Nifsi Babu, Sakardeiya, Narayanpur Bujurg, Narayanpur Khurd, Bhagta, Barha Bujurg, Singaha, Sarsopar/Parasapar, Sajiwan, Leruabari Bujurg, Kanayeel, Lakushi Nifsi Rai, Matihaniya, Tauwa, Leruwa Bari Khurd, Baisahi Bujurg, Bhaisahi Khurd, Manjhariya, Kanayeecha, Pali Khas, Harigana, Mau Bujurg, Mahatha, Atarauli, Kanapar, Pipar Patti, Lakhanaura, Soharadeeh, Jadopali, Harikhora, Kalani Urf Tarwa, Mitanpur Khurd, Mitanpur Bujurg, Baniyapar, Mahuja, Pakari Dubey, Tiyaar, Dumari, Bisunpura, Dadikhas, Charediya, Raj Garh, Bardeeha, Shivrajpur and Kohara Buzurg of Gorakhpur district of Uttar Pradesh.

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

The watershed falls under the semi – arid region of Tropical climate. The average annual rainfall is 1393 mm. Most of the rainfall (about 85 %) is received during July to September rainfall is of moderate to high intensity. The Temperature ranges from as high as 46.6°C in the month of May – June to as low as 3.3°C in December - January. The climate of the region may be divided into four seasons. The cold season from mid November to February is followed by the summer season from March to mid June. The period from mid June to the end of September is the south-west monsoon season and the October and the first half of November constitute the post-monsoon season.

The soils are mainly sandy, sandy loamy and clayey.

Agriculture is the main source of income of the farmers of the watershed. Kharif is the main crop in the study area Paddy, Arhar, Bajra and Maize are the main variety. The production of Paddy is 17.00q/ha which is very low due to delay in transplanting, weed infestation, poor seed & variety replacement rate. Decreasing factor productivity in rice wheat cropping system is a major challenge to accelerate the economy of farmer in the project area.

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

It is expected that the implementation of different watershed management activities will bring down the run off and soil loss by 70% and 80% of their present level respectively. It is envisaged to increase the water and land utilization. The

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

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, Gorakhpur, as P.I.A for the afforesaid project. The area of watershed is proposed to be taken by Bhoomi Sanrakshan Adhikari, Department of land development & water resources, Gorakhpur, 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	Physical		Financial	% of the budget
	Quantity in Mt./No.	Area in Ha	Total (Lakhs) Amount	
(A) (i)Construction of bunds (Field Bund,Contour Bund, Submergence Bund, Marginal Bund and Peripheral Bund)	2,11,000 mt	3665.00	141.9000	50%
(B) (i)Construction and renovation of Water Harvesting Structure/ Bundhi ,Farm Pond	15 No.	450.00	45.0000	
(ii) Drainage line treatment(Pucca structure/ Check Dam)	4 No.	-	16.0000	
(C) Agroforestry & Horticulture	-	40.00	25.6000	
(i) Rainfed horticulture with fencing	-	500.00	50.0000	
(ii) Rainfed horticulture without fencing	-	20.00	2.0000	
(iii) Afforestation & development of Silvi_pastoral system	-			
Total		4675.00	280.500	50%

Livelihood Activities (community Based)

Component	Physical	Total (Lakhs) Amount	% of the budget
(a) Goat farming	8	56.100	10%
(b) Establishment of barmy compost	5		
(c) Nadaf compost	3		
(d) General merchant shop	4		
(e) Live stock development Activities	3		
(f)Poultry Farming	3		
Total	26	56.100	10%

YEAR WISE PHASING PHYSICAL & FINANCIAL ITEM WISE- I.W.M.P. III GORAKHPUR (2010 – 11)

RESOURCE CONSERVATION AND WATER MANAGEMENT IN L.B. TARAINA WATERSHED, BLOCK – KAUDIRAM, GAGAHA, GOLA & BANSGAO, GORAKHPUR DISTRICT (UTTAR PRADESH)

S. No.	Item	Physical Year wise (area in ha.)						Financial Year wise (Rs.)					
		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%	-	-	-	-	-	-	-	11.220	15.147	15.147	14.586	56.100
2	Monitoring 1%	-	-	-	-	-	-	-	1.122	1.122	1.122	2.244	5.610
3	Evaluation 1%	-	-	-	-	-	-	-	1.683	1.122	1.122	1.683	5.610
4	Entry Point Activity 4%	-	-	-	-	-	-	22.440	-	-	-	-	22.440
5	Institutional and Capacity building 5%	-	-	-	-	-	-	5.610	11.220	4.2075	4.2075	2.805	28.050
6	D.P.R. Preparation 1%	-	-	-	-	-	-	5.610	-	-	-	-	5.610
7	Watershed Development works 50%	-	700.00	1230.00	1230.00	1515.00	4675.00	-	42.075	73.7715	73.7715	90.882	280.500
8	Livelihood & Income Generating 10%	-	-	-	-	-	-	-	5.610	22.440	16.830	11.220	56.100
9	Production System development 13%	-	-	-	-	-	-	-	5.610	22.440	28.050	16.830	72.930
10	Consolidation Phase 5%	-	-	-	-	-	-	-	-	-	-	28.050	28.050
	Total		700.00	1230.00	1230.00	1515.00	4675.00	33.660	78.540	140.250	140.250	168.300	561.000

TREATMENT AREA AND DETAILS

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

The main problem in a watershed is the soil erosion by rainfall. The run off water transport the sediments which may block the channel head, dam, reservoir and storage structures are the major problems faced in the project area and attempts made so far to overcome them. The other main problems in the selected watershed are : lack of awareness amongst the villagers about the deteriorating environmental condition of the area, 75% of the run off water makes it away to way towards Rapti and Ghaghra river through Taraina 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)	Total Treatable Area (ha)
1	2B1C2b2c	1631.40	1495.00
2	2B1C2e1b	1486.00	1360.00
3	2B1C2e1f	1406.90	1290.00
4	2B1C2c2e	577.10	530.00
	Total	5101.40	4675.00

FACE SHEET ABOUT BENCH MARK INDICATORS

Area Under Various LCC Classes

LCC class	Area ha
I	360.40
II	2790.00
III	1951.00
Total	5101.40

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 have been done during field survey; Meetings were conducted between gram pradhan, and farmers of the project area ;Different groups for social mobilization like users group, Self help group, have been formed with the consultation of the members of watershed development team ; PRA exercises to be done for the detailed survey of the village assets have been done.

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 watershed with code No. **2B1C2b2c, 2B1C2e1b, 2B1C2e1f, 2B1C2c2e** having area of 5101.40 ha is located in South- East Part of Gorakhpur district of U.P. The area of watersheds is proposed to be taken up by Bhoomi Sanrakshan Adhikari, Department of land development & water resources Gorakhpur for integrated watershed management programme (IWMP-III) starting from the year 20010-11. The project will be completed by 2014-15.

NEED AND SCOPE FOR WATERSHED DEVELOPMENT:

The main objectives are

- (a) To control damage by run-off
- (b) To manage and utilize run-off for useful purpose or soil conservation
- (c) To increase infiltration of rain water

Main problem in watershed Area

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

- (a) Lack of awareness amongst the villagers about the deteriorating environmental condition of the area.
- (b) 75% of the run off water makes it away to way towards Rapti and Ghaghra through Taraina rivers carrying fertile soil with has nutrients and this decreases soil fertility, there is a decline in the productivity of cereals,pulses and vegetable crops.
- (c) Due to over grazing, vegetative cover is declining on community land. There is no grasses and even shrub. Vegetation is vanishing, River carry a huge silt every year
- (d) Due to continuous cutting of trees, overgrazing bushes and shrubs ecological balance of the area has been hardly disturbed.
- (e) Due to increasing population pressure of man and animal there is competition for collection of food, fodder and fuel resources.

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

WEIGHTAGE FOR SELECTION OF WATERSHED

Problem Identification and Prioritization:

Food sufficiency, economic growth and environmental security were identified as the major issues to be addressed in the watershed area. The area has flat topography hence highly prone to soil erosion. Lack of irrigation water is the greatest problem experienced by the people followed by low function of field crops, lack of fodder availability and low animal productivity.

Problems identified and prioritized during the transact walk and PRA exercises in all the villages of study area namely Kohra Khurd, Kast Bhavani Datt, Dudhawan, Math Ayodhya, Kalani, Kanwar Babu, Kanwar Raja, Ahirauli, Sasana, Ashapar, Chakmali Urf Bithuwa, Narrey Khurd, Harha Bhar, Tinduhani, Ghorsaon, Dumari Manjhariya, Bela, Narrey Bujurg, Rajgarh, Araideeh, Khajuri, Akusi, Lahidari Bujurg, Lahidari khurd, Nauwadeeh Khurd, Nauwadeeh Bujurg, Badepar, Jagdishpur, Janipur, Musaili, Musaila, Newara, Kanjarpar, Parsia, Bansipar, Kalechak, Mathiya, Palhipar, Deokali, Bhitari, Gangwal, Bharwaliya, Sidhari, Bhoopgarh, Balliya, Khakhari, Keshawapar, Belahi, Genuadeeh, Baikunthpur, Chari, Foolpur, Jangal Saray Belwariya, Sahado Dand, Dubauli, Harauli, Lakushi Nifsi Babu, Sakardeiya , Narayanpur Bujurg, Narayanpur Khurd, Bhagta, Barha Bujurg, Singaha, Sarsopar, Sajiwan, Leruabari Bujurg, Kanayeel, Lakushi Nifsi Rai, Matihaniya, Tauwa, Leruwa Bari Khurd, Baisahi Bujurg, Bhaisahi Khurd, Manjhariya, Kanayeecha, Pali Khas, Harigana, Mau Bujurg, Mahatha, Atarauli, Kanapar, Pipar Patti, Lakhanaura, Soharadeeh, Jadopali, Harikhora, Kalani Urf Tarwa, Mitanpur Khurd, Mitanpur Bujurg, Baniyapar, Mahuja, Pakari Dubey, Tiyar, Dumari, Bisunpura, Dadikhas, Charediya, Raj Garh, Bardeeha, Shivrajpur and Kohara

Buzurg. The problems were pooled and a list of nine problems representing the whole watershed was prepared. Problems were ranked as per their total weightage in these villages.

Problem Identification And Prioritization For Watershed

S.N	Problem	Rank
1.	Low production of field crops	5
2.	Lack of drinking water	3
3.	Lack of irrigation water	1
4.	Lack of fodder availability	8
5.	Non-availability of fuel wood	7
6.	Lack of inputs like quality seeds, fertilizer, pesticides etc.	4
7.	Lack of market facility	9
8.	Lack of medical, educational and transportation facilities	2
9.	Medical and Health care facilities for and low animal productivity.	6

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

SWOT analysis of the watershed

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

Weightage of The Project

Project name	Project Type	Weightage													
		i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv
IWMP-III Gorakhpur	IWMP	7.5	5	5	10	0	0	15	5	5	10	10	15	0	87.5

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 water sheds to be treated	Watershed Code	Watershed regime/type/order
IWMP Gorakhpur -III	4	2B1C2b2c, 2B1C2e1b, 2B1C2e1f,2B1C2c2e	Micro Watershed

OTHER DEVELOPMENTAL PROJECTS/SCHEMES RUNNING IN THE VILLAGES:

These villages being very backward have been on top priority for a number of developmental projects. These programmes are Swarnajayanti Gram Swarojgar Yojana (SGSY) and Indira Awas Yojana (IAY). Integrated Watershed Management Programme in other areas of the district is under operation in the department of Agriculture. Gaugaha and gola blocks which come under Taraina watershed of the districts Gorakhpur were selected for I.W.D.P. program. This program was started in 2006-07 which is still going on. There were seven micro watersheds in Taraina watershed these are 2B1C2d1b, 2B1C2e1a, 2B1C2d1a, 2B1C2b2b, 2B1C2b2a, 2B1C2b1b, 2B1C2b1a.

Details of ongoing watershed/development programmes are given as under:

Details on ongoing Development Programme

Sr. No.	Name of Programme	Implementing agency	Objectives of the programme	Year of Commencement	Villages covered	Project Cost
1	Swarnajayanti Gram Swarojgar Yojana (SGSY)	DRDA	Farmulation of groups for weaker section of the BC/SC	On going	All the villages of the project area	-
2	Indira Awas Yojana (IAY)	DRDA	Provide low cast houses to the weaker section SC/ST	On going	All the villages of the project area	-
3	Integrated Watershed Development Programme (IWDP)	B.S.A DOLR	To improvement of enviornmental condition of the watershed	2006-07 to 2011-12	7 micro watershed	612.00 Lacs

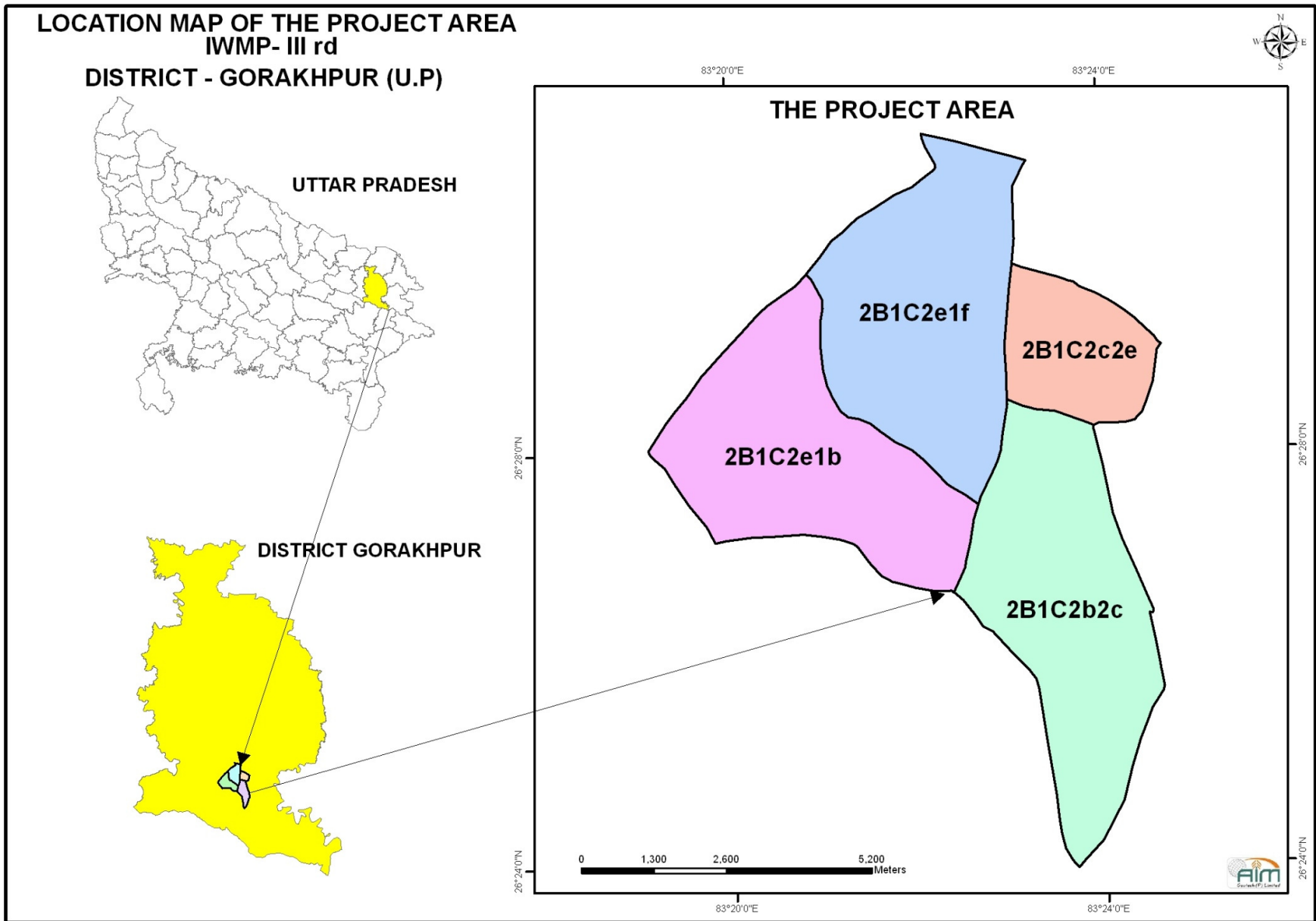
Detail of Ongoing Watershed Programmes in the project area

Sr. No.	Name of Project	Year of Commencement	Villages covered	No. of Micro Water sheds	Watershed Code	Area under treatment	Funding Source	PIA	Status of completion
1	Integrated Watershed Development Programme (IWDP)	2006-07-2011-12	142	7	2B1C2d1b 2B1C2e1a 2B1C2b2b 2B1C2d1a 2B1C2b2a 2B1C2b1b 2B1C2b1a	10200 ha.	DOLR	B.S.A DOLR Gorakhpur	2011-2012
2	IWMP- I	2009-2010 to 2013- 2014	95	6	2B1C2c1a, 2B1C2c1b, 2B1C2c1c, 2B1C2c1d, 2B1C2c1e, 2B1C2c1f	3677 ha.	DOLR	B.S.A DOLR Gorakhpur	2013-2014
3	IWMP- II	2010-2011 to 2014- 2015	112	6	2B1C2c2a, 2B1C2c2b, 2B1C2c2c, 2B1C2c2d, 2B1C2c2f, 2B1C2c2g	4100 ha	DOLR	B.S.A DOLR Gorakhpur	2014-2015
4	IWMP- III	2010-2011 to 2014-2015	101	4	2B1C2b2c, 2B1C2e1b, 2B1C2e1f, 2B1C2c2e	4675 ha	DOLR	B.S.A DOLR Gorakhpur	2014-2015

CHAPTER – 2

GENERAL DESCRIPTION OF PROJECT

AREA



LOCATION:

The selected watershed, IWMP-III is located on Gorakhpur-Varanasi National Highway (NH-29) about 3-8 Km from the Taraina river, in Kaudiram, Gagaha & Bangao block of Gorakhpur district (U.P). The Block Kaudiram, Gagaha & Bangao is approximately 30-45 km away from district head quarter and the project area is situated with minimum distance of 5-15 km from Block head quarter as well as from about 5-15 km. from tahsil.

The project is a cluster of four (4) micro- watersheds with code No. 2B1C2b2c, 2B1C2e1b, 2B1C2e1f,2B1C2c2e having an area of 5101.40 Ha of which 4675.00 Ha, has been undertaken to be treated under Integrated Watershed Management Programme (IWMP-III) starting year 2010-2011. It lies between $26^{\circ} 23'57''$ N to $26^{\circ} 31'04''$ N Latitude and $83^{\circ} 19' 06''$ E to $83^{\circ} 24' 39''$ E Longitude. There are 48 Gram panchayat and 101 revenue villages in the project.

AREA

GENERAL LANDUSE PATTERN OF THE PROJECT AREA

S. No	Name of District	No. of Micro-watershed	No. of Villages	Geographical Area	Rainfed Area	Land under agricultural use	Wasteland	
							Cultivable	Non- Cultivable
1	Gorakhpur	04	101	5101.40	4880.00	4880.00	1410.00	190.00

AGRO-CLIMATE CONDITIONS

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

DETAIL OF AGRO-CLIMATE CONDITIONS, I.W.M.P-III, GORAKHPUR

S. No.	Name of Project	Name of Agro-climate Zone covered	Area (Ha)	No. of the Villages	Major Soil Type (Ha)		Topography	Average Rainfall (mm)	Major crops	
					Type	Area (ha)			Name	Area (ha)
1	I.W.M.P-III, Gorakhpur	North Eastern Plain	5101.40	101	Sandy Loam	3840.00	Undulating	1220 mm	Paddy, Wheat	7010.00

PHYSIOGRAPHY:

The project area falls under the Basin of Upper Ganga above confluence with Ghaghara R.B., which is a level plain densely populated and most parts of the land is available for cultivation. Most of the agricultural land is dependent on monsoon. The plains form a level tract which slopes gently from north-west to south-east. The height above sea-level ranges 54 meters in north-west to 84 meters in the south-east. The higher percentage of high flood zone is mainly owing to the confluence effect of Ghaghara and rapti rivers and as well as local streams and depressions, which are generally over flooded even with the slight increase in water level of rivers during monsoon season.

ELEVATION RANGE, LONGITUDE LATITUDE, RELIEF, HEIGHT DIFFERENCE ETC

S. No.	Detail s of the watershed	Names of Villages	Name of the Micro-watershed	Location		Elevation of watershed from Mean Sea level		
				Latitude (N)	Longitude (E)	Highest in Meters	Lowest in Meters	Relief Height Difference
1	2B1C2b2c	Kohra Khurd, Kast Bhavani Datt, Dudhawan, Math Ayodhya, Kalani, Kanwar Babu and others	Narrey Bujurg	26 ⁰ 24' 02" to 26 ⁰ 28' 26"	83 ⁰ 22'26" to 83 ⁰ 24' 35"	83	61	22
2	2B1C2e1b	Jagdishpur, Janipur, Bharwaliya, Sidhari, Bhoopgarh, Balliya, Khakhari, and others	Jangal Saray Belwariya	26 ⁰ 26' 38" to 26 ⁰ 29' 42"	83 ⁰ 19'08" to 83 ⁰ 22' 37"	84	54	30
3	2B1C2e1f	Janipur, Deokali, Bhitari, Sahado Dand, Dubauli, Harauli, and others	Baisahi Bujurg	26 ⁰ 27' 33" to 26 ⁰ 31' 01"	83 ⁰ 20'54" to 83 ⁰ 23' 10"	82	57	25
4	2B1C2c2e	Deokali, Palhipar, Matihaniya, Tauwa, and others	Tiyar	26 ⁰ 28' 13" to 26 ⁰ 29' 44"	83 ⁰ 22'59" to 83 ⁰ 29'01"	74	63	11

CLIMATE:

The climate of the northern portions of the district is conditioned to some extent by the proximity of the hills in the north and the terai swamps. The year may be divided into four seasons. The cold season from mid November to February is followed by the summer season from March to mid June. The period from mid June to the end of September is the south-west monsoon season and the October and the first half of November constitute the post-monsoon season. The details of the weather condition of the project area has been given below.

Climatic condition of last five year as per

Sr. No.	Year	Average Rainfall (mm)	Highest Rainfall intensity in a day (mm)	Temperature (C)		Relative humidity %
			Max.	Min.	Max.	Min.
1	2006 - 2007	1280	-	3.0	42.2	93
2	2007 - 2008	1393	-	3.5	42.4	96
3	2008 -2009	1291	-	4.2	43.3	90
4	2009-2010	1172	-	3.8	42.6	94
5	2010-2011	1200	-	3.7	41.2	89

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 1393 mm. About 85 percent of the annual rainfall is recorded during the period July 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 district has two meteorological observatories at Gorakhpur and Nautanwa. The data of Gorakhpur observatory may be taken as representative of the meteorological conditions in the district, except that the northern region of the district have a comparatively milder summer as indicated by the records at Nautanwa. From mid November there is a rapid fall in temperature. January is the coldest month with the mean daily maximum temperature at 22.8° C and the mean daily minimum temperature at 9.3° C. In association with cold waves in the wake of the western disturbances passing eastwards in the winter season, temperature tends to go down to a degree or two above the freezing point. Day temperature begins to rise rapidly after February. May is the hottest with mean daily maximum temperature at 42.6 C and the mean daily minimum at 25.1° C. With the advent of the monsoon by about the middle of June there is appreciable drop in the day temperature, however, the nights continue to be warm. In September there is a slight increase again in the day temperature but the night temperature decreases after September. With the withdrawal of monsoon by the beginning of October it decreases progressively.

HUMIDITY:

During the monsoon and the post monsoon seasons the relative humidity are high ranging between 89 and 96 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 4-10 Km/hr.

WATERSHED CHARACTERISTICS:

SHAPE AND SIZE

All the four watersheds (IWMP - III, Gorakhpur) of the project area have more or less traingle in shape. The direction of the slope in the project area is north-west to south east.

The maximum length and width of IWMP - III watershed, are 11745 m and 7939 m, respectively with the length: width ratio 1.47/1

SHAPE AND SIZE OF WATERSHED

Sl. N.	Micro watershed Code	Name of the Micro-watershed	Area (ha)	Shape	Approximate size in meter		Ratio Length: width
					Length	Width	
1	2B1C2b2c	Narrey Bujurg	1631.40	Cone	6969	3639	1.91:1
2	2B1C2e1b	Jangal Saray Belwariya	1486.00	Rectangle	5610	3450	1.62:1
3	2B1C2e1f	Baisahi Bujurg	1406.90	Traingle	4113	2716	1.51:1
4	2B1C2c2e	Tiyar	577.10	Square	5291	4075	1.29:1

GEOMORPHOLOGY

The area lies in the south-east of the District- Gorakhpur of Taraina Basin. The soil is mainly sandy loam soil which is easily transportable after detaching causing soil erosion by water erosion and wind erosion.

Details of soil erosion in the project area

1	2	3	4	5
Cause	Type of erosion	Area affected (ha)	Run off (mm/ year)	Average soil loss (Tonnes/ ha/ year)
Water erosion				
a	Sheet	3360	800	16.50
b	Rill	1210		
c	Gully	105		
Wind erosion		NA	-	-
Sub-Total		4675	800	16.50

SOILS

The soils are mainly sandy, sandyloam and clayey.

DRAINAGE

Due to moderate to steep slopes and presence of a number of drainage lines, drainage is adequate. The watershed forms part of basin of Upper Ganga above confluence of Ghaghara R.B.

NATURAL VEGETATION

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

CHAPTER-3

BASELINE SURVEY

A DETAILED BASELINE SURVEY OF THE PROJECT AREA WAS CONDUCTED TO THE STUDY MAJOR SOCIOECONOMIC AND BIOPHYSICAL CONSTRAINTS TO SUSTAINABLE CROP PRODUCTION. THE FOLLOWING INFORMATION WERE COLLECTED:

SOCIO-ECONOMIC ANALYSIS OF THE PROJECT

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

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

HUMAN POPULATION

The total population of 101 villages of the watershed is **75389** out of which **36873** are males and **38516** are females with average family size of 7 persons and total no. of household are **10720**

Demographic information

S.N	Name of Villages	Population			Population SC			Total Household
		Total	Males	Females	Total	Males	Females	
1	Mau Buzurg	485	250	235	163	87	76	57
2	Mahatha	363	175	188	137	62	75	52
3	Atrauli	312	162	150	0	0	0	34
4	Kanapar	809	406	403	301	124	177	118
5	Harigana	395	212	183	207	104	103	54
6	Piperpati	389	192	197	114	47	67	61
7	Pali Khas	3311	1649	1662	1387	691	696	433
8	Lakhnaura	484	249	235	0	0	0	69
9	Kanayeecha	1520	712	808	710	335	375	210
10	Manjharia	0	0	0	0	0	0	0
11	Bhaisahi Buzurg	1893	878	1015	937	437	500	266
12	Bhaisahi Khurd	378	193	185	91	47	44	39
13	Jado Pali	281	135	146	83	39	44	45
14	Leduabari Khurd	1059	560	499	48	22	26	128
15	Leduabari Buzurg	376	184	192	358	175	183	45
16	Sajeewan	327	166	161	162	81	81	56
17	Paraspura	0	0	0	0	0	0	0
18	Barha Buzurg	706	359	347	206	107	99	106
19	Singha	1296	651	645	842	435	407	188
20	Kanayeel	1531	775	756	578	296	282	191
21	Lakusi Nisfibaboo	392	196	196	198	91	107	52

22	Bhagta	497	233	264	234	98	136	75
23	Jangal Sariaya Belwaria	1035	498	537	303	138	165	156
24	Foolpur	223	124	99	71	43	28	28
25	Tarawa	716	358	358	306	151	155	131
26	Teeyer	1904	933	971	250	118	132	282
27	Matihania	823	380	443	276	129	147	110
28	Deokali	807	428	379	175	88	87	118
29	Lukuri Nisfiray	824	422	402	620	312	308	119
30	Bhivari	763	352	411	288	142	146	115
31	Dubauli	956	482	474	138	67	71	134
32	Sahdodad	1536	724	812	571	272	299	227
33	Harauli	203	104	99	127	66	61	31
34	Baliya	728	343	385	171	80	91	120
35	Khakari	407	169	238	0	0	0	69
36	Mitanpur Buz	335	143	192	178	64	114	58
37	Rajgarh	1436	679	757	185	75	110	173
38	Sohara Deeh	53	31	22	30	18	12	11
39	Bardeeha	144	69	75	144	69	75	24
40	Dumri	0	0	0	0	0	0	0
41	Mahuja	1358	631	727	597	294	303	200
42	Pakri Dubey	718	365	353	207	113	94	92
43	Baniyapar	504	255	249	264	134	130	79
44	Kalani Urf Tandwa	1092	559	533	343	163	180	142
45	Mitanpur Khurd	423	200	223	234	116	118	59

46	Harikhora	984	488	496	336	168	168	167
47	Palhipar	540	269	271	261	124	137	89
48	Basipar	164	81	83	81	36	45	24
49	Parsiya	338	173	165	37	19	18	49
50	Mathiya	419	193	226	32	10	22	42
51	Kalechak	275	139	136	106	58	48	35
52	Musaila	503	258	245	293	157	136	66
53	Kanjarpal	0	0	0	0	0	0	0
54	Janipur	2575	1302	1273	535	249	286	354
55	Bharwaliya	109	60	49	63	38	25	19
56	Jagdishpur	604	300	304	16	7	9	72
57	Neora	597	264	333	118	53	65	94
58	Musaila	189	87	102	0	0	0	27
59	Shiorajpur	682	342	340	366	191	175	98
60	Bishunpura	390	190	200	0	0	0	50
61	Khajuri	1635	787	848	472	238	234	245
62	Aryee Deeh	92	46	46	92	46	46	19
63	Nauadeeh Khurd	0	0	0	0	0	0	0
64	Navadeeh Buzurg	102	49	53	68	34	34	20
65	Lahidari Buzurg	405	225	180	63	34	29	71
66	Lahdari Khurd	448	221	227	101	56	45	70
67	Ghorsaon	540	244	296	171	82	89	91
68	Bela	522	235	287	0	0	0	68
69	Dumari Manjharia	416	166	250	0	0	0	64

70	Harha Bhar	109	47	62	30	13	17	19
71	Tenduhani	591	284	307	244	123	121	83
72	Narrey Khurd	489	225	264	265	111	154	83
73	Narrey Buzurg	3694	1831	1863	1074	541	533	550
74	Ashapar	844	395	449	240	116	124	120
75	Chakmali Urf Bithua	983	498	485	0	0	0	140
76	Sasana	0	0	0	0	0	0	0
77	Ahirauli	544	257	287	65	25	40	81
78	Rajgarh	1480	664	816	129	59	70	221
79	Akusi	1024	480	544	420	203	217	167
80	Sidhari	1710	892	818	662	368	294	272
81	Barepar	687	314	373	43	22	21	95
82	Gangwal	695	328	367	387	185	202	90
83	Dari Khas	1421	694	727	292	158	134	197
84	Math Ajodhya	0	0	0	0	0	0	0
85	Kunwar Raja	386	181	205	86	43	43	57
86	Chareria	790	385	405	301	160	141	105
87	Kalani	587	283	304	36	16	20	78
88	Dudhava	0	0	0	0	0	0	0
89	Kunwar Babu	85	33	52	17	10	7	13
90	Kohara Bujurg	1944	996	948	828	451	377	271
91	Kast Bhawani Datt	104	52	52	0	0	0	14
92	Kohara Khurd	861	404	457	366	176	190	116
93	Chari	2016	1006	1010	1046	519	527	281

94	Narayanpur Khurd	1008	516	492	358	181	177	130
95	Narayanpur Bujurg	811	366	445	375	163	212	134
96	Kesawapar	1386	680	706	420	209	211	168
97	Sakar Deia	643	313	330	184	93	91	82
98	Bakunthpur	565	280	285	0	0	0	76
99	Genua Dih	409	189	220	69	40	29	48
100	Belahi	453	222	231	0	0	0	57
101	Bhopgarh	2749	1353	1396	814	415	399	381
	G.Total	75389	36873	38516	24196	11930	12266	10720

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-IV) GORAKHPUR

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	101	1690	180	Due to Unemployment in village and high wages in city	970

SOIL AND LAND CAPABILITY CLASSIFICATION:

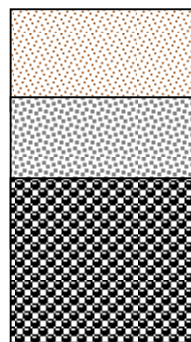
SOIL MORPHOLOGY:

The study area is situated in the South-East of District-Gorakhpur. The entire watershed is topographically divided into three major land forms. Accordingly, the soils of watershed have been grouped in the three major categories.

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

Soil Profile: A Representative

Soil Profile



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

5 -8m (Locally called "Clay")

7 -8 m(Sandy Clay)

Morphology of Typical Solid Profile of Watershed

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

Soil Characteristics and Fertility Status:

Three types of soils are in the watershed area. The fertility status is about normal range due to production of major pulses crops. There is scarcity of phosphorus due to continuous growing of pulses. The four soil samples of each village, three for nutrients analysis and one for sulphur and micro nutrients analysis have been send to laboratory. After receiving the analysis report effort will be made to motivate the farmers to use nutrients and micronutrients according to the any analysis report. The results shows that the soils of the study area is fit for sowing of Kharif and Rabi under agriculture production activity.

LAND CAPABILITY CLASSIFICATION (LCC):

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

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

Class I lands have slight limitations that restrict their use.

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

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

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

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

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

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

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

‘w’ represents drainage difficulties including wetness or overflow,

‘s’ represents soil limitations for plant growth and

‘c’ represents climatic limitations.

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

- stony or rocky (0),
- erosion hazard/slope (1),
- coarse texture (2),
- fine texture (3),
- Slowly permeable subsoil (4),

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

CONCLUSION:

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

The study area being the part of Lower Rapti – Ghaghra Deob.The confluence effect of Ghaghara and Rapti river as well as local streams and depressions causes more severe erosion because of sandy nature of the soil and swift currents with large volume of water.

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 Taraina have varied land/use land cover categories as shown in table below. One such map of land use/ land cover of the watershed is shown in Annexure Map.

The land under different categories within watershed

S. No	Watershed Code	Name of villages falling in the watershed	Built-Up Land	Wasteland all types	Agriculture	Plantation	Fallow Land	Water Bodies	Total
1	2B1C2b2c	Kohra Khurd, Kast Bhavani Datt, Dudhawan, Math Ayodhya, Kalani, Kanwar Babu, Kanwar Raja, Ahirauli, Sasana, Ashapar, Chakmali Urf Bithuwa, Narrey Khurd, Harha Bhar, Tinduhani, Ghorsaon, Dumari Manjhariya, Bela, Narrey Bujurg, Rajgarh, Araideeh, Khajuri, Akusi, Lahidari Bujurg, Lahidari khurd, Nauwadeeh Khurd, Nauwadeeh Bujurg, Badepar, Jagdishpur, Janipur, Musaili, Musaila, Newara, Kanjarpar, Parsia, Bansipar, Kalechak, Mathiya, Palhipar, Deokali, Bhitari, Gangwal, Shiv Rajpur, Bisunpura, Dadikhas, Harikhora, Chaviria and Kohara Buzurg	68.91	0.46	1502.92	27.19	0.97	30.95	1631.40
2	2B1C2e1b	Jagdishpur, Janipur, Bharwaliya, Sidhari, Bhoopgarh, Balliya, Khakhari, Keshawapar, Belahi, Genuadeeh, Baikunthpur, Chari, Foolpur, Jangal Saray Belwariya, Sahado Dand, Dubauli, Harauli, Lakushi Nifsi Babu, Sakardeiya, Narayanpur Bujurg, Narayanpur Khurd, Bhagta, Barha Bujurg, Singaha, Sarsopar/Paresapar, Sajiwan, Leruabari Bujurg,	59.88	15.14	1330.79	39.65	21.88	18.66	1486.00
3	2B1C2e1f	Janipur, Deokali, Bhitari, Sahado Dand, Dubauli, Harauli, Lakushi Nifsi Babu, Singaha, Leruabari Bujurg, Kanayeel, Lakushi Nifsi Rai, Matihaniya, Tauwa, Leruwa Bari Khurd, Baisahi Bujurg, Bhaisahi Khurd, Manjhariya, Kanayeecha, Pali Khas, Harigana, Mau Bujurg, Mahatha, Atarauli, Kanapar, Pipar Patti,	37.00	1.24	1308.18	34.70	0.54	25.24	1406.90

		Lakhanaura, Soharadeeh, Jadopali, Bardeeha, Bansipar							
4	2B1C2c2e	Deokali, Palhipar, Matihaniya, Tauwa, Harikhora, Kalani Urf Tarwa, Mitampur Khurd, Mitampur Bujurg, Baniyapar, Mahuja, Pakari Dubey, Tiyaar, Dumari, Kanaicha, Raj Garh	17.46	1.74	534.04	05.78	1.08	17.00	577.10
		Total	183.25	18.58	4675.93	107.32	24.47	91.85	5101.40

Present Landuse/Landcover of the project area:

S. No	Landuse	Area (ha)	%
1	Built-up land	183.25	3.59
2	Waste Land	18.58	0.39
3	Water Bodies	91.85	1.80
4	Plantation	107.32	2.10
5	Agricultural Land	4675.93	91.65
6.	Fallow Land	24.47	0.47
	Total	5101.40	100

DESCRIPTION:

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

BUILT-UP LAND

All the major settlement areas have been mapped under this category i.c Kohra Khurd, Kast Bhavani Datt, Dudhawan, Jagdishpur, Bharwaliya, Janipur, Bhitari, Sahado Dand, Deokali,Palhipar, Matihaniya, Tauwa and the total area under category is 183.25 Hectare which is 3.59 % of the total mapped area. Under this category road network and other built-up area has also been included.

WASTE LAND

Land which is deteriorating for lack of appropriate water and soil on account of natural causes comes under this category. The total area under this category comes about 18.58 Hectare which is 0.39% of the total mapped area. The sub categories are like Salt affected land, Gullied/Ravenous Land, Scrub Land etc.

WATER BODIES

This category comprises area with surface water either impounded in the form of ponds, lake & reservoirs. The total area under this category is about 91.85 Hectare which is 1.80 % 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 107.32 Hectare which is 2.10 % of the total mapped area.

AGRICULTURAL LAND

These are the lands primarily used for farming and for production of food; it includes land under the (irrigated and un-irrigated). Areas with standing crop as on the date of satellite overpass. Cropped areas are in varying shape and size in a contiguous and non contiguous pattern. They are widely distributed in different terrains; prominently appear in the irrigated areas irrespective of the source of irrigation. The study area is predominantly paddy producing area being its flatness in 2007-08 maximum production of paddy recorded in this region under the double crop area. Area under rabi crop is about 4330.00 Hectare of the total cropped area, area under Kharif crop is 3980.00 Hectare in project 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 4675.93 Hectare which is 91.65% of the total mapped area.

FALLOW LAND

The current Fallow land have been mapped in the study area as viewed in the satellite scene. Actually the above category is a part of agriculture land which have left for sowing due to some reason by the faemers. The total area under this category comes about 24.47 Hectare which is 0.47% of the total mapped area.

SLOPE ANALYSIS:

The Project area 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.

AGRICULTURE

Various agriculture land uses in the watershed are extended to diversified land capabilities starting from marginal to good class IInd lands. The watershed distinctly has three types of land i.e. levelled, sloping and degraded and undulating. The water

(both for irrigation and drinking) is most scarce natural resource in the watershed. The operation of tube wells for irrigation of agricultural crops frequently leads to the drinking water problem to the farmers for watershed.

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

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

One Year Crop Rotation

Single Cropping: Paddy

Double Cropping: Wheat, Maize, Potato

Cropping Pattern of Watershed Areas is as follows:

S.No.	Name of the Distict	Item	Unit of Measurement	Area under Watershed
1	Gorakhpur	Area under agriculture crop	Hector	4800
2		i- Area under single crop	Hector	2600
3		ii- Area under double crop	Hector	2180
4		iii- Area under multiple crop	Hector	20

CROP PRODUCTIVITY

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

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

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

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

Average Productivity of Main Crop in Watershed Areas is as follows:

S. No.	Name of Cereal	Area in hectare	Production /Hect./Quintal
1.	Paddy	2820.00	17.00
2.	Arhar	460.00	5.00
3.	Maize	70.00	8.00
4.	Wheat	3530.00	20.00
5.	Mustard	110.00	8.00
6.	Moong	20.00	4.00
	Total	7010	

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

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

HORTICULTURE

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

AGRO-FORESTRY

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

LIVESTOCK POPULATION

Total livestock population of the watershed is 14830. 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 as:-

Livestock population in watershed

livestock Resolution							
Buffaloes	Cows	Bullocks	Goat	Pig	Sheep	Others	Total
5860	5320	550	2400	450	250	-	14830

LIVELIHOOD

Out of the total population of **75389** in the watershed, a majority *i.e.* more than 80 % has farming as their major source of livelihood followed by 18 % labourers and 2 % service + business class.

INFRASTRUCTURE SOCIAL FEATURES

The watershed has moderate communication facilities and all 101 villages are approachable through motorable road. Literacy rate in the watershed is very low because except some village all villages are having education facilities up to Junior High School. All the villages are electrified and have telephonic connection. Small land holdings (average less than 0.1 ha) with large family size (average 6 person) and more than 50% of the labour force of the total population living below poverty line indicate poor socio-economic status of the watershed community However a strong community spirit among the village show a positive indication for the success of any programme implemented in a participatory mode. Traditionally, the entire village community participates in the individual's work needing labor such as sowing, harvesting, house construction works etc.

DETAILS OF THE VILLAGE WISE INFORMATION IN THE PROJECT AREA

VILLAGE WISE UTILITIES IN THE PROJECT AREA Part - 1

S.No.	NAME OF VILLAGES	VILLAGE CENSUS CODE	EDUCATION FACILITIES						MEDICAL FACILITIES							DRINKING WATER FACILITIES				
			P SCH	M SCH	S SCH	SS SCH	ADLT LT CT	OTH SCH	ALL HOSP	AYU HOSP	ALL DISP	MC W CEN TR	M H O M E	CW C	RP M	CH W	WEL L WAT ER	TANK WATE R	TUBE WELL WATE R	HAN DPU MP
1	Kohra Khurd	80808															1			1
2	Kast Bhavani Datt	80807	1														1			1
3	Dudhawan	80804																		
4	Math Ayodhya	80798															1			1
5	Kalani	80803															1			1
6	Kanwar Babu	80805	2	1				1											1	1
7	Kanwar Raja	80799																	1	1
8	Ahirauli	80751	1	1																1
9	Sasana	79584						1												1
10	Ashapar	79582															1			1
11	Chakmali Urf Bithuwa	79583	1																	1
12	Narrey Khurd	79580																		
13	Harha Bhar	79578	2		1	1			1	1	1	1	1	1	10	1	1			1
14	Tinduhani	79579																		
15	Ghorsaoon	79575																		
16	Dumari Manjhariya	79577	1																	1
17	Bela	79576	1	1																1

18	Narrey Bujurg	79581	2	1													1			1	
19	Rajgarh	79587	1																		1
20	Araideeh	79569																			1
21	Khajuri	79568	1																		1
22	Akushi	79637	1				1				2	1			2	1					1
23	Lahidari Bujurg	79573																			1
24	Lahidari khurd	79574																			1
25	Nauwadeeh Khurd	79570	1																		1
26	Nauwadeeh Bujurg	79572	1	1																	1
27	Badepar	80778	2	1							2				2						1
28	Jagdishpur	81003	1	1																	1
29	Janipur	79555																			
30	Musaili	79559	2																		1
31	Musaila	79553	1									1									1
32	Newara	79558																			1
33	Kanjarpar	79554																			1
34	Parsia	79549																			1
35	Bansipar	79548	1																		1
36	Kalechak	79551																			1
37	Mathiya	79550	1																		1
38	Palhipar	79547	1																		1
39	Deokali	79347	1									1									1
40	Bhitari	79349																			1
41	Gangwal	80779																			1
42	Bharwaliya	79556																			1

43	Sidhari	80777																1	1	1	1
44	Bhoopgarh	80952																			
45	Balliya	79353	1																		1
46	Khakhari	79354																			1
47	Keshawapar	80947	1																		1
48	Belahi	80951	1	1																	1
49	Genuadeeh	80950																			1
50	Baikunthpur	80949	2																		1
51	Chari	80941																			1
52	Foolpur	79343	1																		1
53	Jangal Saray Belwariya	79342	1																		1
54	Sahado Dand	79351																			1
55	Dubauli	79350	1																		1
56	Harauli	79352																			1
57	Lakushi Nifsi Babu	79340	1																		1
58	Sakardeiya	80948																			1
59	Narayanpur Bujurg	80946																			
60	Narayanpur Khurd	80945																			1
61	Bhagta	79341	1																		1
62	Barha Bujurg	79337																			1
63	Singaha	79338																			1

64	Sarsopar	79219																
65	Sajiwan	79334																
66	Leruabari Bujurg	79333	1											1	1	1		
67	Kanayeel	79339														1	1	
68	Lakushi Nifsi Rai	79348														1	1	
69	Matihaniya	79346	1	1										1				1
70	Tauwa	79344																1
71	Leruwa Bari Khurd	79332																
72	Baisahi Bujurg	79328																
73	Bhaisahi Khurd	79329																
74	Manjhariya	79327												1				1
75	Kanayeecha	79326	1	1														1
76	Pali Khas	79322																1
77	Harigana	79320																
78	Mau Bujurg	79316																1
79	Mahatha	79317	2												1			1
80	Atarauli	79318															1	1
81	Kanapar	79319																1
82	Pipar Patti	79321		0														1
83	Lakhanaura	79325																1
84	Soharadeeh	79534																
85	Jadopali	79330																

86	Harikhora	79546																		
87	Kalani Urf Tarwa	79543	1	1													1			1
88	Mitanpur Khurd	79544	1														2	2	2	2
89	Mitanpur Bujurg	79489	2																	1
90	Baniyapar	79542		1																1
91	Mahuja	79540	1																	
92	Pakari Dubey	79541						1												1
93	Tiyar	79345																		1
94	Dumari	79621																		1
95	Bisunpura	79567																		
96	Dari Khas	80780																		
97	Charediya	80800																		
98	Raj Garh	79513																		
99	Bardeeha	79537																		
100	Shivraj Pur	79561																		
101	Kohara Bujurg	80806																		
	Total		46	12	01	01	01	03	01	01	05	03	01	01	15	05	24	09	13	67

VILLAGE WISE UTILITIES IN THE PROJECT AREA Part - 2

S.No.	NAME OF VILLAGES	POST, TELEGRAPH, BUS STAND & BANK'S							SOCIETY & ROADS					POWER SUPPLY			
		POST OFFICE	TELEGRAPH OFFICE	POST & TELE. OFFICE	PHONE	BUS SERVICE	COMMERCIAL BANK	CO-OPERATIVE BANK	AG. CR. SOCIETY	NON AG. CR. SOCIETY	APPROACH PAVED ROAD	APPROACH MUD ROAD	APPROACH FOOT PATH	ELECTRICITY FOR DOMESTIC	ELECTRICITY FOR AGRICULTURE	ELECTRICITY FOR OTHER PURPOSES	ELECTRICITY FOR ALL PURPOSES
1	Kohra Khurd					2					1	1	1				1
2	Kast Bhavani Datt				5	2					1	1	2				1
3	Dudhawan																
4	Math Ayodhya										1	1	1	2	2	2	2
5	Kalani										2	1	1	2	2	2	2
6	Kanwar Babu										1	1	1	1	1	2	2
7	Kanwar Raja										1	1	1	2	2	2	2
8	Ahirauli				6						1	1	1	2	2	2	2
9	Sasana										1	2	2	1	1	2	2
10	Ashapar										2	1	1				1
11	Chakmali Urf Bithuwa				1						1	1	2	1	2	2	2
12	Narrey Khurd																
13	Harha Bhar	1	1	1	10		1	1	1	1	1	1					1
14	Tinduhani																
15	Ghorsaon																
16	Dumari Manjhariya	1			1						1	2	1	1	2	2	2
17	Bela										1	2	2	1	1	2	2
18	Narrey Bujurg										1	1	1	1	2	2	2
19	Rajgarh										1	1	1	1	2	2	2
20	Araideeh										2	1	2	1	1	2	2
21	Khajuri	1			1						1	2	2	1	1	2	2

22	Akushi									1	2	2	1	1	2	2
23	Lahidari Bujurg				3					2	1	1	1	2	1	2
24	Lahidari khurd									1	2	1	2	2	2	2
25	Nauwade eh Khurd									1	2	2	2	2	2	2
26	Nauwade eh Bujurg				6		1			1	1	2	1	1	2	2
27	Badepar	1				1	1			1	1	2	1	2	1	2
28	Jagdishpur									2	2	1	2	2	2	2
29	Janipur															
30	Musaili	1			10					1	1	1				1
31	Musaila	1								1	2	2	1	1	2	2
32	Newara									1	2	2	2	1	2	2
33	Kanjarpar									1	1	1	2	2	2	2
34	Parsia				1					1	1	2	1	1	2	2
35	Bansipar									1	2	2	1	1	2	2
36	Kalechak				1					1	1	1				1
37	Mathiya				1					1	1	1				1
38	Palhipar									2	1	1				1
39	Deokali				1					1	1	2	1	1	2	2
40	Bhitari									1	2	2	2	2	2	2
41	Gangwal									1	1	1	1	1	2	2
42	Bharwalya									1	2	1	2	2	2	2
43	Sidhari									1	1	1				1
44	Bhoopgar															

	h																
45	Balliya									1	1	1					1
46	Khakhari									1	2	2	1	2	2	2	2
47	Keshawa par				5					1	2	2	1	2	2	2	2
48	Belahi									1	1	1					1
49	Genuade eh									2	1	1	2	2	2	2	2
50	Baikunth pur									1	1	1	1	1	2	2	2
51	Chari									1	1	1	2	2	2	2	2
52	Foolpur	1			3					1	2	2	1	2	2	2	2
53	Jangal Saray Belwariya									1	2	2	2	1	2	2	2
54	Sahado Dand									2	2	1	1	1	2	2	2
55	Dubauli									1	1	1	1	2	2	2	2
56	Harauli									1	2	2	2	2	2	2	2
57	Lakushi Nifsi Babu				8					1	1	2	1	2	2	2	2
58	Sakardeiy a				1					1	1	1					1
59	Narayanp																

	ur Bujurg																
60	Narayanpur Khurd									1	1	1					1
61	Bhagta			1						1	1	1	1	2	2	2	2
62	Barha Bujurg									2	1	1	1	2	2	2	2
63	Singaha									2	1	1	2	2	2	2	2
64	Sarsopar																
65	Sajiwan																
66	Leruabari Bujurg									1	1	1	1	1	2	2	2
67	Kanayeel									1	1	1					1
68	Lakushi Nifsi Rai									1	1	1	2	2	2	2	2
69	Matihani ya									1	1	1	1	2	2	2	2
70	Tauwa									1	1	1	2	2	2	2	2
71	Leruwa Bari Khurd									1	1	1					1
72	Baisahi Bujurg									1	2	2	1	2	2	2	2
73	Bhaisahi Khurd									1	2	2	1	2	2	2	2
74	Manjhari									1	1	1					1

	ya																
75	Kanayeec ha									1	1	1					1
76	Pali Khas									2	1	1	2	2	2	2	2
77	Harigana																
78	Mau Bujurg									2	1	1	2	2	2	2	2
79	Mahatha									1	1	1					1
80	Atarauli									1	2	2					1
81	Kanapar									1	1	2	2	2	2	2	2
82	Pipar Patti									1	1	1	2	2	2	2	2
83	Lakhanau ra									2	1	1	2	2	2	2	2
84	Soharade eh									1	1	1					1
85	Jadopali									1	2	2	1	2	2	2	2
86	Harikhora									1	2	2	1	2	2	2	2
87	Kalani Urf Tarwa									1	1	1					1
88	Mitanpur Khurd									1	1	2	1	1	2	2	2
89	Mitanpur Bujurg									1	1	1					1

90	Baniyapar										1	1	1	1	2	2	2
91	Mahuja																
92	Pakari Dubey										1	1	1	1	2	2	2
93	Tiyar										1	1	1	2	2	2	2
94	Dumari										1	1	1	1	2	1	2
95	Bisunpura										1	1	1				1
96	Dari Khas										1	2	2	1	2	2	2
97	Charediya										1	2	2	1	2	2	2
98	Raj Garh										1	1	1				1
99	Bardeeha										1	1	2	2	2	2	2
100	Shivraj Pur										1	1	1	2	2	2	2
101	Kohara Bujurg										2	1	1	2	2	2	2
	Total	06	01	01	66	05	03	01	01	01	103	116	122	93	114	129	156

IMPORTANCE OF DEVELOPMENT INSTITUTION

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

DEPENDENCY ON FOREST FOR FUEL WOOD AND FODDER

a) Fuel wood

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

b) Fodder:

Farmers also do not have any preferred fodder tree in the watershed in spite of fact that watershed falls in semi arid tract. The marketing facilities, lack of follow up of modern scientific package of practices of cropping potential in the watershed, socio-economical factors etc. is found to be most important factors deciding the preferences of farmers pertaining to selection and cultivation of agricultural crops, fruits, or fodder trees in the watershed.

LACK OF ADEQUATE FARM MACHINERY

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

LACK OF GOOD QUALITY SEEDS AND FERTILIZERS

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

LACK OF OTHER FACILITIES SUCH AS STORAGE AND MARKETING

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

HYDROLOGY AND WATER RESOURCE CATEGORIES

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

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

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

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

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

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

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

- (i)Stream outflow from the basin;
- (ii)loss through evaporation;and
- (iii)the influent recharge to the ground water.

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

- (i)Evapo-transpiration from the ground-water-table;
- (ii)outflow to the neighbouring ground-water basin;
- (iii)the effluent discharge to the streams;and
- (iv)the addition to the ground-water storage.

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

- (i)by influent recharge from the streams;
- (ii)by seepage from natural lakes,ponds,etc;
- (iii)seepage from artificial storage reservoirs,canal systems,etc, &

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

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

Factors Affecting Water Resources

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

1. Climatic Factors

- A. Rainfall : its intensity, duration & distribution.
- B. Snow
- C. Evapo-transpiration

2. Physiographic Factors

- A. Basic characteristics.
 - 1. Geometric factors : drainage area, shape, slope & stream density.
 - 2. Physical factors : land use, surface infiltration conditions, soil types, etc.
- B. Channel characteristics : carrying capacity & storage capacity.

3. Geological Factors

- A. Lithologic including composition, texture, sequence of rock types & the thickness of rock formations.
- B. Structural, including chief faults & folds that interrupt the uniformity of occurrence 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 occurrence & 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 drylands. The amount of available water is equivalent to the water moving through the landscape. It also fluctuates between the wet and dry periods. Fresh water scarcity is not limited to the arid climatic regions only. Even in areas with good supply, the access to safe water is becoming a critical problem. Lack of water is caused by low water storage capacity, low infiltration capacity, large inter-annual and annual fluctuations of precipitation and high evaporative demand.

A variety of essential soil moisture and water conservation technologies must be adopted to reduce the cost of irrigation, extend it throughout and promote sustainable small-scale irrigation on a watershed basis. These technologies are essential especially in drought-prone areas. Even though drought is a purely natural calamity caused by the failure of (monsoon) rain, it can be minimized by careful planning and operation. During good rainy years, excess rainwater should be stored in the soil and also underground using suitable soil moisture conservation measures and water harvesting structures on a watershed basis. This stored water can subsequently be used for irrigation. Total area in work proposed in the project area is 3665.00 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 difficulty to cope up with the water demand during this period. Similarly, in some locations or areas water shortage is observed just before the rainy season commences. These two situations can be managed if suitable soil and moisture conservation measures are systematically implemented on a small watershed basis.

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

Appropriate structures and their functions

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

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

Soil and water conservation measures on a watershed basis

The engineering measures adopted differ with location, slope of the land, soil type, amount and intensity of rainfall. Depending on these parameters, the methods commonly used are contour trenching, contour stone walls, construction of temporary and permanent check dams and gully plugging structures. Additionally, percolation ponds, silt detention tanks and irrigation tanks are constructed to harvest water and recharge it to the groundwater for use in agriculture (irrigation). Farm ponds can also be constructed for every 4-5 ha in the watershed to provide protective/supplemental irrigation. Total above work proposed in project area are 3665.00 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 m³). 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 m³). This quantity of water, if it is used for irrigation, is sufficient to irrigate 4-6 hectares of irrigated dry crops (maize, cotton, pulse, etc.) and 2-3 hectares of paddy crop.

Irrigation Tank: The main function of this storage structure is irrigating crops. It is constructed below the above-mentioned structures in a watershed. Each tank can irrigates from 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 practised in the watershed to increase production.

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

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

PROBLEMS AND NEEDS

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



Focused Group Discussion and PRA Exercise of Village Bhaisahi Bujurg



Focused Group Discussion and PRA Exercise of Village Bhaisahi Bujurg



Focused Group Discussion and PRA Exercise of Village Bhaisahi Bujurg



Focused Group Discussion and PRA Exercise of Village Jangal Sarai Belwariya



Focused Group Discussion and PRA Exercise of Village Jangal Sarai Belwariya



Focused Group Discussion and PRA Exercise of Village Jangal Sarai Belwariya



Focused Group Discussion and PRA Exercise of Village Narrey Bujurg



Focused Group Discussion and PRA Exercise of Village Narrey Bujurg



Focused Group Discussion and PRA Exercise of Village Narrey Bujurg



Focused Group Discussion and PRA Exercise of Village Teeyar



Focused Group Discussion and PRA Exercise of Village Teeyar



Focused Group Discussion and PRA Exercise of Village Teeyar

CHAPTER - 4

INSTITUTION BUILDING & PROJECT

MANAGEMENT

PROJECT IMPLEMENTING AGENCY (PIA)

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

Detail Staffing Pattern of PIA

S.No.	Name	Desingnation	Qualification
1	Shri P.C.Verma	Bhoomi Sanrakshan Adhikari	Intermediate, Diploma in Ag. Engg..
2	„ R.K.Gupta	Junior Engineer	Intermediate, Diploma in Ag. Engg..
3	„ H.R.Verma	Accountant	M. Com
4	„ A.K.Gupta	Accountant	B.Com
5	„ Shambhu Prasad	Droughtman	High School
6	„ S. P. Sharma	Zeledar	B.A.
7	„ R.S.Shahi	Senior Clerk	Intermediate
8	„ R.P.Singh	Junior clerk	B.Com.
9	„ S.S.Upadyay	Junior clerk	Intermediate
10	„ Bachcha Yadav	Tracer	B.A.
11	“ R.P. Mishra	Work Incharge	B.A.
12	“ B.L.Gautam	Work Incharge	B.A
13	“ R.K Varma	Work Incharge	Intermediate
14	“ S.C Tiwari	Work Incharge	M.A
15	“ R.K Dubey	Work Incharge	Intermediate
16	“ Sri Bhagwan	Work Incharge	Intermediate

17	“ Sri Ramvinay Kumar	Work Incharge	Intermediate
18	“ J.P Pandey	Sinch Pal	B.A
19	“ Jai Shankar singh	Driver	Highschool
20	“ Harendra Shukla	Iv th Class	Intermediate
21	“Shambhu Singh	Iv th Class	Junior Highschool
22	“ Ram Jeet Yadav	Iv th Class	Intermediate
23	“ Dal Bahadur	Iv th Class	Primary
24	“ Mithai Lal	Iv th Class	Primary
25	Smt. Ramkali	Iv th Class	Primary

Roles and Responsibilities of the PIA:

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

The PIA, after careful scrutiny, shall submit the action plan for watershed development project for approval of the DWDU/DRDA and other arrangements. The PIA shall submit the periodical progress report to DWDU. The PIA shall also arrange physical, financial and social audit of the work undertaken. It will facilitate the mobilization of additional financial

resource from other government programs, such as NREGA, BRGF, SGRY, National Horticulture Mission, Tribal Welfare Schemes, Artificial Ground Water Recharging, Greening India, etc.

WATERSHED DEVELOPMENT TEAM:

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

Watershed Development Team

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

S. No.	Subject	Name of Member of WDT	Address	Qualification	Designation	Experience
1	Agriculture	K.K. Singh	Vill & Post-Karwal urf Majhgawa, Gorakhpur	B. Sc. (Agriculture)	Kisan Mitra	Broad knowledge and experience in Agricultural work since 15 years
2	Soil Science	Dr. S.K. Tomar	K.V.K.-Balipar, Gorakhpur	M. Sc (Agriculture)	Scientist	Experience in Departmental work since 10 years
3	Social Mobilization	Sri Ranjit Kumar Yadav	Vill & Post-Karwal urf Majhgawa, Gorakhpur	M.A Sociology	Teacher	Three years teaching experience in Sociology
4	Water Management	S. P. Sharma	Vill-Kuawal Kalan (Harpurbudhat),Gorakhpur	B. Sc. (Agriculture)	A. S. C. I.(Retd. from Dept of Agriculture	Broad knowledge and experience in Agriculture Extension, soil conservation and water management
5.	Capacity Building	Sri. Braj Mohan Yadav	Vill.- Ghora Deor, Post Sabhadar Khurd, Gorakhpur	M. Sc. (Ext.)	Trainer	Experience in Rural development and Extension

Roles and Responsibilities of WDT:

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

- a. Assist Gram Panchayat /Gram Sabha in constitution of the watershed committee and their functioning.

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

WATERSHED COMMITTEE (WC)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
S. No	Names of WCs	Date of Registration as a Society (dd/mm/yyyy)	Name of the Watershed member	Designation	M /F	SC	ST	SF	MF	LF	Land -Less	UG	SHG	G P	Any Other	Educational Qualification	Function (s) assigned #	
1	Narrey Bujurg 2B2C2b2c	Under Process	Smt. Meena Chand	President	M			√						√		Intermediate	A & D	
			Sri ManojChand	Secretary	M			√				√					Intermediate	C & H
			Sri Padmakar Chand	Member	M			√					√				Intermediate	E
			Sri Adalat	Member	M	√			√						√		Primary	E & F
			Sri Ramesh Singh	Member	M			√					√				High School	E
			Sri Paltan	Member	M					√			√				J.High School	E
			Sri Balajee	Member	M					√			√				B.A.	E
			Sri Jaiprakash Yadav	Member	M					√						√	Intermediate	I & F
			Sri Panney Lal	Member	M					√			√				Intermediate	B & E
			Sri Virendra Yadav	Member	M	√				√			√				High School	E
			Sri Lalla	Member	M	√							√		√		Primary	E
Sri Shekh Bhan	Member	M	√							√		√		Intermediate	E			
			Shri S.C. Tiwari	Work incharge	M									√	B.sc (Ag.)	A & D		

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
S. No	Names of WCs	Date of Registration as a Society (dd/mm/yyyy)	Name of the Watershed member	Designation	M /F	SC	ST	SF	MF	LF	Land -Less	UG	SHG	G P	Any Other	Educational Qualification	Function (s) assigned #	
2	Jangal Sariy Balwariya 2B1C2e1b	Under Process	Sri Shiv Kumar Yadav	President	M			√						√		Intermediate	A & D	
			Sri Acchelal Pal	Secretary	M			√				√					B.A.	C & H
			Sri Jagdish Pal	Member	M				√				√				Graduate	B
			Sri Anil Kumar	Member	M	√						√				√	Intermediate	E & F
			Sri Ram Sagar Nisad	Member	M	√						√				√	J. High School	A
			Sri Ramanand yadav	Member	M					√			√				Intermediate	A
			Sri Subash	Member	M	√						√				√	J. High School)	E& I
			Sri Serve Jeet Yadav	Member	M					√			√				Intermediate	E
			Sri Niwas Sharma	Member	M					√			√				J.High School	E
			Sri Shrinath Yadav	Member	M					√			√				B.A.	E
			Smt Chhanga Devi	Member	F	√						√		√			J.High School	E
			Shri Ram Vinay Kumar	Work incharge	M									√	B.sc(Maths) & M.A(Eco.)	A & D		

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18			
S. No	Names of WCs	Date of Registration as a Society (dd/mm/yyyy)	Name of the Watershed member	Designation	M /F	SC	ST	SF	MF	LF	Land -Less	UG	SHG	G P	Any Other	Educational Qualification	Function (s) assigned #			
3	Bhaisahi Buzurg 2B1C2e1f	Under Process	Sri Raj Pati Chauhan	President	M			√				√				Intermediate	A & D			
			Sri Sushil Kumar Prajapati	Secretary	M			√							√		B.A.	C & H		
			Sri Dinesh singh	Member	M			√					√					Intermediate	E	
			Sri Jai nath Yadav	Member	M			√					√					Highschool	E	
			Sri Vipin Prajapati	Member	M			√							√			B.A.	A & B	
			Sri Chandra Shekhar Shurma	Member	M								√				√		High School	E
			Sri Sarvesh	Member	M	√							√				√		J. High School	E
			Sri Chhote Lal Yadav	Member	M			√						√					High School	E
			Sri Jalai	Member	M	√							√				√		J. High School	E
			Sri Shyam Bali	Member	F	√							√				√		J.High School	E
			Shri Dhananjay	Member	F	√							√				√		J.High School	E
			Shri Ram Vinay Kumar	Work incharge	M										√	B.sc(Maths) & M.A(Eco.)	A & D			

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
S. No	Names of WCs	Date of Registration as a Society (dd/mm/yyyy)	Name of the Watershed member	Designation	M /F	SC	ST	SF	MF	LF	Land -Less	UG	SHG	G P	Any Other	Educational Qualification	Function (s) assigned #	
4	Tiyer 2B1C2c2e	Under Process	Sri Jay prakash singh	President	M			√				√				Intermediate	A & D	
			Sri Shailendra Pratap	Secretary	M			√					√				Graguate	C & H
			Sri Omprakash	Member	M	√						√				√	High School	E
			Sri Deep Chandra Bharti	Member	M			√					√				Intermediate	E
			Sri Bhim Singh	Member	M			√					√				.High School	F
			Sri Dhruv Narayan Singh	Member	M			√					√				High School	E
			Sri Gopal Yadav	Member	M			√					√				High School	E
			Sri Ram Dayal	Member	M			√								√	Intermediate	B & E
			Smt. Rajendra YAdav	Member	F			√					√				Graguate	E
			Shri Ashok Rai	Member	M			√								√	Intermediate	I & E
			Shri Ram Palat Nisad	Member	M	√							√			√	High School	E
			Shri R.K. Verma	Work incharge	M									√	Graguate	A & D		

SELF HELP GROUP

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

- a) Lack of proper credit facilities due to low intervention of formal financial credit institution.
- b) Excessive exploitation of weaker section by money lenders
- c) Lack of attitude for saving among poor people
- d) Lack of knowledge on credit and thrift activity and banking.

Details of Self Help Group in Project Area IWMP-III, Gorakhpur

S. No.	Code No. (M.W.S.)	Name of Project (M.W.S.)	Name of S.H.G.	Occupation of S.H.G.	Name of Chairman	No. Members
1.	2B1C2b2c	Narrey Bujurg	Bajrang Bali S.H.G Narrey Bujurg	Dairy	Sri Tirath S/o Gudari	10
2.	2B1C2e1b	Jangal Saray Belwariya	Maa Durga S.H.G Jangal Saray Belwariya	Goat Farming	Smt. Changa Devi W/o Suvash	10
3.	2B1C2e1f	Baisahi Bujurg	Kali Ji S.H.G Pipar Pati (Baisahi Bujurg)	Goat Farming	Sri Rajesh S/o Shankar	11
4.	2B1C2c2e	Tiyar	Shiv Shankar S.H.G Tiyar	Goat Farming	Sri Rahullah S/o Rahim	11

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

S.N.	Name of watershed	No. Of Groups						Proposed outlay (Rs. In lakh)	Expected annual income per SHG (Rs. In lakh)	Remark
		Poultry Farm	Goat Keeping	Animal Farming	General merchant shop	other	Total Groups			
1.	Narrey Bujurg	1	2	1	1	2	7	56.100	0.25 to 0.40	From Project Period
2.	Jangal Saray Belwariya	1	2	1	1	2	7			
3.	Baisahi Bujurg	1	2	1	1	2	7			
4.	Tiyar	-	2	-	1	2	5			
Total		3	8	3	4	8	26	56.100	65.00	

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 under proposed- IWMP-III Gorakhpur

S. No.	Code No. (M.W.S.)	Name of Project (M.W.S.)	No of U.G.	No. of Cultivators
1.	2B1C2b2c	Narrey Bujurg	12	3250
2.	2B1C2e1b	Jangal Saray Belwariya	10	2955
3.	2B1C2e1f	Baisahi Bujurg	10	2800
4.	2B1C2c2e	Tiyar	6	1155
		Total	38	10160

Institutional Arrangement at Project level:-

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

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

- 1- They should preferably have prior experience in watershed related aspects or management of watershed development projects.
- 2- They should be prepared to constitute dedicated Watershed Development Teams.

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

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

CHAPTER – 5
MANAGEMENT / ACTION PLAN

PROBLEM AND NEED OF THE AREA

Integrated Watershed Development Programme is aimed at the socio-economic upliftment of the dwellers of watershed area and to create trust about the programme to be implemented so that they can coordinate in participatory mode for success of the programme. As per the New Common Guidelines total financial outlay for entry point activities is 4% of the total project cost. To increase the per capita availability of drinking water, older wells of the village will be renovated as well as the chabootra will be constructed, to increase the irrigation water availability, older Bund which already exists but not functioning will be reconstructed/renovated. Repairing and maintenance of water bodies have been proposed on priority basis. Schools 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 Well Repairing, Krishak Vikas Munch, Approach Road (Brick Soling), Boundry Wall, Water Recharging Tank will be completed. Total estimated cost for these activities is Rs. 22.440 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. 22.440 Lakh was allotted for EPA activity, which was 4 per cent of total allocated budget. The villagers discussed various activities which they felt is important but after a brief discussion it was conveyed to them that only those activities can be taken, which revive the common natural resources. It was also taken into priority that there should be an instrument of convergence which will result in sustainability of activities

Entry point activities (EPA) (All financial figures in lakh Rs.)

S.No.	Name of Micro Watershed		Amount earmarked for EPA in Lacs	Entry Point Activities Planned
	Name of Project	Micro Watershed code		
1.	Narrey Bujurg	2B1C2b2c	7.176	(A) Well Repairing (B) Krishak Vikas Munch (C) Approach Road (Brick Soling). (D) Boundry Wall (E) Water Recharging Tank
2.	Jangal Saray Belwariya	2B1C2e1b	6.528	
3.	Baisahi Bujurg	2B1C2e1f	6.192	
4.	Tiyar	2B1C2c2e	2.944	
	Total		22.440	

WATER HARVESTING STRUCTURES•WATER, ENERGY AND RESOURCE CONSERVATION

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

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

Watershed Development works is proposed to be taken up from 2nd year of the initiation of the project. These works are proposed to be taken up from village to village. And allocation of Rs 268.20 Lakh & 50% of the total cost has been made for watershed development works

CONTOUR , MARGINAL AND PERIPHERAL BUND

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

WATER HARVESTING STRUCTURE/CHECK DAM

These structures are built of masonry. Check dams have been proposed to be constructed in big gullies/ravines carrying relatively high runoff and sediment load. Water stored in check dams will be utilized as a source of irrigation water during the post-monsoon season.

AGRO FORESTRY

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

DRY LAND HORTICULTURE

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

AREA TREATMENT PLAN

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

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

PASTURE MANAGEMENT

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

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

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

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

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

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

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

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

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

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

ROLE OF GRASSLAND IN SOIL CONSERVATION

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

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

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

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

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

HORTICULTURE DEVELOPMENT FOR WATERSHED MANAGEMENT

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

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

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

(A) Basic constraints

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

(B) Soil constraints

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

(C) Plant related constraints

- 1- Problem of plant establishment
- 2- Physiological disorders
- 3- Fruit drop and poor productivity
- 4- Incidence of insects-pests.

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

CONCEPTS AND ADVANTAGES OF CONSERVATION HORTICULTURE

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

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

Horticulture Practices (For plantation)

Some of the important practices are given below:

1- Selection of Suitable Fruits Types:

For the success of conservation horticulture, selection of hardy varieties resistant to diseases and pests and use of local or other hardy root stocks for raising fruit-trees is of great importance. The major part of the reproductive cycle ie. Period from

flowering to fruiting must also fall during maximum water availability period and the root ripening must be completed before the onset of dry summer (April-May).

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

2-Planting Techniques:

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

3-Use of Root Stokes:

Budding and grafting on the wild root stock gives benefit of the establishment root and in turn provides better quality fruits with high field potential. For example, *Ziziphun mauritiana*, a wild ber can be successful budded with scion of improved cultivars, This practice is only successful where sizable patch of wild root stock is available. The budded/grafted stock needs intensive management as it is required to be protected from the wild animals, birds, insects, pests etc. The wild root stock develops efficient top root to provide moisture and nutrients to the scion. Amla. Bel is other examples of raising the improved cultivation the wild root stock.

4-In Site Water Harvesting:

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

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

5-Mulching:

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

6-Drip Irrigation:

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

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
ha¹)**

Sl. No.	Particulars of work Remarks	Rate (Rs.)	Cost (Rs.)
1-	Clear felling or bush clearance of area protected Infected with <i>Lantana</i> etc. including Cost of burning	LS	550.00
			The area is to be through biofencing
2-	Soil working –earth work, digging of Pits/holes 60 cm deep, 30cm dia -800 Nos. Including cost of refilling and trenching (400 trenches/ha)	LS	6085.00
3-	Cost of seedlings for 900 nos. and grass 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			10,335.00
Say			10,350.00

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

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

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

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

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

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

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

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

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

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

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

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

Financial Component

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

Estimate of Livestock Development Activities

Total number of female animals:	Buffalo	-	5860
	Cow	-	5320
	Total	-	10180

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

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

Total Amount - Rs. 4,12,500

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

1. H.S. + B.Q.	@ 5.50	112915.00
2. F.M.D.	@10.50	2,15,565.00

(Twice in a year)

Total Amount - Rs. 3,28,480.00

3. Deworming:

Adult animals - 19500

Child animals - 2000

Albendazole for 19500 animals @ 40.56 7,90,920.00

2000 child animals @20.28 40,560.00

Total Amount - Rs. 8,31,480.00

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

GRAND TOTAL - Rs. 25,45,500.00

DRAWING AND DETAIL ESTIMATE 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 dung, and crop residue, leaf of trees, straw and other organic materials. The method of filling up the pit is below.

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

ESTIMATE OF ‘BARMY’ COMPOST PIT’S

<u>DETAIL’S OF MEASURMENT</u>			
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 MEASUREMENT

Brick Work In Bed	$4.00 \times 2.50 \times 0.11 = 1.100$ Cmt.
„ „ „ Long Wall	$2 \times 4.00 \times 0.23 \times 1.00 = 1.840$ „
„ „ „ Short Wall	$2 \times 2.00 \times 0.23 \times 1.00 = 0.920$ „
	Total B.W. = <u>3.860</u> „
Deduction Of BrickWork	$2 \times 3 \times 8 \times 0.15 \times 0.23 \times 0.08 = 0.132$ „
	$2 \times 3 \times 4 \times 0.15 \times 0.23 \times 0.08 = 0.066$ „
	Total Deduction = <u>0.198</u> „
	Total Net B.W. = <u>3.662</u> Cmt.
Plaster Work In Bed	$3.50 \times 1.90 = 6.650$ Sq.mt.
	Total P.W = <u>6.650</u> 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-Gorakhpur

Irrigated-W.H-542

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

Kathia-Raj 1555

2- Seed rate -100 -125 Kg/hectare

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

ESTIMATE OF DEMONSTRATION OF WHEAT IN 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 200 LITRES CAPACITY

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

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

Therefore, it is hoped that farmers will adapt this procedure for Agro-forestry and will become prosperous.

DETAIL ESTIMATE OF DEMONSTRATION OF HORTICULTURE AND MIXED CROPPING

For 1.00 Hectare

S.No.	Description of Work	No.	L.	B.	D./H.	Quantity
1.	Earth work in cutting	156	3.14 x 1.20	-	1.35	793.54
	Trench	156	1.50	0.75	0.75	131.62
	Fencing Poll	133	0.20	0.20	0.20	1.064
Total						926.22 cum
2.	Farm yard manure	156x10				1560 kg
3.	Filling of earth work with farm yard manure	156	3.14 x 1.00	-	1.20	587.80 cum
4.	C.C.W. 1:2:4 for fencing poll	133	0.20	0.20	0.20	1.064 cum
5.	Angle iron for poll	133	1.80	-	-	239.40 m
6.	Barbed wire	3	400	-	-	1200.00 m
7.	Plants	156	-	-	-	156 nos.
8.	Plastic drums (200 litre)	156	-	-	-	156 nos.

CONSUMPTION OF MATERIALS

S.No.	Description of Work	Quantity	Farmyard Manure (kg)	Cement Bags (nos)	Coarse Sand (cum)	G.S.Grit 10-20 mm	Angle Iron (m)	Barbed Wire (kg)	Planting Drum (nos)
1.	C.C.W. 1:2:4	1.064 cum	-	6.49	0.446	0.883	-	-	-
2.	Angle iron	239.4 m	-	-	-	-	239.40	-	-
3.	Barbed wire	1200.0 m	-	-	-	-	-	1200.0	-
4.	Farmyard manure	1560.0 kg	1560 kg	-	-	-	-	-	-
5.	Plastic drum	156 nos.	-	-	-	-	-	-	156
Total			1560.0 kg	6.49	0.446	0.883	239.40	1200.0	156
Say			1560.0 kg	6.50 bags	0.450 cum	0.900 cum	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.

Scope of capacity building at Project Area

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

Capacity Building Institution:

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

Institutional Arrangement & Capacity Building in the Projects

S. No.	Project Stake holders	No. of Stake holders	Total no. of persons	No. of persons trained so far	No. of Persons to be trained	Sources of funding for training, BSA Unit or DOLR or others		Name & Address of Training institute
						DOLR	BSA unit or others	
1	Distinct Data centre	1	1	-	1	DOLR	BSA unit	Deen Dayal Upadhaya Rajya Gram Vikas Sansthan, Baksi Ka Talab Lucknow
2	PIA	1	14	4	10	DOLR	BSA unit	Deen Dayal Upadhaya Rajya Gram Vikas Sansthan, Baksi Ka Talab Lucknow
3	WDTs	1	5	1	4	DOLR	BSA unit	Deen Dayal Upadhaya Rajya Gram Vikas Sansthan, Baksi Ka Talab Lucknow
4	W.Cs	4	45	-	45	DOLR	BSA unit	R.R.D.I., Gorakhpur, Baksi Ka Talab Lucknow, UPLDWR Training Centre, Belikala, Lucknow & Water and Land Management Institute(WALMI), Utretia, Lucknow
5	GPs	48	210	-	210	DOLR	BSA unit	-----do-----
6	SHG	26	280	-	280	DOLR	BSA unit	-----do-----
7	UG	38	390	-	390	DOLR	BSA unit	-----do-----
8	Community	25	150	-	150	DOLR	BSA unit	-----do-----
9	Any others	-	-	-	-	DOLR	BSA unit	-----do-----

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, Gorakhpur Project consist of 4 micro watersheds.

Base line Survey

To access the impact of any watershed development programmed a detailed baseline survey has to be conducted. This acts a benchmark for any intervention during and post implementation of any development programme. A detailed baseline survey was undertaken which involved household census survey, Bio-physical survey and Village level data collection from Talati – cum mantri. Household census survey includes a detailed questionnaire which has been filled by visiting each and every household in the village. This gave in the details of the demographic profile of the village, the literacy percentage, SC/ST population, number of BPL household, cattle population and net consumption rate in the village, average milk production of the cattle and various schemes running and their benefits

Bio-physical survey was undertaken to identify various natural resources available in the village. It included the soil typology, wells in the area, crop taken in the field, Cropping pattern, fertilizer used and various sources of irrigation in the field.

Participatory Rural Appraisal (PRA)

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

techniques like resource mapping, social mapping, and season calendars were used to understand the physical and social orientation of the village in general and watershed in specific. These tools put the villagers in ease than the complicated questionnaires.

Use Of GIS And Remote Sensing For Planning

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

Prioritization

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

Planning

An action plan matrix was formulated by State Level Nodal Agency (SLNA) taking into account various features like the slope percent, Soil Depth, Soil Texture, Soil erosion in the area for wasteland, forest land and agricultural land. Global positioning System (GPS) was used to identify each and every water conservation structures available in the project area. This was used to create a map. Contour Map of vertical interval of 1.0 meter at a scale of 1:4000 was used for identifying various locations for soil and water conservation structures. GIS study is used to identify the area require the degree of concentration for the implementation of Watershed Plan.

Hydrological modeling

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

Details of Scientific Planning and Inputs in IWMP projects

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

Land use	Yes
Ground water status	Yes
Watershed boundaries	Yes
Activity	Yes
Crop simulation models	No
Integrated coupled analyzer/ near infrared visible spectroscopy/ medium spectroscopy for high speed soil nutrient analysis	No
Normalized difference vegetation index (NDVI)#	No
Weather Station	-
(B) Inputs	NO
Bio-pesticides	No
Organic manures	No
Vermi compost	Yes
Bio-fertilizer	Yes
Water saving devices	Yes
Mechanized tools/ implements	Yes
Bio-fencing	Yes
Nutrient budgeting	Yes
Automatic water level recorders & sediment samplers	NO
Any other (please specify)	NO

YEAR WISE PHASING OF WORKS (PHYSICAL & FINANCIAL)

Phasing of various works / activities during different years of the project period is presented in Table

Component wise & Year wise Phasing of Physical & Financial Outlay

Financial (Lacks Rs.) Physical (ha.)

S. No.	Component	% of Budget	Ist Year		IInd Year		IIIrd Year		IV Year		V Year		Total	
			P	F	P	F	P	F	P	F	P	F	P	F
1.	<u>Administration Cost</u>													
A.	TA & DA, POL/Hiring of vehicles/ office and payment of electricity and Phone bill etc. computer, stationary and office consumable and contingency.	10%	-	-	-	11.220	-	15.147	-	15.147	-	14.586	-	56.100
B.	Monitoring	1%	-	-	-	1.122	-	1.122	-	1.122	-	2.244	-	5.610
C.	Evaluation	1%	-	-	-	1.683	-	1.122	-	1.122	-	1.683	-	5.610
Sub Total		12%	-	-	-	14.025	-	17.391	-	17.391	-	18.513	-	67.320
2.	<u>Preparatory Phases</u>													
A.	Entry Point Activities, like well repairing, Kisan vikash munch & brick soling Road	4%	-	22.440	-	-	-	-	-	-	-	-	-	22.440
B.	Capicity Building	5%	-	5.610	-	11.220	-	4.2075	-	4.2075	-	2.805	-	28.050
C.	Preparation of DPR	1%	-	5.610	-	-	-	-	-	-	-	-	-	5.610
Sub Total		10%	-	33.66	-	11.220	-	4.2075	-	4.2075	-	2.805	-	56.100

3.	Watershed works													
A.	Soil & moisture conservation Construction of Bunds. (graded bund, contour bund, field Bund, Marzinal bund & Peripheral Bundh)		-	-	565.00	25.875	924.00	33.7715	944.00	35.7715	1232.00	46.482	3665.00	141.900
B.	Water Resources Development	50%	-	-	70.00	7.0000	130.00	13.0000	120.00	12.0000	130.00	13.000	450.00	45.0000
i.	New and Renovation of existing Water Harvesting Structure/ Gully plug/Chak Dam/Ponds etc.													
ii.	Drainage line treatment(Pucca structure/ Check Dam)		-	-	-	-	1No.	4.0000	1No.	4.0000	2No.	8.000	4No.	16.0000
C.	Agroforestry		-	-	5.00	3.2000	10.00	6.400	10.00	6.4000	15.000	9.600	40.00	25.600
i.	Rainfed horticulture with fencing													
ii.	Rainfed horticulture without fencing		-	-	60.00	6.000	160.00	16.000	150.00	15.000	130.000	13.000	500.00	50.0000
iii.	Aforestation & development of Silvi_pastoral system		-	-	-	-	6.00	0.6000	6.00	0.6000	8.000	0.800	20.00	2.0000
Sub Total		50%	-	-	700.00	42.075	1230.00	73.7715	1230.00	73.7715	1515.00	90.882	4675.00	280.500

4.	<u>Livelihood Activities</u> Income generating Activities through SHGs for landless and Marginal formers (Goat farming, Establish of barmy compost, nadaf compost ,General merchant shop & live stock development Activities)	10%	-	-	-	5.610	-	22.440	-	16.830	-	11.220	-	56.100
Sub Total		10%	-	-	-	5.610	-	22.440	-	16.830	-	11.220	-	56.100
5.	<u>Production System & Micro enterprises</u> Demonstration and assessment of improved composting system as: Seed, Chemical Fertilizer/ Bio Fertilizer, Pest Control, Advance Agriculture Equipment and Production of compost	13%	-	-	-	5.610	-	22.440	-	28.050	-	16.830	-	72.930
Sub Total		13%	-	-	-	5.610	-	22.440	-	28.050	-	16.830	-	72.930
6.	<u>Consolidation Phase</u>	5%	-	-	-	-	-	-	-	-	-	28.050	-	28.050
Sub total		5%	-	-	-	-	-	-	-	-	-	28.050	-	28.050
Grand Total		100%	-	33.660	700.00	78.540	1230.00	140.250	1230.00	140.250	1515.00	168.300	4675.00	561.000

Note: Unit costs of different activities are given in annexure.

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

S.N.	Name of watershed	No. Of Groups						Proposed outlay (Rs. In lakh)	Expected annual income per SHG (Rs. In lakh)	Remark
		Poultry Farm	Goat Keeping	Animal Farming	General merchant shop	other	Total Groups			
1.	Narrey Bujurg	1	2	1	1	2	7	56.100	0.25 to 0.40	From Project Period
2.	Jangal Saray Belwariya	1	2	1	1	2	7			
3.	Baisahi Bujurg	1	2	1	1	2	7			
4.	Tiyar	-	2	-	1	2	5			
	Total	3	8	3	4	8	26	56.100	65.00	

CHAPTER -9
CONSOLIDATION/ WITHDRAWAL
STRATEGY

PLANS FOR MONITORING AND EVALUATION

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

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

PLANS AND PROJECT MANAGEMENT

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

capacity building organisation. They will act as a major kingpin during post implementation for scaling up the successful experience during project.

WATERSHED DEVELOPMENT FUND

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

USER CHARGES

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

SUSTAINABILITY AND ENVIRONMENT SECURITY

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

ECONOMIC ANALYSIS

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

AGRICULTURE

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

HORTICULTURE

The Economic analysis of horticulture plantation in agri-horticulture system at I.W.M.P.- III watershed. Project life is considered to be 25 years and discount rate for NPV estimation is 10%

FOREST/ FUEL WOOD PLANTATION

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

FOOD SUFFICIENCY

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

RATIO OF COST AND PROFIT

Status Before Work

S. No.	Name of Cereal	Area in hectare	Production /Hect./Quintal	InvestCost/hect.	Rate/Quintal.	Net profit/hect.	Total Net profit.
1.	Paddy	2820.00	17.00	4000.00	800.00	9600.00	27072000.00
2.	Arhar	460.00	5.00	2300.00	3500.00	15200.00	6992000.00
3.	Maize	70.00	8.00	2600.00	900.00	4600.00	322000.00
4.	Wheat	3530.00	20.00	4200.00	1000.00	15800.00	55714000.00
5.	Mustard	110.00	8.00	2600.00	2000.00	13400.00	1742000.00
6.	Moong	20.00	4.00	5000.00	4000.00	1900.00	380000.00
	Total	7010					92282000

Status After Work:

S. No.	Name of Cereal	Area in hectare	Production /Hect./Quintal	InvestCost/hect.	Rate/Quintal.	Net profit/hect.	Total Net profit.
1.	Paddy	2950.00	21.00	4000.00	800.00	12800.00	3776000.00
2.	Arhar	550.00	7.00	2300.00	3500.00	22200.00	12210000.00
3.	Maize	90.00	11.00	2600.00	900.00	7300.00	584000.00
4.	Wheat	3840.00	24.00	4200.00	1000.00	19800.00	76032000.00
5.	Mustard	170.00	12.00	2600.00	2000.00	21400.00	3638000.00
6.	Moong	80.00	6.00	5000.00	4000.00	1900.00	1520000.00
	Total	7680.00					131744000.00

Bhoomi Sanrakshan after the treatment of Land	-	131744000.00
Bhoomi Sanrakshan before the treatment of Land	-	922282000.00
Net Profit	-	33379000.00
Ratio of cost profit ratio	-	$\frac{131744000.00}{922282000.00} = 1:1.42$

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

CHAPTER -10

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 0.60 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 1.80 lacs in the watershed.

EXPECTED EMPLOYMENT RELATED OUTCOMES

S.No.	No. of the Villages	Wage employment										Self employment				
		No. of mandays (Lakhs)					No. Of beneficiaries					No. Of beneficiaries				
		SC	ST	Others	Women	Total	SC	ST	Others	Women	Total	SC	ST	Others	Women	Total
1	101	0.562	0	1.772	0.050	2.384	3550	0	6610	0	10160	350	0	480	130	960

MIGRATION

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

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

Name of the Project	No. of persons migrating	No. of days per year of migration	Main reason for migration	Expected reduction in no. of persons migrating
I.W.M.P.- III	1690	180	Due to Unemployment in Villages and Wages in City	970

VEGETATION/ CROP RELATED OUTCOMES

It is expected that after compilation of the project, the crop productivity of Rice-Wheat will certainly enhance, It would be around Paddy (30.00 qt/ha),Wheat (42.00 qt/ha). There will be an improvement in soil health of the study area after conservation measures.

MAJOR CROPS GROWN AND THEIR PRODUCTIVITY IN THE PROJECT AREA

S. N.	Names of the crop	Current status		Expected Post-Project Status	
		Area (ha)	Productivity (kg/ha)	Area(ha)	Productivity(kg /ha)
1	Kharif Paddy	2820	1700	2950	2100
2	Arhar	460	500	550	700
3	Maize	70	800	90	1100
4	Rabi Wheat	3530	2000	3840	2400
5	Mustard	110	800	170	1200
6	Zaid/Other season	20	400	80	600
7	Total	7010	-	7680	-

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	101	10months Easily & 2 Months Crisis	12 months Easily	Smelly & Oily Water	Pure

DETAILS OF AVERAGE GROUND WATER TABLE DEPTH IN THE PROJECT AREAS (IN METERS)

S. N.	No. of the villages	Sources	Pre-project	Expected Post-Project	Remarks
1	101	Open wells	6.05	5.75	-

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

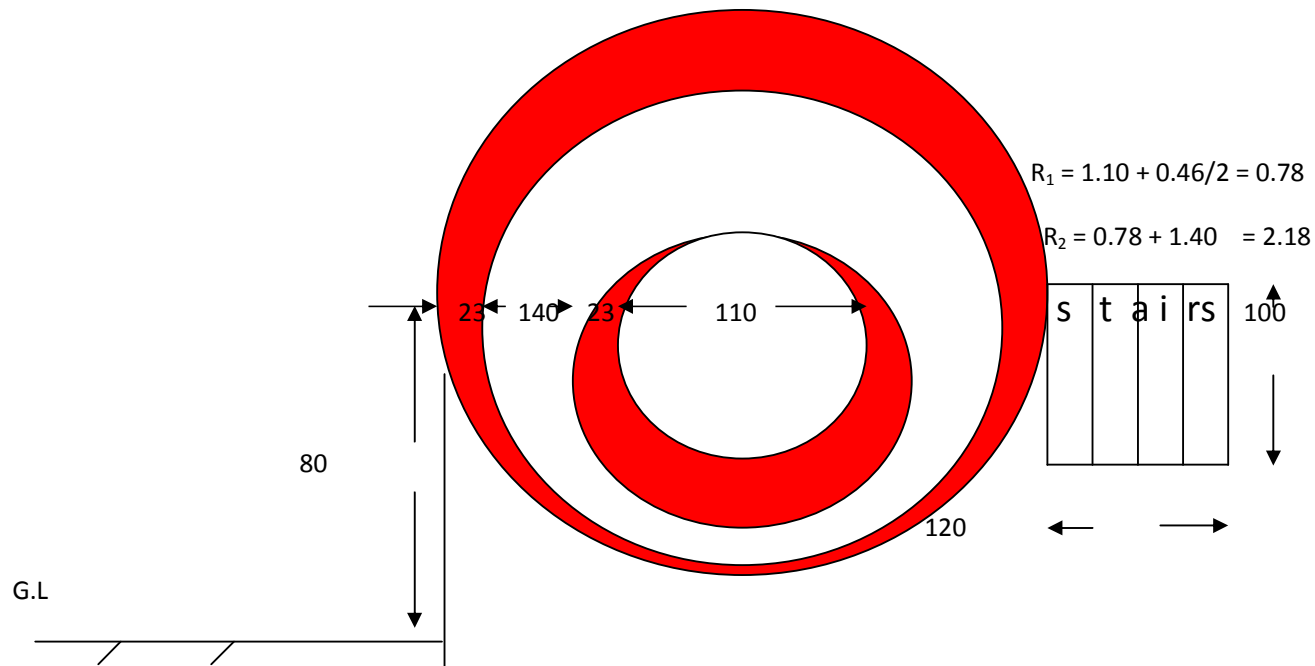
There is negligible area under tree cover. The village has a negligible forest area which consists of only *Prosopis Juliflora* (babool). Trees like Neem and *Alianthus* are seen just here and there, not concentrated in any area. It is planned that land to be covered under new plantation.

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

S.No.	Name of the Distict	Item	Unit of Measurement	Pre-project Status	Expected Post-project Status
1	Gorakhpur	Status of water table	Meter	6.05	5.75
2		Ground water sturcture repaired/ rejuvenated	-	-	-
3		Quality of drinking water	-	Smelly & Oily	Pure
4		Availability of drinking water	Meter	10 months Easily & 2Months Crtsis	12 Months Easily
5		Increase in irrigation potential			
6		Change in cropping/land use pattern	-	Paddy, Single	Double Cropping & Multiple Cropping
7		Area under agriculture crop	Hector	4800	4800
8		i- Area under single crop	Hector	2600	2000
9		ii- Area under double crop	Hector	2180	2720
10		iii- Area under multiple crop	Hector	20	80
11		iv-Cropping Intensity	%	146.00	160.00
12		Increase in area under vegetation	Hector	-	80
13		Increase in area under horticulture	Hector	-	120
14		Increase in area under fuel & fodder	Hector	-	5
15		Increase in milk production	Liters	2.50	4 .00
16		No. of SHGs	No.	-	26
17		Increase in no. of livelihoods	No.	-	26
18		Migration	%	2.24	1.28
19		SHG Federation formed	No.	-	26
20		Credit Linkage with banks	-	-	26

CHAPTER -11
COST NORMS & DESIGN
STRUCTURE PROPOSED

DETAIL ESTIMATE OF VILLAGE WELL REPAIR



Earth Work $\pi(r_1^2 - r_2^2) \times h$

$$3.14 (0.60 - 4.75) \times 0.80$$

$$3.14 \times 4.15 \times 0.80 = 10.42$$

C.C. Work :-

Top of Well Jagat $\pi(r_1^2 - r_2^2) \times h$

$$3.14 \times 4.15 \times 0.10$$

1.303

Brick Work :-

On top floor	$\pi(r_1^2 - r_2^2) \times h$ $3.14 \times 4.15 \times 0.11$
in outer wall	$2\pi r \times \text{width} \times \text{height}$ $2 \times 3.14 \times 2.18 \times 0.23 \times 0.80$ $= 2.519$
inner wall	$2\pi r \times \text{width} \times \text{height}$ $2 \times 3.14 \times 0.55 \times 0.23 \times 1.10$ $= 0.873$

Plaster Work :-

In side of inner wall -	$2\pi r \times \text{lenght}$ $2 \times 3.14 \times 0.55 \times 5.00$ $= 17.27$
out side of outer wall -	$2\pi r h$ $2 \times 3.14 \times 2.41 \times 0.80$ $= 12.10$
top floor	$\pi(r_1^2 - r_2^2)$

$$3.14 \times 0.78 \times 0.78 - 2.41 \times 2.41$$

$$= 16.32$$

Stair of well

Earth Work $1.00 \times 1.20 \times 0.20$

$$= 0.24$$

Brick Work

1 st Step	$1.00 \times 1.20 \times 0.26$	=	0.312
2 nd Step	$1.00 \times 0.90 \times 0.15$	=	0.135
3 rd Step	$1.00 \times 0.60 \times 0.15$	=	0.090
4 th Step	$1.00 \times 0.30 \times 0.15$	=	0.045
	Total	-	0.582

Plaster Work

Side of stairs	$2 \times 1.20 + 0.30 / 2 \times 0.60$	=	0.90
Top of stairs	$4 \times 1.00 \times 0.30$	=	1.20
Front of stairs	$4 \times 1.00 \times 0.15$	=	0.60
	Total	-	2.70

Requirement of Material & labours

Sl.no,	Item	Quantity	Unit	Material				labors	
				Brick 1 st class 23x11x7 (No's)	Coarse Sand (Cu.mt)	Cement (Bags)	Brick Ballast (Cu.mt)	Masons (No's)	Labours (No's)
1	Earth Work	10.66	Cu.mt.	-	-	-	-		3.47
2.	C.C.Work 1:4:8	1.303	„	-	0.60	4.43	1.21	0.26	5.99
3.	Brick Work 1:4	5.407	„	2703	1.48	9.73	-	5.40	10.80
4.	Plaster Work 1:4	48.39	Sq. mt.	-	0.72	5.32	-	6.04	9.07
5.	Curing for 7 days	-	-	-	-	-	-		7
	Total	-	-	2703	2.80	19.48	1.21	11.70	36.34
	Say			2700	3.00	20.00	1.25	12.00	37.00

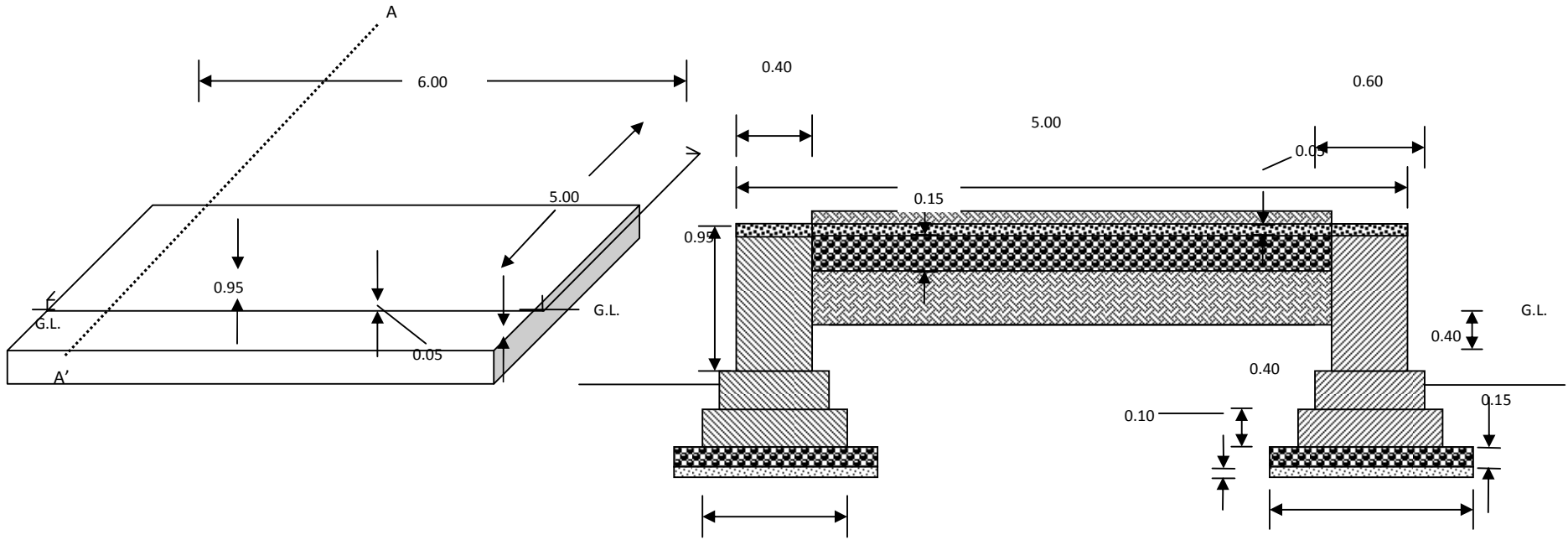
Cost of Material & Labour

Sl.no.	Item	Quantity	Rate	Unit	Amount
	Material Cost				
1	Brick 1 st class 11x23x7	2700	4600/=	1000 Bricks	12420.00
2	Coarse Sand (Banda)	3.00	2600/=	Cu.mt.	7800.00

3	Portland Cement	20.00	320/=	Bag	6400.00
4.	Brick Ballast	1.25	1000/=	Cu.mts.	1250.00
5.	Hume pipe 300mm x 2.50 mts.	3	1500/=	Nos.	4500.00
	Sub Total				32370.00
	Labor cost				
1	Mason	12.00	250/=	Each	3000.00
2.	Labor	37.00	120/=	Each	4440.00
3.	Hume pipe fixing	3	300/=	each pipe	900.00
	Sub Total				8340.00
	T&P Charge 2% cost of Material				647.40
	Total cost				41357.40

Say Rs. 41400

DRAWING OF KRISHAK VIKAS MANCH



ISOMETRIC VIEW OF PLATFORM (CHABUTRA)

DESCRIPTION

DESCRIPTION

SECTION AT A-A'

1. C.C.W. - 1:4:8.
2. Brick masonry- 1:4
3. Plastering- 1:4

DETAIL ESTIMATE OF KRISHAK VIKAS MANCH

S.No.	Description of Work	No.	L.	B.	D/H	Quantity
1.	Earth work in foundation					
	Long Wall	2	8.00	4.00	1.20	21.12
	Short Wall	2			1.10	10.56
Total						31.68 cum
2.	Laying of Sand					
	Long Wall	2	6.60	3.60	1.00	0.72
	Short Wall	2			0.10	1.32
Total						2.04 cum
3.	C.C.W. 1:4:8					
	Long Wall	2	6.60	3.60	1.00	1.98
	Short Wall	2			0.15	1.08
Total						3.06 cum
4.	Brick masonry work 1:4 in foundation & super structure					
	1st Footing.					
	Long Wall	2	6.40		0.47	1.203
	Short Wall	2	3.80		0.47	0.714
	2nd Footing					
	Long Wall	2	6.20		0.35	0.868
	Short Wall	2	4.00		0.35	0.560
	Super Structure					
Long Wall	2	6.00		0.23	1.242	
Short Wall	2	4.20		0.23	0.869	
Total						5.456 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.	Plaster Work Long Wall	2	6.00	-	0.90	10.80 m ²
	Short Wall	2	5.00	-	0.90	9.00 m ²
Total						19.80 m ²

ABSTRACT OF WORK

1.	Earth Work in Digging	32.00 cum
2	Eart Work in Filling by Carriage	17.00cum
3.	Sand Laying	2.04 cum
4.	C.C.W. 1:4:8	6.336 cum
5.	Brick masonry 1:4	5.456 cum
6.	C.C.W. 1:2:4	1.500 cum
7.	Plastering	19.80 m ²

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Coarse Sand (cum)	Brick(No's)	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.	Brick Masonary	5.456cum	10.91	1.500	2728	-	-
4.	C.C.W. 1:2:4	1.500 cum	9.15	0.630	-	-	1.275
5.	Plastering	19.800 m ²	2.17	0.297	-	-	-
Total			43.77	7.318	2728	5.892	1.275
Say			44.00 Bags	7.500	2750	6.000	1.300

COST OF MATERIALS

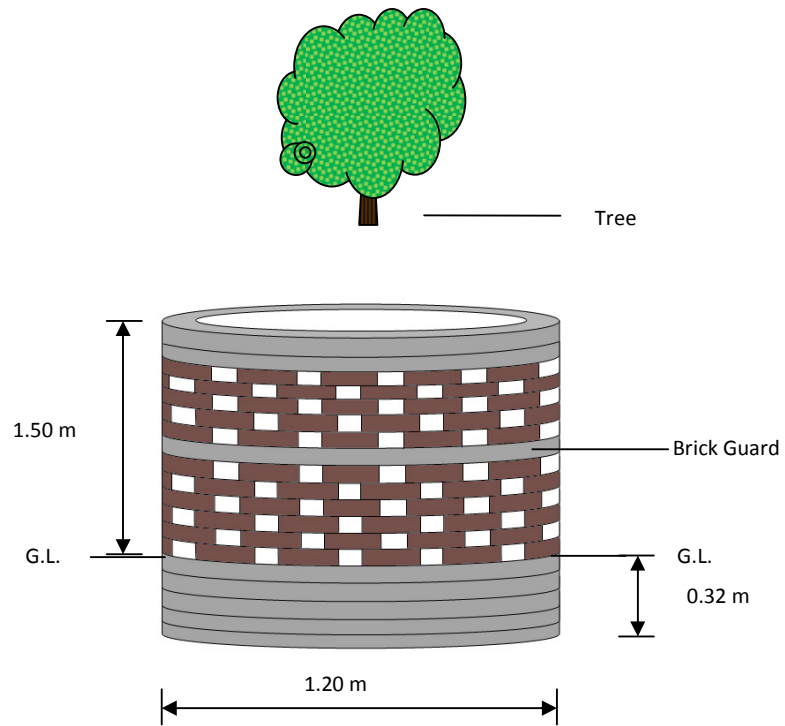
S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	44.00 Bags	320/Bags	14080.00
2.	Coarse Sand	7.50 cum	2600.00/cum	19500.00
3.	Bricks	2750 No's	4600.00/No's	12650.00
4.	G.S.B. 25-40 mm	6.000 cum	1000.00/cum	6000.00
5.	G.S. Grit 10-20 mm	1.300 cum	1600.00/cum	2080.00
Total				Rs. 54310.00

LABOUR CHARGES

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work in Digging	32.00 cum	37.00/cum	1184.00
2.	Earth Work in Filling by Carriage	17.00 cum	350.00/cum	5950.00
3.	Sand Laying	2.040 cum	41.00/cum	81.60
4.	C.C.W. 1:4:8	6.336 cum	550.00/cum	3484.80
5.	C.C.W. 1:2:4	1.500 cum	550.00/cum	825.00
6.	R/R Brick Masonary 1:4	5.456 cum	370.00/cum	2018.72
7.	Plastering 1:4	19.800 m ²	55.00/cum	1089.00
8.	Curing & Other Charges L . S	5.456 cum	100.00/cum	545.60
9.	Chowkidar	6 Man Days	120.00/Man Day	720.00
Total				Rs. 15898.72

Total Expenditure	
1. Cost of Materials	Rs. 54310.00
2. Labour Charges	Rs. 15898.72
Total	Rs. 70208.72
Say	Rs. 70,200 only

DRAWING OF BRICK GUARD



DESCRIPTION.

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

DETAIL ESTIMATE OF BRICK GUARD

S.No.	Description of work	No.	L	B	D/H	Quantity	
1.	Earthwork for tree	1	0.60	0.60	0.60	0.216	
	In foundation	1	3.14x1.09	0.20	0.30	0.205	
Total						0.421	
2.	Brick work 1:4					Solid	Glazed
	In foundation	1	3.14x1.09	0.11	0.40	0.151	-
	In super structure with glazed	1	3.14x1.09	0.11	0.48	-	0.181
	Solid	1	3.14x1.09	0.11	0.08	-	0.030
	Glazed	1	3.14x1.09	0.11	0.40	-	0.151
	Solid	1	3.14x1.09	0.11	0.16	0.060	-
Total						0.211	0.362
3.	Plastering 1:4	1	3.14x1.20	-	0.07	0.264	
		1	3.14x1.20	-	0.15	0.565	
		1	3.14x1.09	-	0.07	0.239	
Total						1.068 m²	

CONSUMPTION OF MATERIALS

S.No.	Description of work	Quantity	Brick Nos.	Cement Bags	Coarse Sand
1.	Brick work 11 cm thick 1:4	0.211 cum	100	0.29	0.050
	Brick work glazed	0.362 cum	86	0.25	0.043
2.	Plastering 1:4	1.068 m ²	-	0.11	0.016
Total			186	0.65	0.109
Say			200	0.75	0.110 cum

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Brick 1 st class	200nos.	4600.00	920.00
2.	Cement	0.75 Bags	320.00	240.00
3.	Coarse sand	0.110 cum	2600.00	286.00
Total				Rs. 1446.00

LABOUR CHARGES

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth work	0.421 cum	37.00/cum	15.57
2.	Brick work	0.391 cum	370.00/cum	144.67
3.	Plastering	1.068 m ²	55.00/m ²	58.74
Total				Rs. 218.98

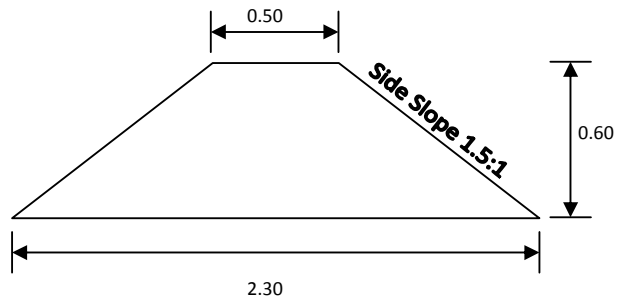
Head load and transportation L.S. - Rs. 335.00

Total Expenditure		
1.	Material	1446.00
2.	Labour	218.98
3.	Head load and transportation	335.00
Total		Rs. 1999.98
Say Rs. 2000.00 only.		

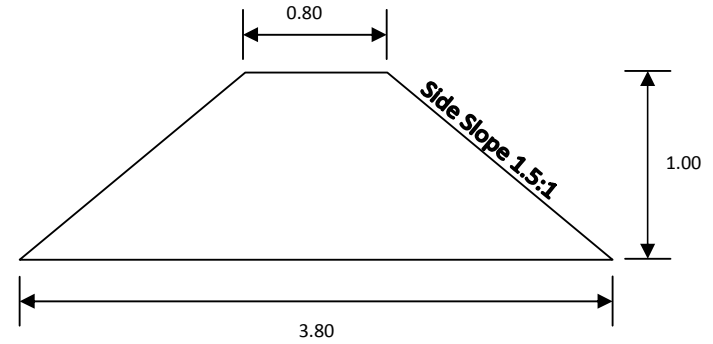
DETAILS ESTIMATE OF WATERSHED DEVELOPMENT WORK PHASE

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

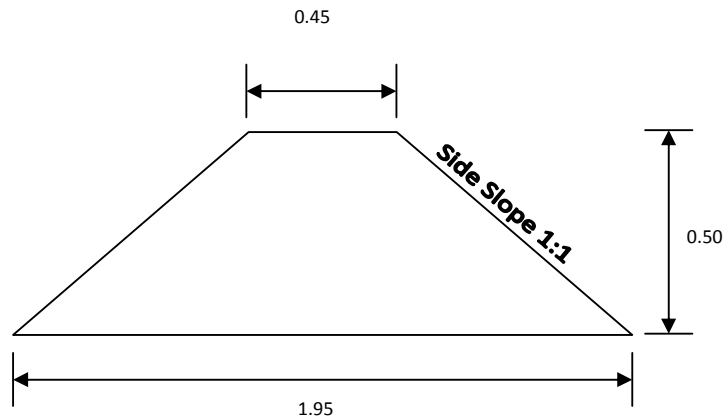
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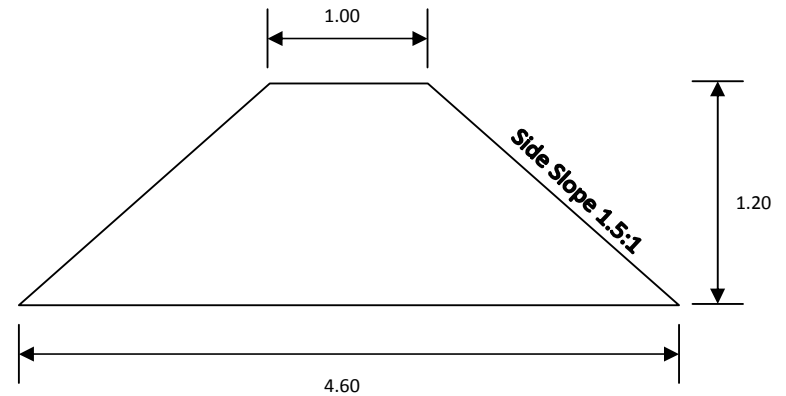
(C.B., Cross-Section – 0.84 m²)



(M.B., Cross-Section – 3.36m²)



(Field Bund, Cross-Section – 0.60 m²)



(S.B. /P.B., Cross-Section – 2.30 m²)

(All dimensions in Metre)

Technical specification of Watershed work

Technical Specification of field Bund .

Particular	Value	Unit
Top Width	0.45	M
Height	0.50	M
Side slope	1.5:1	-
Bottom width	1.95	M
Cross section	0.60	M ²
Length /Ha	180.00	M
Earth work	108.00	CUM
Cost/ Ha	3518.00	Rs.

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

Particular	Value	Unit
Top Width	0.50	m
Height	0.60	m
Side Slope	1.5:1	-
Base of bund	2.30	m
Cross section	0.84	m ²
Length of bund/ha	120	m
Earth work	100.80	m ³
Cost/ Ha	3283.00	Rs..

Technical Specification of Submergence bund

Particular	Value	Unit
Top Width	0.80	m
Height of Bund	1.00	m
Side Slop	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..

DESIGN, DRAWING & ESTIMATE OF SPILLWAY CHECK DAM 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:

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

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

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

To find suitable value of L & H

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

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

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

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

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

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

$h / f = \frac{0.80}{1.50} = 0.53 \leq$ 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

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

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

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

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

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

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

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

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

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

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

$$= 1.6 \quad \text{or} \quad [2.56 - 1.365]$$

$$= 1.6 \quad \text{or} \quad 1.195$$

adopt $J = 1.60 \text{ m}$

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

6- $K = (L_B + 0.1) - M = (2.63 + 0.1) - 1.93$
 $= 0.80 \text{ m}$

Toe and cut off walls

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

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

Depth of cutoff /Toe wall = 1.02 m

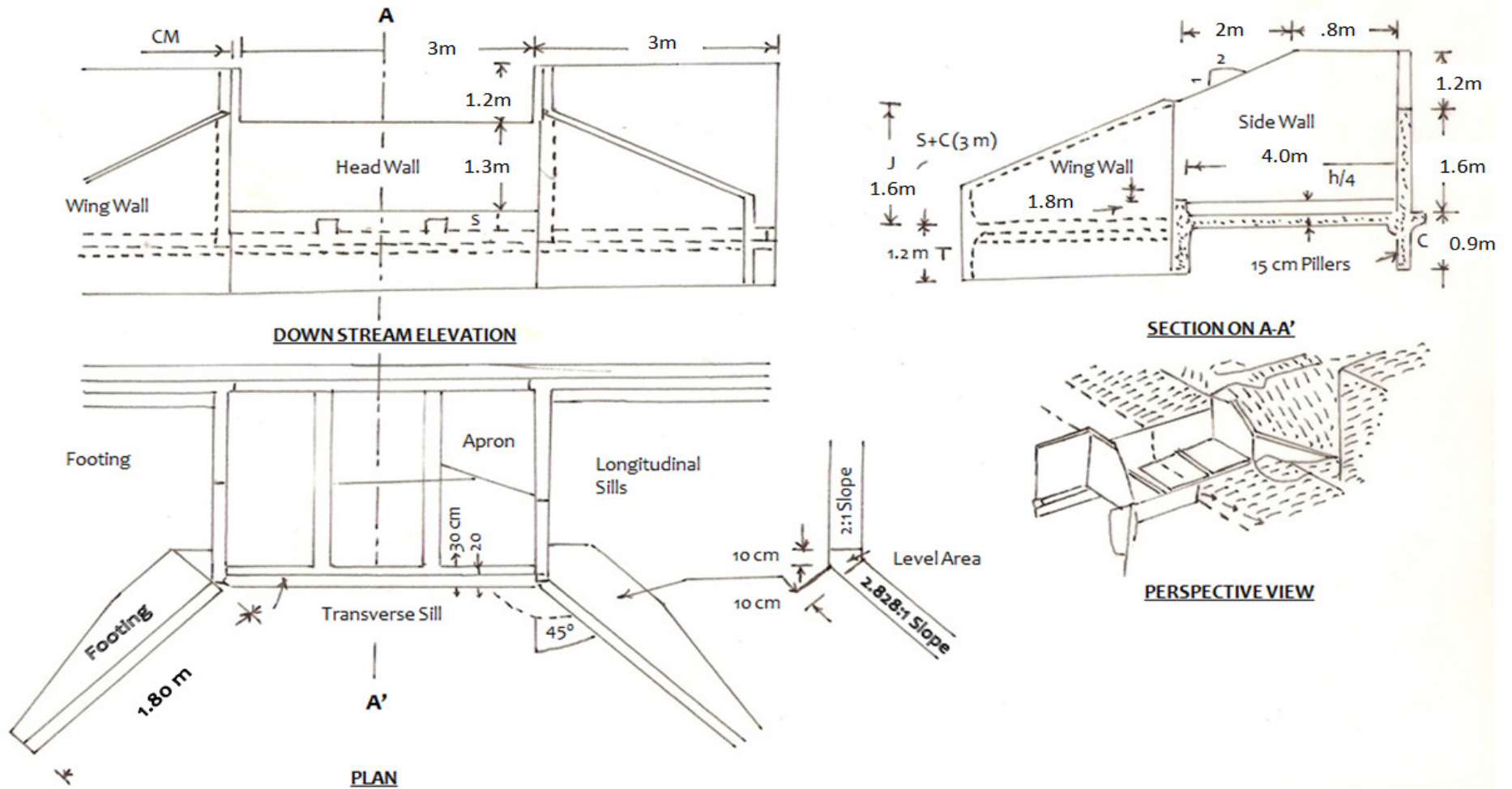
Apron thickness: For an over fall of 1.50 m. The Apron thickness in concrete construction is 0.30 m since the structure is constructed in masonry, the Apron thickness will be $0.30 \times 1.50 = 0.45$ m

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

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

DRAWING OF SPILLWAY CHECK DAM OF CREST LENGTH 3.0 m

Not to Scale



All Dimensions in Metre

DETAIL ESTIMATE FOR SPILLWAY CHECK DAM OF CREST LENGTH 3.00 METRES

1. Earth work in cutting in foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	3.40	1.20	1.20	9.792
2	Head wall	1	3.00	1.60	1.20	5.760
3	Head wall extension	2	3.00	1.00	1.20	7.200
4	Wing wall	2	1.80	1.20	1.20	5.184
5	Toe wall	1	3.00	1.00	1.20	3.600
6	Cut off wall	1	9.00	1.00	1.20	10.800
7	Apron	1	3.00	2.65	0.80	6.480
8	Earthen Bund Both Side	2	100.00	4.00+7.00/2	1.50	1650.00
Total						1698.816 cum
Say						1700.00 cum

2. Laying of sand in the bed of foundation

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Side wall	2	3.40	1.00	0.15	1.020
2	Head wall	1	3.00	0.60	0.15	0.270
3	Wing wall	2	1.80	1.00	0.15	0.540
4	Toe wall	1	3.00	0.80	0.15	0.360
5	Cut off wall	1	9.00	1.00	0.15	1.350

6	Apron	1	3.00	2.70	0.15	1.215
Total						4.755 cum
Say						5.00 cum

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

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	9.00	1.00	0.20	1.800
2	Head wall	1	3.00	0.60	0.20	0.360
3	Side wall	2	3.40	1.00	0.20	1.360
4	Wing wall	2	1.80	1.00	0.20	0.720
5	Toe wall	1	3.00	0.80	0.20	0.480
6	Apron	1	3.00	2.20	0.20	1.620
Total						6.340 cum
Say						6.500 cum

4. Brick masonry 1:4

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	9.00	1.00	0.90	8.100
2	Head wall	1	3.00	1.50	0.90	4.050
		1	3.00	$(1.50+0.50) / 2$	1.50	4.500
3	Head wall extension	2	3.00	0.80	0.45	2.160

		2	3.00	0.60	0.45	1.620
		2	3.00	0.60	0.60	2.160
		2	3.00	0.50	0.60	1.800
		2	3.00	0.40	1.30	3.120
4	Side wall	2	3.40	1.00	0.45	3.060
		2	3.60	0.80	0.45	2.592
		2	3.80	0.60	0.60	2.736
		2	3.90	0.50	1.00	3.900
		2	$(4.00+1.40) / 2$	0.40	1.50	3.240
5	Wing wall	2	1.80	1.00	0.45	1.620
		2	1.80	0.80	0.45	1.296
		2	1.80	0.50	$(1.60+0) / 2$	1.440
6	Toe wall	1	3.00	0.80	0.45	1.080
		1	3.00	0.60	0.45	0.810
		1	3.00	0.40	0.30	0.360
7	Apron	1	3.00	2.70	0.45	3.645
8	Longitudinal sill	2	2.60	0.20	0.45	0.468
Total						53.757 cum
Say						54.000 cum

5. Tuck Pointing 1:3

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1	3.00	-	1.00	3.00
		1	3.00	-	1.18	3.54
2	Side wall	2	3.40	-	1.60	10.88
		2	$(1.40+3.40)/2$	-	1.50	7.20
3	Head wall extension	2	3.00	-	1.50	9.00
4	Wing wall	2	1.80	-	$(1.60+0)/2$	2.88
Total						36.50 m ²
Say						37.00 m ²

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (Bags)	Fine Sand (cum)	Bricks No.	G.S.B 25-40 mm (cum)	Moram (cum)
1	Sand laying	5.000 cum	-	5.00	-	-	-
2	C.C.W. 1:3:6	6.500 cum	29.25	-	-	5.85	2.92
3	B/M 1:4	54.000cum	108.00	-	27000	-	14.85
4	Raised Pointing 1:3	37.000 m ²	1.11	-	-	-	0.18
Total			138.36	5.00	27000	5.85	17.95
Say			140.00	5.00	27000	6.00	18.00

COST OF MATERIALS

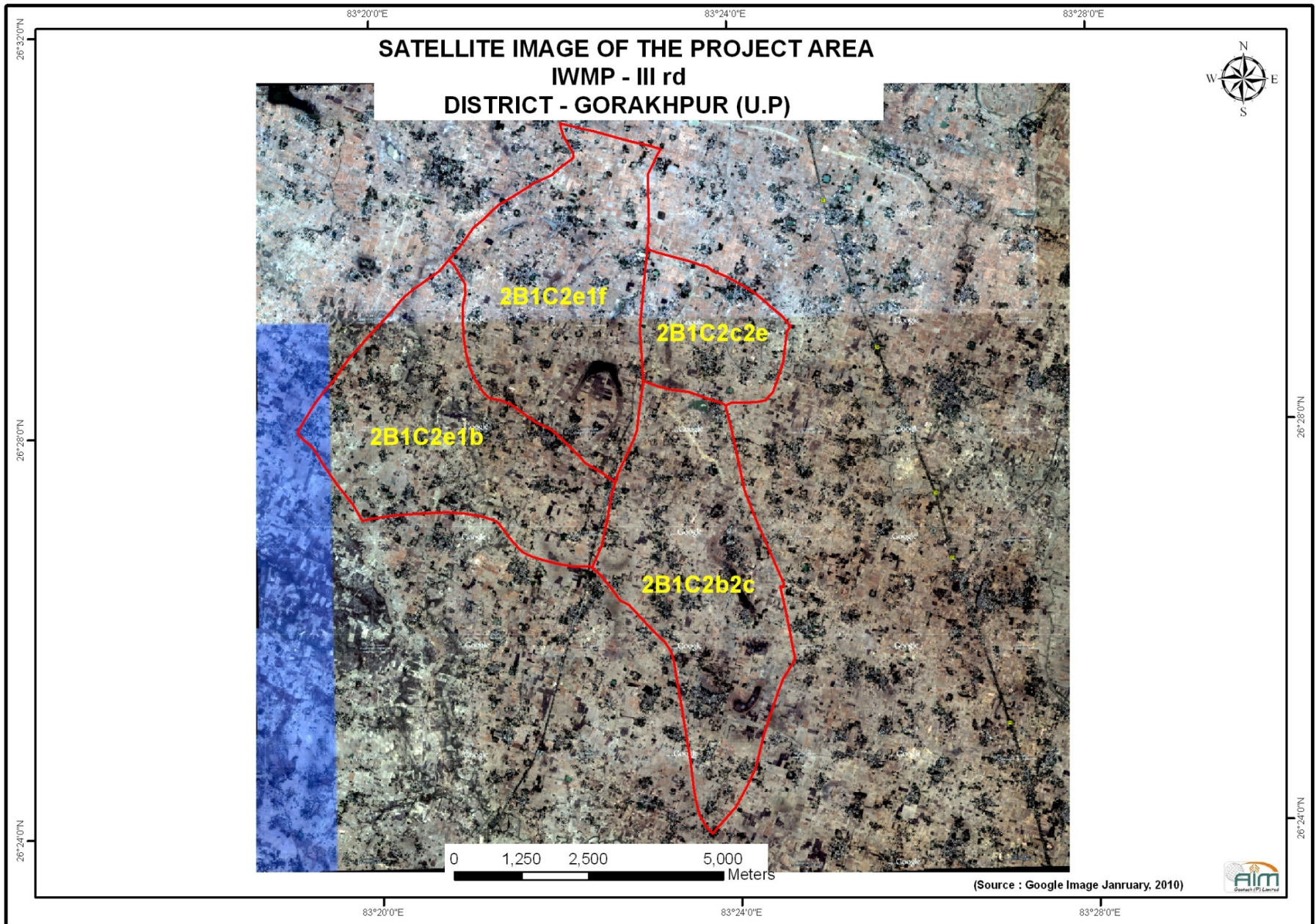
S.NO	Name of materials	Quantity	Rate	Amount
1	Cement (Bags)	140	260.00	36400.00
2	Coarse sand (cum)	18.00	2600.00	46800.00
3	Brick (No.)	27000	4600.00	124200.00
4	G.S.B. 25-40 mm (cum)	6.00	3000.00	18000.00
5	Fine Sand (cum)	5.00	1200.00	6000.00
Total				231400.00

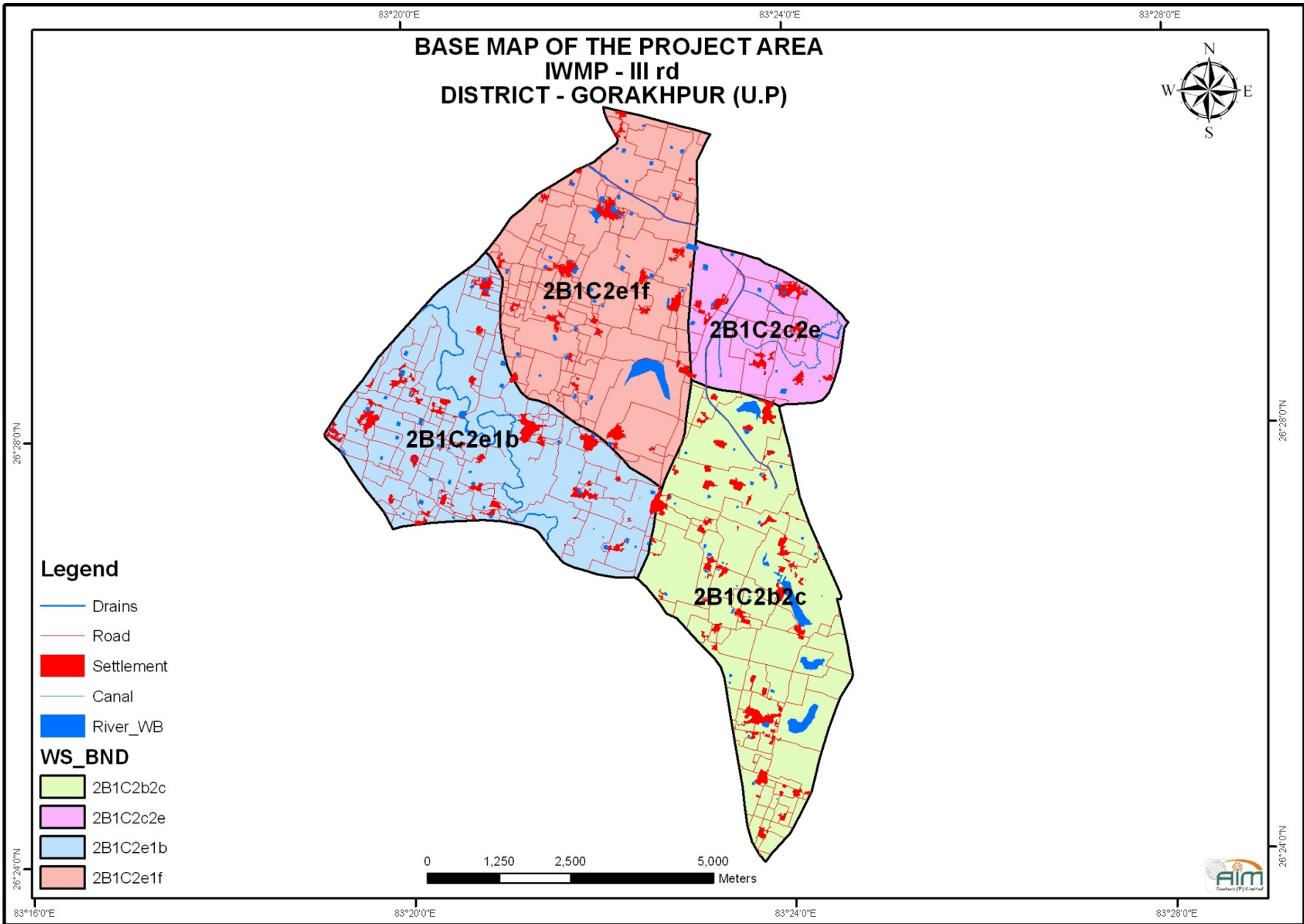
LABOUR CHARGE

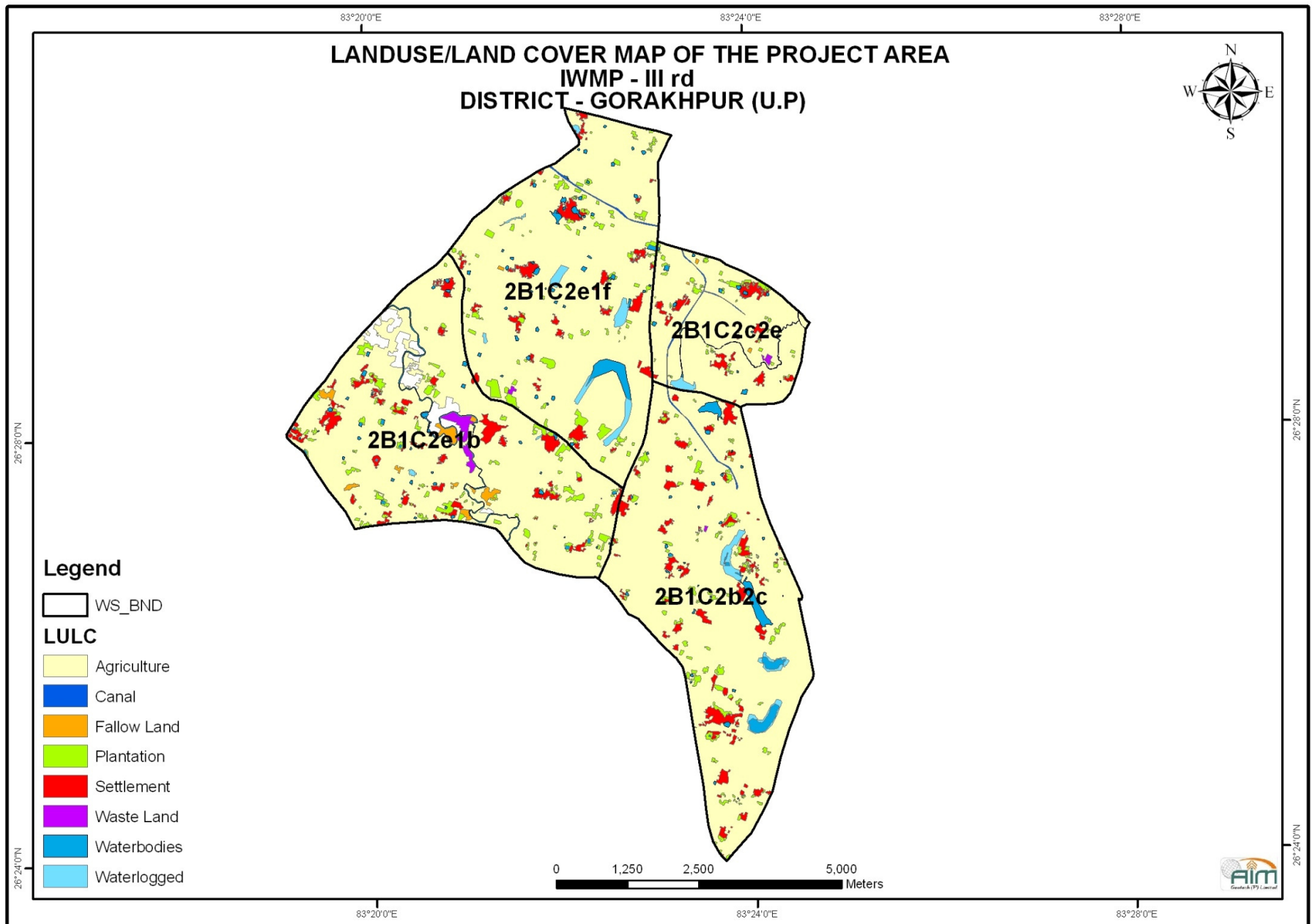
S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	1700.00 cum	50.00/cum	85000.00
2.	Sand Laying	5.00 cum	40.00/cum	200.00
3.	C.C.W. 1:3:6	6.50 cum	550.00/cum	3575.00
4.	B/w 1:4	54.00 cum	450.00/cum	24300.00
5.	Raised Pointing	37.00 m ²	60.00/m ²	2220.00
6.	Curing	54.00 cum	30.00/cum	1620.00
7.	Chowkidar	20 Man Days	100.00/Man Day	2000.00
8.	Head load & local transportation cost 21.5% cost of material Rs. 231400	-	-	49751.00
Total				Rs. 168666.00

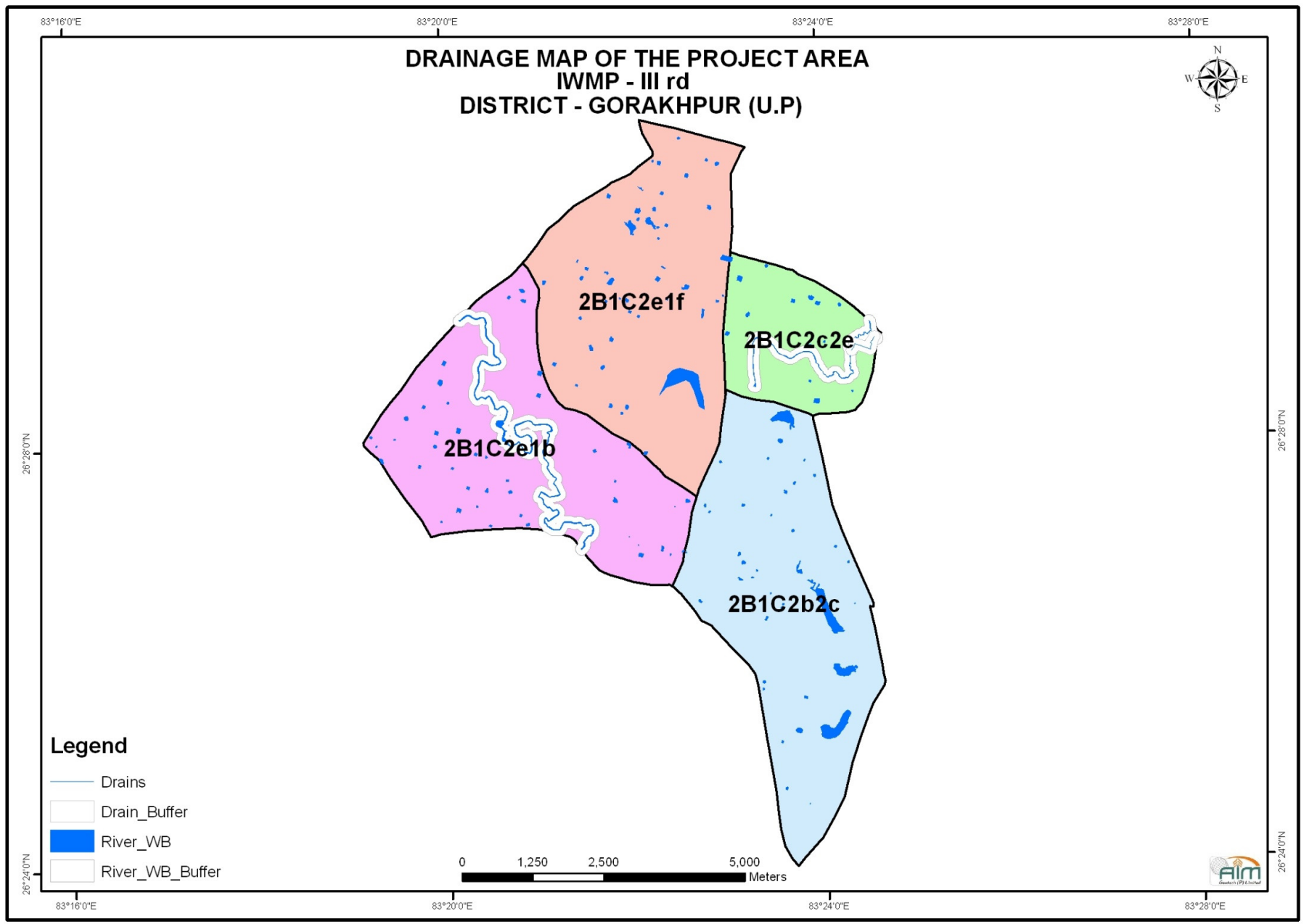
Total Expenditure	
1. Cost of materials	231400.00
2. Labour Charges	168666.00
Total	Rs. 400066.00
Say Rs. 400000.00 only	

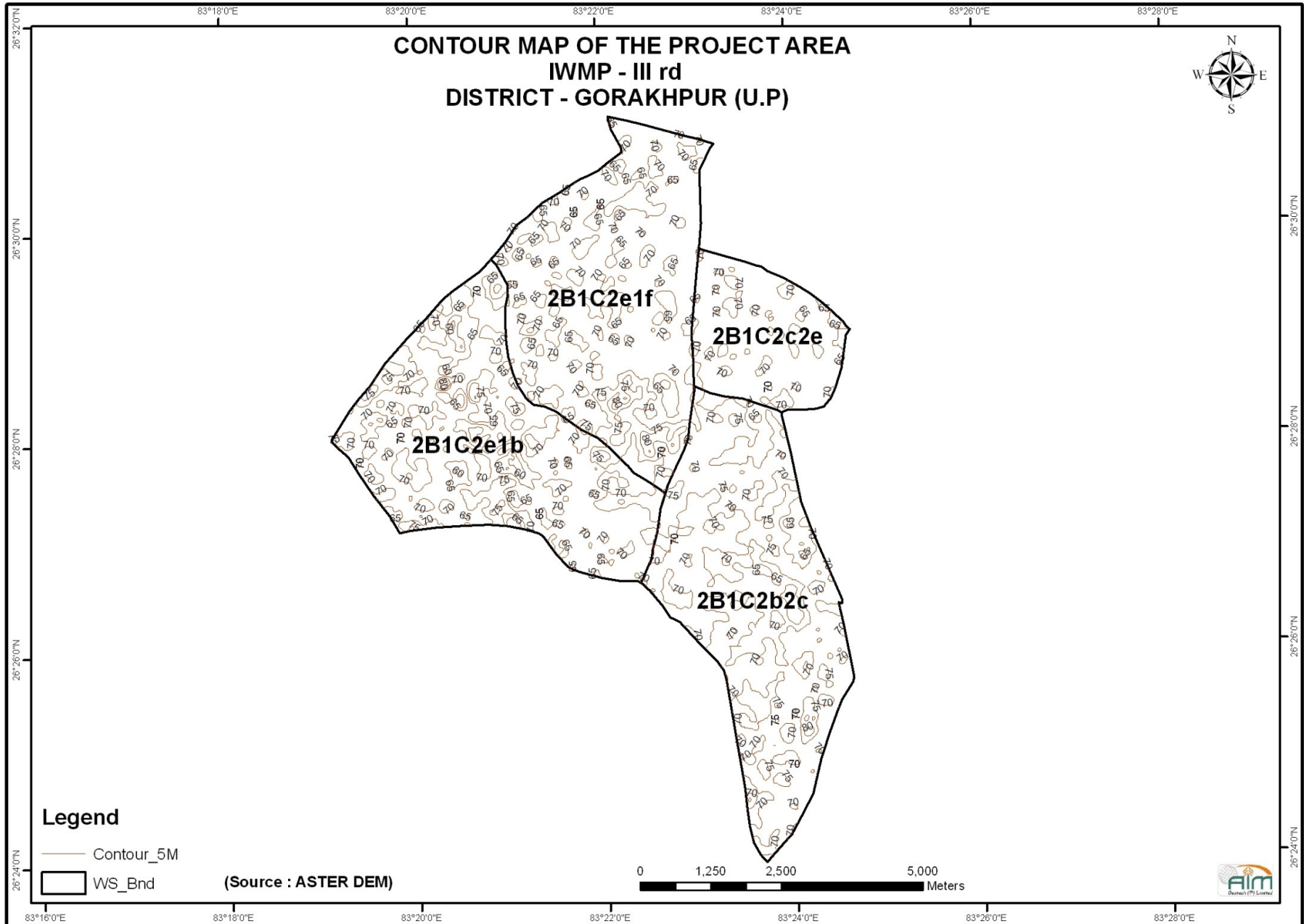
MAPS

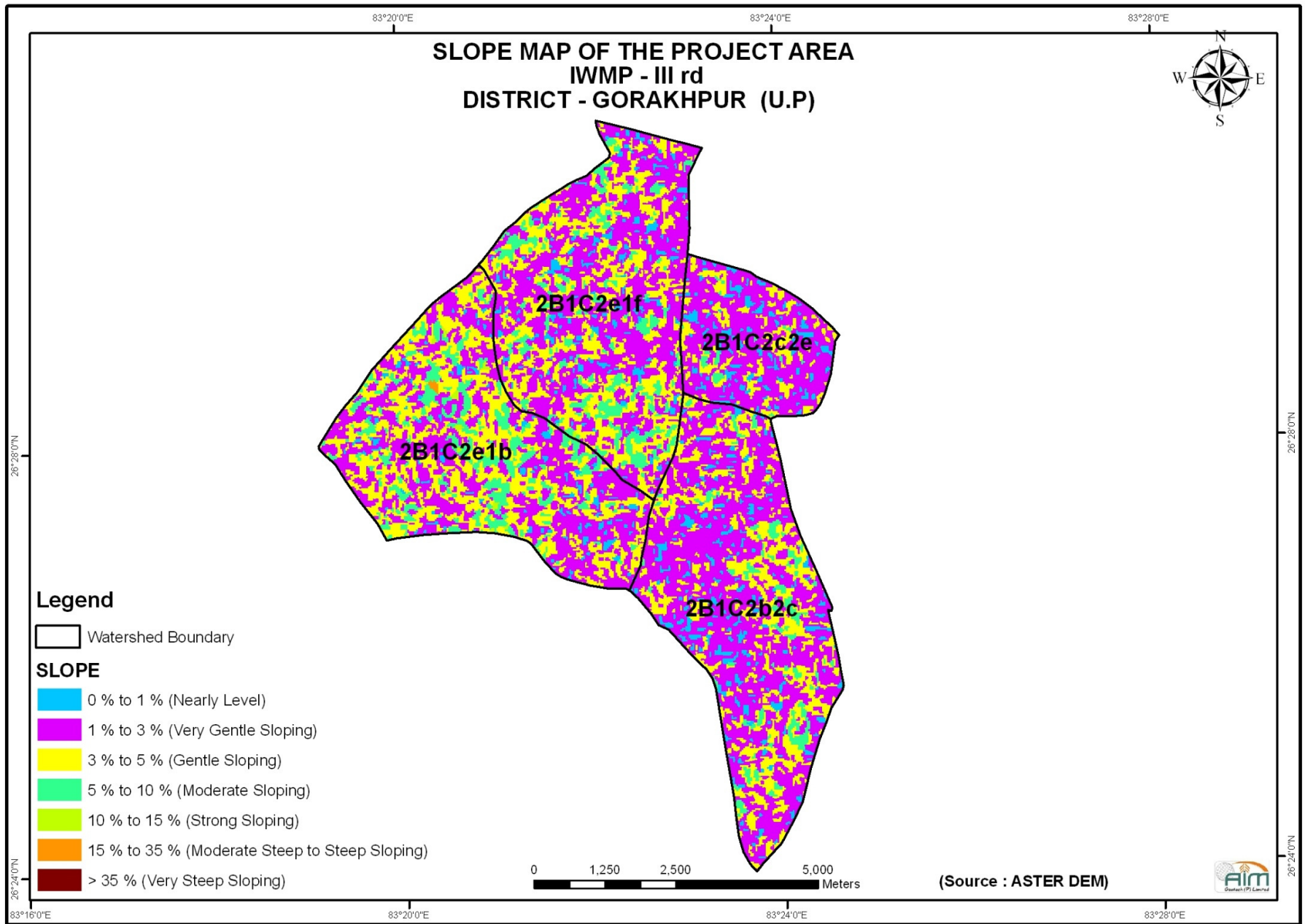












Preparation of DPR

Detail Project Report of Integrated Watershed Management Programme IWMP-1st had been prepared through base line/ bench Mark survey for physiography climate, soil, land use, vegetation, hydrology and socio economic data analysis. PRA have been exercised to collect primary data, secondary data have been collected from Revenue, Statistics department, Statistical Magazine of the district, Gorakhpur, development block Gagaha., Topo sheet (1 : 50000) survey of India- Deheradoon and technical & specific input and health with preparation and drafting of detail project report.


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DPR PLAN ABSTRACT

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

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


Prepared By:

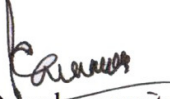

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