DETAIL PROJECT REPORT (D.P.R.) FOR

(I.W.M.P. IIIrd - FATEHPUR) INTEGRATED WATERSHED MANAGEMENT PROGRAMM IN PANDU WATERSHED, BLOCK- MALAWAN DISTRICT- FATEHPUR (UTTAR PRADESH)



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SUBMITTED TO :

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INTRODUCTION:

In Fatehpur District the total no. of micro watershed are 118 and these watersheds cover 119303.00 hectare area. In I.W.M.P. 3^{rd} Project have 10 Micro watersheds cover 5866.00 hectare area in Fatehpur. These micro watersheds are situated in the catchment of river Ganga. The above watersheds are situated in the Northern region of Fatehpur District. It lies between 26^{0} 6' 49.548" to 26^{0} 11' 59.5" latitude and 80^{0} 25' 54.826" to 80^{0} 33' 42.243" longitude. The estimate of the selected project is semi-arid with an average rainfall (preceding-five year) is **621** mm. out of which about **90%** is received during the monsoon season from July to September. The variation of temperature very high (46.4 0 C) during May-June and minimum (4.2 0 C) in December-January.

The soil of project area is mainly Sandy clay. The slope in Upper portion of the project has minor percentage. Agriculture is the main occupation of the people is in this region. The main crops are wheat, Mirch, Arhar, Bajra. Green Manuring is the proposed to minimize the runoff and to maintain the fertility of the soil.

Natural vegetation of the watershed area is very poor. Babool, Mahua are the main tree of the area. Occasionally Neem, Sheesham, Ber tree are found in this area. There is no reserve pasture in the watershed area. Due to Anna Pratha and lack of irrigation water, the rate of mortality of planted trees is very high. P.R.A. exercise conducted in the villages of watershed area revealed that inadequate irrigation facilities, low production of field crops. Fodder shortage, lack of inputs and market facility are some of the major constraints being experienced by the farmers. For this area Mango, Amla, Guava, Ber, Bel fruit plants are suitable. <u>60.40 ha. Agro-Horticulture is proposed</u> in the selected area to motivate the farmers to adopt the agro horticulture in practice because of inadequate irrigation water.

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

PROJECT AT A GLANCE

Name Of Project	I.W.M.P.– 3^{ru} (2010-11)
Name Of Block	DEOMAI
Name Of District	FATEHPUR
Name Of State	U.P.
Name Of Watershed	PANDU- River
Name Of Village Selected	Karbigawan, Sadipur, Parsadepur, Mirai, Chhiwali, Kharauli, Chaknadi, Basawanpur, Khadara, Karchalpur, Aung, Godhrauli, Gangchauli Khurd, Gangchauli Bujurg, Mayaram Khera, Rasulpur, Padhara, Dodara, Baniyan Khera, Nama mau, Shahjahanpur, Delemau, Tikara, Rusi, Shah, Bhaisauli, Kansahi, Sujawalpur, Deomai.
Micro Watershed Code Selected	2B3C1a1c, 2B3C1a1d, 2B3C1a2b, 2B3C1a4a, 2B3C1a4c, 2B3C1a4d, 2B3C1a4g, 2B3C1a4i, 2B3C1a4j, 2B3C1a2a.
Total Area Of The Project	5866.00 Hact.
Proposed Area For treatment	4545.00 Hact.
Cost Per Hectare	Rs. 12000.00
Project Period	<u>2010-11</u> 2014-15
Total Cost Of Project	545.40 Lakhs
Proposed Man Days	2.290 Lakhs.

SALIENT FEATURES

1. <u>Financial Outlays.</u>

S.No.	Component	Unit	Quantity	Cost / Unit	Total	
				(Lakns)	(Lakns)	
A.	MANAGEMENT COSTS					
	Administrative cost- TD & DA, POL/ Hiring of vehicles/ Office	Nos	NA	NA	54.5400	
	and payment of electricity and phone bill, etc. computer,					
	stationary and office consumable and contingency					
	Expert for monitoring	Nos	NA	NA	5.4540	
	Elevation				5.4540	
	Sub Total				65.4480	
B.	PREPARATORY PHASES					
	(1) Entry point Activities					
	(a) Renovation of Culvert	Nos	8	0.4458	3.5661	
	(b) Renovation of Well	Nos	11	1.05250	11.5775	
	(c) Soaking Pit	Nos	13	0.0400	0.5200	
	(d) Silting Tank	Nos	12	0.0052	0.0624	
	(e) Krishak Vikas Manch	Nos	7	0.8700	6.0900	
	Sub Total					
	(2) Institutional and Capacity Building				27.2700	
	(3) Detail Project Report				5.4540	
	Sub Total				32.7240	
C.	WATERSHED WORKS					
	(1) Watershed Development Works					
	(a) Construction of Bunds (Field Bund, Contour Bund,	Hect.	2727	0.04206	114.6970	
	Submergence Bund, marginal Bund and Peripheral Bund)					
	(b) renovation of the Existing Bund for insitu soil Moisture	Hect.	447	0.04500	20.1150	
	Conservation					
	(c) Rain-fed Horticulture with Fencing	Hect.	15	0.6080	9.1200	
	Rain-fed Horticulture without Fencing	Hect.	195	0.1505	29.3470	
	Total of Rain-fed Horticulture	-	3384	-	173.2790	
	(e) New and renovation of Existing Water Harvesting Structure/	Hect.	1149	0.0600	68.9400	
	Gully Plug/ Chek Dam					
	(f) Affroestation and Development of Silvi-Pastoral System	Hact.	12	0.10345	1.2410	
	(g) Drainage Line Treatment (Pucca Structure / Gully Plug and	Nos	25	1.1696	29.2400	

	Chek Dam)				
	Sub Total		4545	·	312.300
	(2) Livelihood Programme (Community Based)				
	Income Generating Activities through S.H.G.'s for Landless and				
	Marginal Farmers				
	(a) Establishment of Nadef-Compost Units	Nos	10	0.1040	1.0400
	(b) Dairy Work	Nos	16	2.5000	40.0000
	(c) Goat-Keeping	Nos	28	0.4395	12.2500
	(d) General Merchant Shop	Nos	5	0.2500	1.2500
	Sub Total				54.5400
	(3) Production System and Micro-Enterprises				
	(a) Crop Production, Diversification of Agriculture	Hact.	408	0.05914	29.0230
	(b) Introduction of Agro-Forestry / Horticulture	Hact.	25	1.58771	39.6920
	(c) Demonstration of Green Manuring	Hact.	350	0.00625	2.1870
	Sub Total				70.9020
D.	CONSOLIDATION PHASE				27.2700
	GRAND TOTAL				545.4000

2. Physical Outlays.

ACTIVITIES RELATED TO	Total (Quantity)
ADMINISTRATIVE COSTS	
TD & DA, POL/ Hiring of vehicles/ Office and payment of electricity and phone bill etc. computer,	-
stationary and office consumable and contingency	
Expert for monitoring and evaluation.	-
PREPARATORY PHASES	
Entry Point Activities improvement in Panchvati Drinking Water System, School, etc.	51
Institutional and Capacity Building	-
WATERSHED WORKS	
Watershed Development Works	
Construction of Bunds (Field Bund, Contour Bund, Submergency Bund, Marginal Bund and	2727.00
Peripheral Bund	
Renovation of the Existing Bund for Insitu Soil Moisture Conservation	447.00
Rain-fed Horticulture with Fencing	15.00
Rain-fed Horticulture without Fencing	195.00
New and Renovation of Existing Water Harvesting Structure/ Gully Plug / Chek Dam	1149.00
Afforestation and development of Silvi-pastoral System	12.00
Drainage Line Treatment (Pucca Structure / Gully Plug and Chek Dam) (Nos.)	25
LIVELIHOOD PROGRAMME (Community Based)	
Income generating activities through SHG's for Landless and marginal farmers.	
(a) Goat Keeping (Nos.)	28
(b) Establishment of Nadef Compost Unit. (Nos.)	10
(c) Dairy Work. (Nos.)	16
(d) General Merchant Shop. (Nos.)	5
PRODUCTION SYSTEM AND MICRO ENTERPRISES	
Demonstration and assessment of improved composting system using alternate materials (118 Nadef-	408
compost and 100 nutrient analysis (Nos)	
Introduction of improved crop production practices.	
(i) For Kharif crops (ha).	40
(ii) For Rabi Crop (ha).	30
CONSOLIDATION PHASE	-

PHASING OF WORK (FINANCIAL & PHYSICAL)

1. Financial Outlays.

S.	Component	Unit	Quantity	Unit	I st Year	II nd	III rd Year	IV th Year	V th Year	Total
No.				Cost	(Lakhs)	Year	(Lakhs)	(Lakhs)	(Lakhs)	
				(Lakhs)		(Lakhs)				
A.	MANAGEMENT COSTS									
	Administrative cost - TD & DA, POL/ Hiring				-	10.908	14.4531	14.4531	14.7258	54.54
	of vehicles/Office and payment of electricity									
	and phone bill, etc. computer, stationary and				-					
	Expert for monitoring	Nos	ΝA	NΛ		1.0008	1.0008	1 0008	1 0008	5 454
	Evaluation	Nos	NA	NΔ		1.6362	0.9545	0.9544	1.0000	5 454
	Evaluation Sub Total	1105.	INA	INA		13 6350	16 4984	16 4083	1.9009	65 448
D	SUD 10tal				-	13.0330	10.4704	10.4905	10.0105	03.440
В	PREPARATORY PHASES									
	(1) Entry Point Activities	NY	0	0.4450	0.5661					2.56
	(a) Renovation of Culvert	Nos	8	0.4458	3.5661	-	-	-	-	3.5661
	(b) Renovation of Well	Nos	11	1.05250	11.5775	-	-	-	-	11.5775
	(c) Soaking Pit	Nos	13	0.04000	0.5200	-	-	-	-	0.5200
	(d) Silting Tank	Nos	12	0.00520	0.0624	-	-	-	-	0.0624
	(e) Krishak Vikas Manch	Nos	7	0.87000	6.0900	-	-	-	-	6.0900
	Sub Total				21.816	-	-	-	-	21.816
	(2) Institutional and Capacity Building		NA		-	16.3620	4.0905	4.0905	2.7270	27.2700
	(3) Detail Project Report				5.454	-	-	-	-	5.4540
	Sub Total				5.454	16.3620	4.0905	4.0905	2.7270	32.7240
C.	WATERSHED WORKS									
	(1) Watershed Development Works									
	(a) Construction of Bunds (Field Bund, Contour Bund, Submergence Bund, Marginal Bund and Peripheral Bund	На	2727	0.04206	-	29.7350	47.5941	10.4892	26.8787	114.6970
	(b) Renovation of the Existing Bund for Insitu Soil Moisture Conservation	На	447	0.04500	-	1.5000	2.7150	7.9500	7.9500	20.1150
	(c) Rain-fed Horticulture with Fencing	На	15.00	0.60800	-	-	1.2310	4.5600	3.3290	9.1200
	Rain-fed Horticulture without Fencing	На	195.00	0.15050	-	-	3.9630	12.6920	12.6920	29.3470
	Total of Rain-fed Horticulture	На	3384	-	-	31.2350	55.5031	356912	50.8497	173.2790

	(d) New and Renovation of Existing Water	На	1149	0.0600	-	5.1700	9.3060	27.2320	27.2320	68.940
	Harvesting Structure / Gully Plug / Chek Dam									
	(e) Afforestation and Development of Silvi-	На	12.00	0.10345	-	-	0.1610	0.620	0.4600	1.2410
	Pastoral System									
	(g) Drainage Line Treatment (Pucca Structure /	Nos	25	1.1696	-	4.5000	6.7500	8.9950	8.9950	29.240
	Gully Plug and Chek Dam)									
	Sub Total		4545			40.905	71.7201	72.5382	87.5367	272.70
	(2) Livelihood Programme (Community Based)									
	Income Generating Activities through S.H.G.'s									
	for Landless and Marginal Farmers									
	(a) Establishment of Nadef Compost Unit	Nos	10	0.10400	-	1.0400	-	-	-	1.0400
	(b) Dairy Work	Nos	16	2.50000	-	2.5000	17.5000	12.5000	7.5000	40.000
	(c) Goat Keeping	Nos	28	0.43950	-	1.4140	3.5660	3.8620	3.4080	12.2500
	(d) General Merchant Shop	Nos	5	0.25000	-	0.500	0.7500	-	-	1.2500
	Sub Total					5.454	21.816	16.362	10.908	5454
	(3) Production System and Micro-Enterprises									
	(a) Crop Production, Diversification of	Ha	408	0.05914	-	5.308	10.597	6.559	6.559	29.0230
	Agriculture									
	(b) Introduction of Agro-Forestry / Horticulture	Ha	25	1.58771	-	-	11.114	19.743	8.835	39.692
	(c) Demonstration of Green Manuring	На	350	0.00625	-	0.146	0.105	0.968	0.968	2.187
	Sub Total			-	5.454	21.816	27.27	16.362	70.902	
D	CONSOLIDATION PHASE	-	-	-	-	-	-	-	27.27	27.27
	GRAND TOTAL		27.27	81.81	135.941	136.759	163.62	545.40		

2. Physical Outlays

Activities Related To	I st Year	II nd Year	III rd Year	IV th Year	V th Year	Total
	(Quantity)	(Quantity)	(Quantity)	(Quantity)	(Quantity)	(Quantity)
ADMINISTRATIVE COSTS						
Administrative cost - TD & DA, POL/ Hiring of	-	-	-	-	-	-
vehicles/Office and payment of electricity and phone bill,						
etc. computer, stationary and office consumable and						
contingency						
Expert for monitoring and evaluation	-	-	-	-	-	-
PREPARATORY PHASES						
Entry Point Activities improvement in Panchvati Drinking	-	-	-	-		-
Water System, School, etc.						
Institutional and capacity building	-	-	-	-	-	-
WATERSHED WORKS						
Watershed Development Works						
Construction of Bunds (Field Bund, Contour Bund,	-	707.00	1131.00	249.00	640.00	2727.00
Submergence Bund, Marginal Bund and Peripheral Bund						
Renovation of the Existing Bund for Insitu soil Moisture	-	33.00	60.00	177.00	177.00	447.00
Conservation						
Rain-fed Horticulture with Fencing	-	-	2.00	7.50	5.50	15.00
Rain-fed Horticulture without Fencing	-	-	26.00	84.00	85.00	195.00
New and Renovation of Existing Water Harvesting	-	86.00	155.00	454.00	454.00	1149.00
Structure/ Gully Plug / Chek Dam						
Afforestation and Development of Silvi-pastoral System	-	20.00	20.00	20.00	23.49	83.49
Drainage Line Treatment (Pucca Structure / Gully Plug	-	4	6	8	7	25
and Chek Dam) (Nos)						
LIVELIHOOD PROGRAMME (Community Based)						
Income Generating Activities through SHG's for Landless						
and marginal farmers.						
(a) Goat Keeping	-	3	8	9	8	28
(b) Establishment of Nadef Compost Unit (Nos)	-	10	-	-	-	10
(c) Dairy Work (Nos)	-	1	7	5	3	16
(d) General Merchant Shop (Nos)	-	2	3	-	-	5

PRODUCTION SYSTEM AND MICRO ENTERPRISES							
Demonstration and assessment of improvement	-	53	106	65	16	240	
composting system using alternate materials (118 Nadef-	-	37	74	45	12	168	
compost) and 100 nutrient analysis (Nos)							
Introduction of Improved crop production practices.	-	3	2	18	17	40	
(i) For Kharif Crops (Ha)		1	12	12	14	20	
(ii) For Rabi Crops (Ha)	-	1	13	13	14	30	
CONSOLIDATION PHASE	_	_	_	$\overline{\mathbf{v}}$			

Proposed Entry Point Activities

S. No.	Name of Project	Culvert	Renovation of Well	Krishak Vikas Manch	Soaking Pit	Silting Tank
1.	Karchal pur	1	2	2	-	-
2.	Sadi pur	1	1	-	-	3
3.	Mirai	-	1	-	-	2
4.	Rasul Pur	-	2	2	-	-
5.	Tikra	1	2	1	-	3
6.	Rusi	1	1	1	6	-
7.	Kansahi –I	1	-	-	2	3
8.	Kansahi –II	2	-	-	-	-
9.	Sujawal pur	1	2	-	2	-
10.	Parsade pur	-	-	1	3	1
	Total	8	11	7	13	12

INTRODUCTION OF THE PROPOSED AREA

<u>Chapter – I</u>

Problems and Needs of Project Area

Problems Identification and Prioritization:-

Food sufficiency, economic growth and environmental security has identified as the major issues to be addressed in the watershed area, The area has moderate to steep slope hence highly prone to soil erosion. Efficiency soil depth is unlimited and spatially useful for good crop growth.

Problems identified and prioritized the transect walk and PRA exercise in all 21 villages have pooled and list of 8 (eight) problems representing the whole watershed was prepared. Problems have ranked as per their total weightage in the 21 villages. 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.

S.No.	Problems	Rank
1.	Low Production of field crops	5
2.	Lack of irrigation water	6
3.	lack of drinking water	7
4.	Non availability of fuel wood	6
5.	Lack of inputs like quality seeds, fertilizers, pesticides etc.	8
6.	Medical and health care facilities for milching animals and low productivity	8
7.	Lack of fodder availability and low annual productivity	9
8.	Lack of medical educational; and transportation facilities	7

Problems Identification and Prioritization for Ganga Watershed

Weightage for Selection of Watershed

1	2	3	4	5	6	7	8													
S. No.	District	Name of the Project	No. of Micro- watershed proposed	Proposed project area (ha)	Type of project (Hilly/De sert/Othe	Proposed Cost (Rs. in lakh)	Weightage under the criteria													
			to be covered		rs)		i	ii	iii	iv	v	vi	vii	viii	ix	Х	xi	xii	xiii	Total
1	FATEHPUR	IWMP -	10	5205	OTHER	624.60	7.5	5	5	10	0	0	10	7.5	10	15	10	15	0	95
		3 rd																		

Characterstics Of Watershed

Geomorphology:- The area lies in the North of District - Fatehpur of Doaba region. The soil is mainly sandy clay which is easily transportable after detaching causing soil erosion.

<u>Soils:-</u> In the watershed area mainly four types of soils named Sandy Clay, Loamy which are the main soil type of Doaba region.

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

Vegetation

(a) Natural Vegetation:-

Natural vegetation of the watershed is very poor. The forest vegetation is predominant with Vilayati Babool (Prosopis Juliflora) followed by Babool (Acacia Nilotica). There are occasional occurrence of Neem, Mango, Guava, Amla, Mahua and Shisham. There is no reserve pasture land in the watershed. Grass patches are seen only on the bunds, road sides and other such places. The principal grasses are Doob & Munj.

(b) Horticulture:-

Though no organized orchards are present in the watershed, homestead planting of fruit trees of Mango, Papaya, Amla, Ber, Bel etc. has been practiced by farmers.

(c) 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 100m.

Means Of Communication:-

The watershed can approached from main road -

(i) Kanpur-Fatehpur National Highway (NH-2) To Ghatam pur road.

Natural Resources:-

Out of the total 5866.00 ha area of the watershed under agriculture use an area of 4782.00 ha is under rain fed agriculture (84.31%) and assured irrigation by Canal & Govt. tube well is available in 1266.00 ha (21.58%). Main source of irrigation are private tube wells and seasonal water bodies for pre-sowing irrigation only. The natural resource maps of the watershed villages drawn by villagers themselves.

Importance of Institutions in Development:-

In the Venn diagram, farmer's perception was recorded for importance and role of different development institutions is relation to infrastructure development in the villages. Importance has been depicted with the size of the circle and role with distance from the village circle. The Venn diagram of selected villages is attached here with from page no. 183 to 191

Livelihood:-

Out of the total population **54204** in the watershed, a majority i.e. more than 81.27% has farming as their major source of livelihood followed by 14.33% laborers and 4.40% service + business class.

Depending on forest for Fuel Wood and Fodder:

(A) Fuel Wood:-

Some villages of the selected village are using LPG to meet their cooking energy requirements. The main source of fuel is from cow dung cake, woody stem of Arhar crop and Mustard. About 65% to 70% of the domestic energy requirement is met from the Agro By-Product and cow dung cake. Rest is met out from the forest outside the village and watershed boundary. Fuel wood is obtained from the forest which is situated in the Block Malwan Outside the Watershed Boundary.

(B) Fodder:-

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

(C) Labour Requirement:-

Labour requirement is found to be maximum during October-November, when the harvesting of Kharif and sowing of Rabi crops are done simultaneously. The other crucial periods are March-April when harvesting and threshing of Rabi crop is done and July-August when sowing of Kharif crops tales place. Other income generating enterprises having potential during the remaining month should be planned to reduce the migration of labours.

(D) Crop Calendar:-

The present crop calendar in the watershed comprises of fallow-wheat, Arhar-Jwar mixed cropping, Paddy-Wheat, Til-Wheat, Fallow-Potato, Bajra-Lentil etc. Fallow-Wheat, Fallow-Gram, Fallow-Lentil, Arhar + Jwar are the most prevailing crop rotation on the agriculture lands both in rain fed and irrigated condition in the watershed. Organized

vegetable cultivation, fruit plantation and traditional agro-forestry system are lacking widely in the watershed. The limited vegetable cultivation in the watershed is confined either to kitchen gardens or to be irrigated conditions in a scattered manner on extremely small area with view to meet out the domestic demand for vegetables. The cultivation of each crop other than the gram, lentil and mustard also lacks in the watershed.

FARMERS PREFERENCES

(A) Fruit Trees:-

Farmer's preferences for fruit trees are solicited in terms of attributes like production, market availability and timber wood value. Overall Amla, Guava, Ber, Papaya is found most preferred fruit tree.

(B) Fodder Trees:-

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.

(C) Agriculture:-

Arhar, Gram, Lentil, Jwar + Arhar, Bajra are the most preferred agricultural crop in the watershed followed by wheat and paddy.

THE VARIED PRESENT LAND USE AND AREA UNDER DIFFERENT CATEGORIES IN WATERSHED IS AS BELOW:

										(Alta III	Incuare
S.No.	Name of	No. of Micro	No. of	Geographical	Forest	Land under	Rain-fed	Permanent	Wasteland		Treatable
	Project	Watershed	Villages	Area of the	Area	Agriculture	Area	Pastures	Cultivable	Uncultivable	Area
	-		_	Villages		Use					
1	2	3	4	5	6	7	8	9	10	11	12
1.	I.W.M.P.	10	30	5866	0.00	5380.00	4742	0.00	337.00	160.00	4545
	5										
	Fatehpur										

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(Area in Hectare)

Historical Aspect

The Historical Timeline is the chronological record of important events in the history of a village which is useful in understanding its background in the context of watershed development. Historical time line depicting important events in respect of different villages of the watershed has prepared through PRA "Historical TimeLine" of the selected villages are attached from Page No. 20 to 28.

Present Land Use in the Watershed Page . 33. The watershed has diversified land uses, namely agriculture waste land (Open Serub), Seasonal Water Bodies etc.

HISTORICAL TIMELIVE VILLAGE-WISE OF I.W.M.P. III

Village - Sujawal Pur					
S.No.	Activities	Year			
1.	Established	1807			
2.	Construction of bandhi [water harvesting structure]	-			
3.	opening up Primary School	1910			
4.	Introduction of Tractor	1970			
5.	Establishment of Gobar Gas Plant	1985			
6.	Kachcha Road	1910			
7.	Introduction of Thresher	1970			
8.	First Tube Well / Diesel Pump Set	1972			
9.	First Motorcycle	1980			
10.	TV & DVD Player	1989			
11.	Over Head Water Tank	-			
12.	Electricity in the Village	1971			
13.	Bituminous Road	2005			
14.	Temple Renovation	1875			
15.	Planning of Water Shed	2010			
16.	Other	-			

Village - Kansahi					
S.No.	Activities	Year			
1.	Established	1600			
2.	Construction of bandhi [water harvesting structure]	-			
3.	opening up Primary School	1910			
4.	Introduction of Tractor	1980			
5.	Establishment of Gobar Gas Plant	1886			
6.	Kachcha Road	1935			
7.	Introduction of Thresher	1981			
8.	First Tube Well / Diesel Pump Set	1978			
9.	First Motorcycle	1983			
10.	TV & DVD Player	1987			
11.	Over Head Water Tank	-			
12.	Electricity in the Village	1972			
13.	Bituminous Road	1970			
14.	Temple Renovation	1800			
15.	Planning of Water Shed	2010			
16.	Other	-			

Village - Mirai						
S.No.	Activities	Year				
1.	Established	1857				
2.	Construction of bandhi [water harvesting structure]	-				
3.	opening up Primary School	1960				
4.	Introduction of Tractor	1987				
5.	Establishment of Gobar Gas Plant	1989				
6.	Kachcha Road	1860				
7.	Introduction of Thresher	1988				
8.	First Tube Well / Diesel Pump Set	1972				
9.	First Motorcycle	1981				
10.	TV & DVD Player	2001				
11.	Over Head Water Tank	-				
12.	Electricity in the Village	1998				
13.	Bituminous Road	1996				
14.	Temple Renovation	1810				
15.	Planning of Water Shed	2010				
16.	Other	-				

Village - Tikara					
S.No.	Activities	Year			
1.	Established	-			
2.	Construction of bandhi [water harvesting structure]	-			
3.	opening up Primary School	-			
4.	Introduction of Tractor	1975			
5.	Establishment of Gobar Gas Plant	-			
6.	Kachcha Road	-			
7.	Introduction of Thresher	-			
8.	First Tube Well / Diesel Pump Set	1976			
9.	First Motorcycle	1977			
10.	TV & DVD Player	1985			
11.	Over Head Water Tank	-			
12.	Electricity in the Village	1961			
13.	Bituminous Road	1988			
14.	Temple Renovation	-			
15.	Planning of Water Shed	2010			
16.	Other	-			

Village – Karchal Pur						
S.No.	Activities	Year				
1.	Established	-				
2.	Construction of bandhi [water harvesting structure]	-				
3.	opening up Primary School	1925				
4.	Introduction of Tractor	1970				
5.	Establishment of Gobar Gas Plant	1985				
6.	Kachcha Road	-				
7.	Introduction of Thresher	1965				
8.	First Tube Well / Diesel Pump Set	1965				
9.	First Motorcycle	1970				
10.	TV & DVD Player	1986				
11.	Over Head Water Tank	-				
12.	Electricity in the Village	1968				
13.	Bituminous Road	1990				
14.	Temple Renovation	-				
15.	Planning of Water Shed	2010				
16.	Other	-				

Village – Parsade Pur					
S.No.	Activities	Year			
1.	Established	-			
2.	Construction of bandhi [water harvesting structure]	-			
3.	opening up Primary School	1985			
4.	Introduction of Tractor	1985			
5.	Establishment of Gobar Gas Plant	_			
6.	Kachcha Road	1970			
7.	Introduction of Thresher	1965			
8.	First Tube Well / Diesel Pump Set	1970			
9.	First Motorcycle	1986			
10.	TV & DVD Player	-			
11.	Over Head Water Tank	1965			
12.	Electricity in the Village	1995			
13.	Bituminous Road	1711			
14.	Temple Renovation	-			
15.	Planning of Water Shed	2010			
16.	Other	-			

Village - Rusi					
S.No.	Activities	Year			
1.	Established	-			
2.	Construction of bandhi [water harvesting structure]	-			
3.	opening up Primary School	1968			
4.	Introduction of Tractor	-			
5.	Establishment of Gobar Gas Plant	-			
6.	Kachcha Road	-			
7.	Introduction of Thresher	1972			
8.	First Tube Well / Diesel Pump Set	1969			
9.	First Motorcycle	1975			
10.	TV & DVD Player	1984			
11.	Over Head Water Tank	-			
12.	Electricity in the Village	1999			
13.	Bituminous Road	2000			
14.	Temple Renovation	-			
15.	Planning of Water Shed	2010			
16.	Other	-			

Village – Rasul Pur					
S.no.	Activities	Year			
1.	Established	1760			
2.	Construction of bandhi [water harvesting structure]	-			
3.	opening up Primary School	1955			
4.	Introduction of Tractor	1982			
5.	Establishment of Gobar Gas Plant	-			
6.	Kachcha Road	-			
7.	Introduction of Thresher	1978			
8.	First Tube Well / Diesel Pump Set	1971			
9.	First Motorcycle	1978			
10.	TV & DVD Player	1985			
11.	Over Head Water Tank	-			
12.	Electricity in the Village	1998			
13.	Bituminous Road	2002			
14.	Temple Renovation	-			
15.	Planning of Water Shed	2010			
16.	Other	-			

Village - SadiPur

S.No.	Activities	Year
1.	Established	-
2.	Construction of bandhi [Water Harvesting Structure]	-
3.	opening up Primary School	1995
4.	Introduction of Tractor	1970
5.	Establishment of Gobar Gas Plant	-
6.	Kachcha Road	-
7.	Introduction of Thresher	1970
8.	First Tube Well / Diesel Pump Set	1970
9.	First Motorcycle	1980
10.	TV & DVD Player	1985
11.	Over Head Water Tank	-
12.	Electricity in the Village	1975
13.	Bituminous Road	1995
14.	Temple Renovation	1917
15.	Planning of Water Shed	2010
16.	Other	-

INDEX OF LAND HOLDING CONDITION

S.No.	Name of Project Land Holding Classification					
		Marginal	Small	Others	Total Area in Ha.	
1.	Sadi Pur	256	189	57	502	
2.	Rasul Pur	679	721	298	1698	
3.	Rusi	331	232	59	622	
4.	Kansahi	55	83	09	147	
5.	Sujawal Pur	214	319	85	618	
6.	Mirai	148	172	75	395	
7.	Tikra	542	555	144	1241	
8.	Parsade Pur	92	137	47	276	
9.	Karchal Pur	596	714	209	1519	
Total Area(in Ha.)		2913	3122	983	7018	

GENERAL DESCRIPTION OF THE PROJECT AREA

LOCATION MAP IWMP-III



<u>Chapter – II</u>

Location of Watershed

The selected watershed in Fatehpur District (U.P) is located along Kanpur-Allahabad national highway (NH-2), about 6 km from Fatehpur between the $26^{0}6'49.548"$ to $26^{0}11'59.50"$ latitude and $80^{0}25'54.826"$ to $80^{0}33'42.243"$ longitude .It locate near about 3Km along with west side to Pandu river (Location Map - Page no....)

PROPOSED LAND USE

Watershed management plan for Ganga watershed is proposed with specific objectives of food efficiency and income and employment generation with environmental security. In plan preparation due importance is given to topology, land suitability, irrigation potentiality, prevailing forming systems, micro-farming situation, farmers preferences and priorities revealed through PRA exercise. Technological options are blended with the indigenous knowledge based on the latest available research / experimental findings for this region. Due attention is given to resource of the farmers and adjustments has made in capital intensive/high resource demanding technological outputs while making them adoptable to the resource poor farmers. Emphasis is given on maximum use of farmyard Manure (FYM) and green manuring. The proposed land use plan of watershed is given as below:

Present and Proposed land use plan of the selected watershed:-

S.No.	Land Use	Present (Ha)	Proposed (Ha)
1.	Agriculture	5380	5380
(A)	Rain-fed	3884	3884
	(i) Crop	2618	3674
	(ii) Agro-forestry	-	210
(B)	Irrigated	1266	1496
	(i) Assured	1186	1186
	(ii) Partial	80	310
2.	Wasteland	432	432
	(i) Afforestation	-	210
	(ii) Pasture	-	12
	(iii) Untreatable	432	210
3.	Village Land	54	54
Total		5866	5866

PHYSIOGRAPHY: The watershed is in the Doaba of Ganga & Yamuna having moderate slopes and drains into river Ganga through Drains. About 60% of the watershed area has slopes up to 3%, 20% area has slopes up to 1% and 20% area has slopes from 3 to 5%. A number of streams join the main perennial stream of Ganga. Total 62 numbers of streams of different order are found in watershed, width total length 57950 meters. Stream characteristics of the watershed are present in the Table-1.

TABLE-1 : STREAM CHARACTERISTICS OF SELECTED WATERSHED

Stream Order	Stream Number	Mean Stream Length(M)
I st Order	35	29750
II nd Order	12	9945
III rd Order	5	5325
IV th Order	-	-
Total	52	45020

AREA AND ELEVATION :

Total area of the watershed is 5866.00 ha. Elevation ranges from 130.88 m to 125.78 m above mean sea level. Twenty Nine villages, Karbigawan, Sadipur, Parsadepur, Mirai, Chhiwali, Kharauli, Chaknadi, Basawanpur, Khadara, Karchalpur, Aung, Godhrauli, Gangchauli Khurd, Gangchauli Bujurg, Mayaram Khera, Rasulpur, Padhara, Dodara, Baniyan Khera, Nama mau, Shahjahanpur, Delemau, Tikara, Rusi, Shah, Bhaisauli, Kansahi, Sujawalpur, Deomai namely are the located in the watershed.

SHAPE:

Maximum length and width of the watershed area is 12500 m and 9600 m respectively with a length: width ratio is 4.405 : 1

CLIMATE:

The watershed lies in the semi-arid region having tropical climate. The average annual precipitation is 618 mm. Most of the annual rain fall (about 90%) is received during the rainy season (July to September) accompanied with high intensity storm. The temperature in the area rarely goes up to 46.40 $^{\circ}$ C during summer and reaches 4.20 $^{\circ}$ C in winter.

SOCIO-ECONOMIC ASPECTS OF THE PROJECT AREA
Chapter – III

SOCIO-ECONOMIC ANALYSIS OF THE PROJECT AREA

Sustainability and Environmental Security:-

In the proposed watershed management plan of Pandu, proper blending of bio engineering measures will be applied. The proposed land use plan will improve the land utilization index and crop diversification index significantly as compared to existing one. It will help in maintaining Ecosystem integrity on sustained basis.

Economic Analysis:-

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

S.No.	Sector	Area in Ha	NPV (Rs.)	BCR	PBP (yrs.)	IRR %
1.	Irrigated Agriculture	1266	295766970.00	1.69 : 1	3	15.77
2.	Rain-fed Agriculture	3884	69748470.00	1.41 : 1	1	-
r	Total Agriculture	5150	365515440.00	1.55 : 1	1	-

ECONOMICS OF AGRICULTURAL SECTOR OF PANDU WATERSHED

ECONOMIC ANALYSIS OF HORTICULTURE SYSTEM IN PANDU WATERSHED CONSIDERING 30 YRS. PROJECT LIFE & 10% DISCOUNT RATE

S.No.	Tree Species	Area (Ha)	NPV (Rs.)	BCR	PBP (yrs.)	IRR %
1.	Amla	23.00	5662370.00	2.75 : 1	12	25.60
2.	Mango	1.00	246190.00	2.65 : 1	11	34.20
3.	Guava	25.00	5539275.00	2.5 :1	9	29.50
4.	Bel	11.40	2525850.00	2.51 :1	8	32.10
Total	Horticulture	60.40	13973685.00	2.60:1	10	30.55

MORPHOLOGY OF TYPICAL SOLID PROFILE OF PANDU

Horizon	Depth(Cm)	Morphology
А	0 -150	70% Sand and 30% Clay/Loam Loose Soil
В	150 - 800	20% Kankar / Hard Clay and 80% Sandy Soil
С	> 800	Fine Clay Soil

Soil Characteristics and Fertility Status:

Three types of soils are in the watershed area. The fertility status is about normal range. The two soil samples of each village, One for nutrients analysis and one for sulphur and micro nutrients analysis have been send to laboratory. After receiving the analysis effort will be made to motivate the farmers to use nutrients and micro nutrients according to the any analysis report. For this demonstration of crop in Kharif and Rabi both seasons have been proposed under agriculture production activity.

Land Capability Classification (LCC):

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

LCC Class	Area Ha.
Ι	275.00
II	2630.00
III	700.00
IV	279.00
Total	3884.00

Area Under Various LCC Classes Pandu Watershed

Agriculture:-

Various agriculture land uses in the watershed are extended to diversified land capabilities starting from marginal to good class Π^{nd} lands. The Watershed distinctly has three types of land i.e. leveled, sloping and degraded and undulating. The agriculture is practiced on all these soil types though the productivity considerably varies. The total area in agriculture in the watershed is about 6859.00 ha out of which 695.13 is irrigated while 3123.30 ha is under Rain-fed agriculture. The water (both for irrigation and drinking) is most scarce natural resource in the watershed. The operation of tube wells for irrigation of agricultural crops frequently leads to the drinking water problem to the farmers for watershed.

The agricultural soils in the watershed have diversified texture i.e. Clay, Silty Clay, Sand mixed with loam which are located in patches throughout the watershed. 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 each selected village has sent to laboratory for testing.

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

One Year Crop Rotation:-

Single Cropping: Follow - gram, Follow - Mustured

Double Cropping: Urad + Jwar + Til - Mustured, Arahar + Jwar.

Irrigated Agriculture:

One Year Crop Rotation:-

Urad/Moong-Wheat, Urad/Moong-Potato, Urad/Moong-Vegetables, Paddy-Gram, Paddy-Lentil, Maize-Potato.

Crop Productivity:-

Food crop production is a major land based activity in the watershed. Traditional cultivation practices, coupled with poor quality seeds and long duration crops varieties result in low crop yields. Crops are taken under rain-fed as well as irrigated conditions. The yield levels of rain-fed crops are particularly very poor. Large variation has been noticed in productivity of wheat (9 Qtl/Ha) and rice (8.5 Qtl./Ha) under rain-fed and irrigation, condition respectively. At present level of rain-fed farming. The total produce from Rabi and Kharif crops obtained by a medium size of holding owning family can meet food requirements for up to 6 to 7 months only.

The farmers also do not have suitable cropping systems to deal aberrant weather. Weeds impose considerable constrant in producing of both Kharif and Rabi crops under irrigation as well as Rain-fed production system. Use of weedicide is rare in the watershed. The mixed cropping is in practice in limited area with Kharif crops like Bajra and

Jawar + 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 agronomical measures like seeding and ploughing across the slope, wed mulching, agro-forestry, vegetative barriers etc. also completely lack in the watershed.

Indigenous Technological Knowledge (I.T.K.) :-

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

Forest and Other Vegetation

Forests:-

The selected watershed area has no resource of forest.

Horticulture / Agro-forestry

Agro-Forestry:-

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

Horticulture:-

The watershed does not have organized orchards; however farmers have fruit plants (Mango, Ber, Bel, Guava, Mahua, Amla etc.) near the homesteads and kitchen gardens. The climate and soil of the area is favorable for fruit growing for sub tropical fruits in the lower reaches. Organized orchards, commercial vegetable cultivation, Agro Horticulture and other system of agro forestry etc. are lacking but have good potential in the watershed. The watershed is located near the National Highway and North Central Railway line and has scope to transport the produce to the nearest market Allahabad, Kanpur, even to Delhi.

AGRO-FORESTRY



Conclusion:

The land capability classification of the Pandu 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.

HUMAN AND LIVE STOCK POPULATION

Human Population:-

The total population of twenty nine villages of the watershed is 54204 with average family size of 5 persons.

Live Stock Population:-

Total live stock population of the watershed is 21962. Buffalo is preferred as milk animal compare to cow milk yield is very low. Goats are kept mainly for the meat purpose. Homestead poultry rearing is common among marginal farmers. The breakup of live stock population is attached on Page No. 46

Land Holdings:-

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

PROJECT-WISE HUMAN POPULATION

S.No.	Name Of Project	Male	Female	Children	Total Population
1.	Karchal Pur	3911	3701	1271	8883
2.	Sadi Pur	1594	1519	771	3884
3.	Mirai	1041	982	403	2426
4.	Rusi	2626	2406	1001	6033
5.	Tikra	3880	3738	1489	9097
6.	Rasul Pur	6165	5864	2541	14570
7.	Kansahi	467	411	237	1115
8.	Sujawal Pur	2265	2126	1030	5421
9.	Parsade Pur	981	942	347	2270
	Total	22930	22184	9090	54204

Livelihood Status

The watershed has moderate communication facilities and all 29 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. Only one Intermediate college in village Karchal Pur are existing. All the villages are electrified. Nearest small market is, Bindki and district headquarter Fatehpur. Small land holdings (average less than 1.0 ha) with large family size (average 6 person) are more than 51% 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 labour such as sowing, harvesting, house construction works etc. social maps of the watershed villages drawn by villagers themselves, depicting villages features is attached from Page No.182 to Page No. 183

S.No.	Name Of Project	Buffaloes	Cows	Bullock	Goat	Other	Total
1.	Karchal Pur	1772	163	119	1599	776	4429
2.	Sadi Pur	954	147	115	895	90	2201
3.	Mirai	421	34	32	411	37	935
4.	Rusi	1506	118	68	1858	116	2866
5.	Tikra	920	218	69	1125	80	2412
6.	Rasul Pur	2956	251	251	1470	255	5153
7.	Kansahi	97	15	12	98	40	262
8.	Sujawal Pur	667	185	50	1030	35	1937
9.	Parsade Pur	369	86	26	370	56	901
	Total	9662	1217	742	8856	1485	21962
				1			

PROJECT-WISE ANIMAL POPULATION

STATUS OF FOOD REQUIREMENT AND AVAILABILITY PER ANNUM IN GANGA WATERSHED:

S.No.	Item	Requirement	Before Project		Proposed		
		(Q / yr.)	Availability (Q / yr.)	Deficit or Surplus (Q/ yr.)	Availability (Q / yr.)	Deficit or Surplus (Q/ yr.)	
1.	Cereals	48035	44170	- 3865	49595	+ 1560	
2.	Pulses	14090	9670	- 4420	15300	+ 1210	
3.	Oil Seeds	36900	27560	- 9340	38320	+ 1420	
4.	Vegetables	44340	23780	- 20560	44590	+ 250	

Employment Generation

Labour migration in search of gainful employment is one of the major problems in the remote watershed in particular. Casual employment opportunities to the tune of more than 2.623 lakhs will be generated during the implementation of the project activities. However, changes in the land use pattern and adoption of other subsidiary enterprises will generate employment opportunities for persons of 3.175 lakhs in the watershed.

WATER RESOURCE DEVELOPMENT AND SOIL CONSERVATION MEASURES

Status of Present water Resources Utilization:-

There is no natural water body in the selected area which may used for irrigation. Present assured / Partial Irrigation is done by private tub wells.

Proposed Plan For Irrigation of Water Resources:-

Sprinkler sets for irrigation from private tube well are distributed by Agriculture Development to Tube Well holders on the basis of & Irrigation group. Effort will make to help the tube well holders of selected area to from group and to get sprinkler sets. Therefore, more area will be irrigated by the available irrigation water.

New Water Harvesting Structures:-

In the 514.66 Ha area new and renovation of existing watershed harvesting structure / Gully Plug / earthen C.D. will be constructed for water harvesting.

Ground Water Recharge:-

In order to augment the flow in the drainage line, it is necessary to undertake moisture and water recharge measure in the watershed area. For the purpose of ground water recharge 25 Nos. of soak pits are planned in the selected area.

Crop Production:-

In the light of the land capability classification of the watershed and need of the farmers, the reallocation of watershed area rain-fed and irrigated lands has been done for improving productivity, income generation and maintaining ecological balance. The production crop management plan has the following salient features:

Organic Farming System:-

Organic Farming System will be achieved in the following manner:

- (1) Maximum use of crop residues in the integrate plant Nutrients System (IPNS)
- (2) Prevision of legumes composed in the cropping system.
- (3) Green manuring with appropriate legumes.
- (4) Rapid compost using crop residue, domestic and farm waste animal dung.

(5) <u>Milching and Crop Residue Management:-</u> Sources of milch material includes weeds, pruning from agro-foresting trees and in situ grown legumes and green manure crops. The concept of live milching is based on the principle of mixed cropping whereby a fast growing legumes is established before or simultaneously along with a widely spaced seasonal grain crops such maize and a incorporated into the soil at an appropriate stage to act on as a milch. Application of organic milch material 4 - 5 t / ha is recommended.

(6) Green Manuring:- To improve the organic matter and physical condition of the soils, green manuring crops like Dhaincha and sun hemp which supply 20 - 30 t / ha of green mutter and 85 - 125 kg/ha of Nitrogen shall be raised and incorporated into the soil. In 1966, ha area green manuring is planned.

(7) <u>Seed Treatment With Rhyzobium Culture:</u> The seed of leguminous crop like black gram, soyabeen, pea etc. should be treated with Rhyzobium culture before sowing.

(8) <u>Tillage operation:-</u> It is advisable to carry out tillage operation like ploughing followed by planking just after the harvest of Kharif crops. This will be helpful in conserving moisture for sowing and germination of Rabi crop in addition, coverage of soil surface with milch material is also recommended to ensure the soil moisture.

(9) Introduction of Improved Seeds / Varieties:- Short duration and high yielding varieties suitable for this region have been proposed in long duration verities. Demonstration of High Yielding Varieties (HYV's) of different crops in --- ha is planned in the watershed however for self sufficiency in seed requirement farmers of the watershed will be involved to produce required quantity of seed of the recommended crop varieties.

(10) Sowing Methods:- Agronomical practices like contour cultivation, strip or inter-cropping, optimum time of sowing, optimum plant population by keeping proper distance through line sowing and placement of fertilizer below the seed will help in enhancing the crop yields without involving monetary inputs.

(11) Control of Insects Pest and Diseases:- Pod borer in gram is the major insect in the watershed area leading to loss in crop productivity. Similarly white blister is also a common disease in the mustard crop the management strategies of these insects, pests and diseases will also be demonstrated in the watershed for benefit of the growers.

(12) Dry Land horticulture:- In the selected area 243.89 ha land is planned for horticulture and agro horticulture. Species like Amla, Guava, Ber, Bel, and Lemon will be planted at suitable spacing in the watershed.

S.No.	Name Of Project	Ground Water Stata Month	Particular Place
		April to June	
1.	Karchal Pur	13.00	Well of near Temple
2.	Sadi Pur	19.00	Well of Sadi Pur
3.	Mirai	14.30	Door well of Shiv Lal
4.	Rusi	14.50	Door well of Chandrika Prasad
5.	Tikra	11.70	Door well of Ramesh Chand
6.	Rasul Pur	12.00	Door well of Chunni Prasad
7.	Kansahi	15.38	Door well of Rameswar
8.	Sujawal Pur	18.54	Door well of Indra Pal
9.	Parsade Pur	15.00	Well of Parsade Pur

PROJECT-WISE HYDROLOGICAL DATA

PROJECT-WISE INFRASTRUCTURE SOCIAL FEATURES

S. No	Name of Project	Pucca Road	Electricity	Primary School	J. H. School	Inter College	Post Office	P.H.C.	Bank	Vetnery Hospital	Co-Op. Society	Market	Ag. Service Center
1.	Karchal Pur	-	-	-	-	-	3km	4km	4km	4km	5km	5km	5km
2.	Sadi Pur	-	-	1km	3km	7km	2km	8km	4km	8km	3km	4km	4km
3.	Mirai	-	-	_	3km	3km	3km	6km	6km	6km	3km	6km	7km
4.	Rusi	-	-	-	-	3km	-	2.50km	3 km	2.50km	3km	3km	8km
5.	Tikra	-	-	_	-	5km	3km	3km	3km	3km	3km	7km	6km
6.	Rasul Pur	-	-	-	-	2.50km	2.50km	2.50km	2.50k m	2.50km	2.50km	2.50km	2.50km
7.	Kansahi	-	-	-	3km	3km	3km	3km	3km	3km	7km	3km	10km
8.	Sujawal Pur	_	-	-	1km	1km	1km	1km	1km	_	6km	1km	7km
9.	Parsade Pur	-	-	-	-	6km	-	6km	6km	6km	6km	6km	8km

INSTITUTIONAL BUILDING AND PROJECT MANAGEMENT

Chapter – IV

DETAIL OF WATERSHED COMMITTEE

S.No.	Name of Gram	Date of	Name of	Name Of	Member of	Member	Female	SC	Land	Member of
	Panchyat/Village	Constituti	President	Secretary	user Group	Of SHG	Member	Member	Less	WDT
		on							Member	
1.	Karchal Pur	14/12/10	Shyam Kali	Shailendra kumar	Dhyanmati	Rajesh Kumar	Dhyanmati	Shiv Kumar	Vinay Shankar	P.C. Sharma
2.	Sadi Pur	20/12/10	Surendra Singh	Gajraj	RamChandra Singh	Kusuma Devi	Manju	Ram Prakash	Jitendra	P.C. Sharma
3.	Mirai	13/12/10	Dharmendra Singh	Jitendra Singh	DevNarayan	Ram Babu	Savita Devi	Raj Kumar	Ramesh	Ram Khelawan
4.	Rusi	12/12/10	Sangeeta Devi	Manoj Kumar	Ram Sajeenvan	Nisha Devi	Rampati	Saroj Kumar	Kali Prasad	S.D. Sahu
5.	Tikra	4/12/10	Sandeep Kumar	Naresh Gupta	Shakuntala Bajpai	Virendra Singh	Ramsiya	Ramdin	Shiv Pal	R.N. Sri.
6.	Rasul Pur	20/12/10	Ram Dhani Verma	Pappu Singh	Babu Ram	Preeti	Sunita	Bachcha Lal	Gajraj	S.D. Sahu
7.	Kansahi	15/12/10	Kanta Singh	Jitendra Kumar	Krishna Kant	Aslam	Rami Singh	Sone Lal	Rakesh	Ram Khelawan
8.	Sujawal Pur	11/12/10	Santosh Kumar	Shiv Babu	IndraPal	Badlu Ram	Vijay Laxmi	Raj Kumar	Ramesh Prasad	Ram Khilawan
9.	Parsade Pur	08/12/10	Raj Narayan	Ram Jiyawan	Jai Karan	Raj Rani	Guddan Devi	Devi Prasad	Rajendra	R.N. Sri.

DETAILS OF USER GROUPS

User Groups (U.G.) have constituted of homogeneous groups of persons which are more affected by each work / related activity and has include those having land holdings within the watershed area.

S.No.	Name of Micro	Area of Micro	Selected Area for	No. of User Group
	Watershed	Watershed (in Ha.)	Treatment (in Ha.)	Constituted
1.	2B3C1a1c	1143.07	885.00	7
2.	2B3C1a1d	433.60	336.00	5
3.	2B3C1a2b	317.80	246.00	4
4.	2B3C1a4a	1038.14	804.00	5
5.	2B3C1a4c	947.14	734.00	5
6.	2B3C1a4d	692.48	537.00	5
7.	2B3C1a4g	132.62	103.00	3
8.	2B3C1a4i	211.70	164.00	2
9.	2B3C1a4j	681.12	528.00	3
10.	2B3C1a2a	268.35	208.00	4
	Total Area in Ha.	5866.02	4545.00	43

PROJECT IMPLEMENTING AGENCY (PIA)

U.P. Government, Land Development And Water Resources Department Section 1- Lucknow has nominates as PIA to Bhoomi Sanrakshan Unit, Land development and water resources Department Fatehpur for IWMP 3rd.

Qualification Designation Experience S.No. Name (year) Shri Lalmani Prasad Bhoomi Sanrakshan Adhikari High School, Diploma in Ag. Engg. 31 1 2 Shri Ram Bahadur Tripathi Junior Engineer Intermediate, Diploma in Civil Engg. 30 Shri Ram Lakhan Verma Intermediate, Diploma in Ag. Engg. 3 Junior Engineer 28 B.Com. Shri Heera Lal Gupta 30 4 Accountant 5 Shri Pramod Kumar Sharma Sr. Clerk B.A. 30 Shri Rama Kant Yadav Jr. Clerk B.A. 6 19 Shri Ramendra Pal Draft Man M.A. 07 7 Shri Swadesh Mishra Intermediate 8 Tracer 10 A.S.C.I. 9 Shri Suresh Chandra Mittal M. Sc. Ag. 07 Shri Ram Babu Intermediate Work Incharge 10 25 11 Shri Sukhram Singh Work Incharge Intermediate 25 Shri Ram khelawan Work Incharge B.A. 25 12 Shri Prem Chandra Sharma Work Incharge B.A. 13 25 Shri Shiv Mohan Awasthi Work Incharge 14 B.A. 21 Shri Sant Das Sahu Intermediate Work Incharge 15 22 Shri Raj Narayan Srivastava Work Incharge M.A. 16 20

Detail Staffing Pattern of PIA:

17	Dr. Sant Ram	Work Incharge	M.Sc. Ag., Ph.D.	07
18	Shri Vishobha Kumar Tripathi	Munshi	B.A.	20
19	Shri Subhash Chandra	Driver	-	30
20	Shri Jagjit Prasad	IV Class	High School	21
21	Shri Arjun Vibhakar	IV Class	Class VIII th	07
22	Smt. Vimla Devi	IV Class	Class V th	14

Institutional Arrangement at Project level

Project management Agency (PIA)

The SLNA would evolve appropriate mechanisms for selecting and approving the PIA's, who would be responsible for implementation of watershed projects in different districts. These PIA's may include relevant line departments. Autonomous organizations under State/Central governments, Government Institutes/Research bodied, Intermediate Panchayat, Voluntary Organization (VOS).

However, the following criteria may be observed in the selection of these PIA's:

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 PIA's will sign a contract/MOU with the concerned DQWSUs. District Level Committee as referred in para - 29 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 programmed funds for DPR and watershed works under any circumstances should be released to either the PIA or Watershed Committee (WC) unless the composition of the WDT has been clearly indicated in the MOU/contract and the team members are fully in place.

Roles and Responsibilities of the PIA:

The project Implementing Agency(PIA) will provide necessary technical guidance to the Gram Panchayat for preparation of development plans for the watershed through Participatory Rural Appraisal(PRA) exercise, undertake community organization and training for the village communities, supervise watershed development activities, inspect and authenticate project accounts, encourage adoption of low cost technologies and build upon indigenous technical knowledge, monitor and reviews 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 programmers, such as NREGA, BRGF, SGRY, Nation Horticulture Mission, Tribal, Welfare Schemes, Artificial Ground Water Recharging, Greening India, etc.

WATERSHED DEVELOPMENT TEAM (WDT)

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 keep8ing in vies 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.

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 others, 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 planed including water and soil conservation or redamation 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 estimated 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.
- **I.** 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.

CONSTITUTION OF W.D.T. BY P.I.A. (I)

S.No.	Name of the member	Qualification	Subject	Experience (year)
1	Shri Premchandra Sharma	B.A.	Member	25
2	Shri Ram Lakhan Verma	Intermediate, Diploma in Ag. Engg.	Water Management	28
3	Shri Suresh Chandra Mittal	M Sc. Ag.	Agriculture	07
4	Shri S. P. Singh	M.Sc.	Soil Science	20
5	Smt. Kiran Devi	B.A.	Social Mobilization	10

CONSTITUTION OF W.D.T. BY P.I.A. (II)

S.No.	Name of the member	Qualification	Subject	Experience
				(year)
1	Shri Ram Khelawan	B.A.	Member	25
2	Shri Ram Lakhan Verma	Intermediate, Diploma in Ag. Engg.	Water Management	28
3	Shri Suresh Chandra Mittal	M Sc. Ag.	Agriculture	07
4	Shri S. P. Singh	M.Sc.	Soil Science	20
5	Smt. Kiran Devi	B.A.	Social Mobilization	10

CONSTITUTION OF W.D.T. BY P.I.A. (III)

S.No.	Name of the member	Qualification	Subject	Experience
				(year)
1	Shri Sant Das Sahu	Intermediate	Member	22
2	Shri Ram Lakhan Verma	Intermediate, Diploma in Ag. Engg.	Water Management	28
3	Shri Suresh Chandra Mittal	M Sc. Ag.	Agriculture	07
4	Shri S. P. Singh	M.Sc.	Soil Science	20
5	Smt. Kiran Devi	B.A.	Social Mobilization	10

CONSTITUTION OF W.D.T. BY P.I.A. (IV)

S.No.	Name of the member	Qualification	Subject	Experience
				(year)
1	Shri Raj Narayan Srivastava	M.A.	Member	20
2	Shri Ram Lakhan Verma	Intermediate, Diploma in Ag. Engg.	Water Management	28
3	Shri Suresh Chandra Mittal	M Sc. Ag.	Agriculture	07
4	Shri S. P. Singh	M.Sc	Soil Science	20
5	Smt. Kiran Devi	B.A.	Social Mobilization	10

CONSTITUTION OF W.D.T. BY P.I.A. (V)

S.No.	Name of the member	Qualification	Subject	Experience
				(year)
1	Shri Premchandra Sharma	B.A.	Member	25
2	Shri Ram Lakhan Verma	Intermediate, Diploma in Ag. Engg.	Water Management	28
3	Shri Suresh Chandra Mittal	M Sc. Ag.	Agriculture	07
4	Shri S. P. Singh	M.Sc	Soil Science	20
5	Smt. Kiran Devi	B.A.	Social Mobilization	10

DRAWING AND DETAIL ESTIMATE OF ENTRY POINT ACTIVITY

DRAWING OF SOAKING PITS WITH SILTING TANK

All Dimensions Are in Metre



DETAIL ESTIMATE OF SOAKING PIT & CHANNEL OF LENGTH 1.50 M

S.No.	Description of Work	No.	L.	B.	D./H.	Quantity
1.	Earth work in Cutting	1	3.14 X 0.75 X 0.75	-	1.50	2.64 cum
2.	Laying of Brick Ballast	1	3.14 X 0.75 X 0.75	-	0.60	1.059 cum
3.	Laying G.S.B. 25-50 mm	1	3.14 X 0.75 X 0.75	-	0.45	0.749 cum
4.	Laying of G.S. Grit 10-20 mm	1	3.14 X 0.75 X 0.75	-	0.15	0.264 cum
5.	Laying of Coarse sand	1	3.14 X 0.75 X 0.75	-	0.15	0.264 cum
6.	Laying of G.S.B. 25-50 mm	1	3.14 X 0.75 X 0.75	-	0.15	0.264 cum
7.	Earth Work	1	1.50	0.50	0.40	0.30 cum
8.	Laying Of sand	1	1.50	0.47	0.10	0.070 cum
9.	Brick Work 1:4	1	1.50	0.47	0.11	0.077 cum
10.	Brick Work 1:4	1 X 2	1.50	0.11	0.15	0.049 cum
	Tota	al of (9 + 10) Brick Work 1:4	•		0.126 cum
11.	Plastering 1:4	1 X 2	1.50	0.56	-	1.680 m^2

ABSTRACT OF MEASURMENT

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

CONSUMPTION OF MATERIAL

S.No.	Description Of Work	Quantity	Cement (bag)	Brick	G.S.B. 25-50	G.S.Grit 10-20	Coarse
				(Nos)	mm (cum)	mm (cum)	Sand
1.	Laying of Brick Ballast	1.059 cum	-	390	-	-	-
2.	Laying of G.S.B	1.058 cum	-	-	1.058	-	-
3.	Laying of G.S. Grit	0.264 cum	-	-	-	0.264	-
4.	Laying of Coarse sand	0.334 cum	-	-	-	-	0.334
5.	Brick Work 1:4	0.126 cum	0.17	60	-	-	0.030
6.	Plastering 1:4	1.680 m^2	0.18	-	-	-	0.025
Total		0.35	450	1.058	0.264	0.389	

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	0.35 Bags	255.00/Bag	89.25
2.	Brick	450 Nos	4050.00/Thousand	822.50
3.	Coarse Sand	0.389 cum	910.00/cum	353.99
4.	G.S.B. 25-50 mm	1.058 cum	855.00/cum	904.59
5.	G.S.Grit	0.264 cum	1250.00/cum	330.00
	Rs. 3,500.33			

LABOUR CHARGES

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	2.94 cum	36.66/cum	107.78
2.	Breaking of Brick Ballast & Laying	1.059 cum	166.33/cum	176.14
3.	G.S.B. Laying	1.058 cum	33.33/cum	35.26
4.	G.S.Grit Laying	0.264 cum	33.33/cum	8.79
5.	Laying of Sand	0.334 cum	33.33/cum	11.13
6.	Brick Work 1:4	0.126 cum	370.00/cum	46.62
7.	Plastering 1:4	1.680 m^2	$40.00/m^2$	67.20
8.	Curing	0.126 cum	25.00/cum	3.15
			Total	Rs. 456.07

DETAIL ESTIMATE OF SILTING TANK

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

CONSUMPTION OF MATERIALS

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

COST OF MATERIALS

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

LABOUR CHARGE

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

TOTAL EXPENDITURE				
1. Cost of Materials	426.35			
2. Labour Charge	90.22			
Total	Rs. 516.57			
Say Rs. 520.00 Only				
TOTAL EXPENDITURE O	F SOAKING PIT & SILTING TANK			
1. Soaking Pits	3325.00			
2. Silting Tank	520.00			
Total Rs. 3,845.00				
Say Rs. 3,845.00 Only				

DRAWING OF WELL

DETAIL ESTIMATE OF JAGAT OF MELL



in the second

DETAIL ESTIMATE OF JAGAT OF WELL

S.No.	Description of Work	No.	L	В	D/H	Quantity
1.	Earth work in foundation	1	3.14 X 7.4	1.20	1.00	27.88
2.	Laying Of Sand	1	3.14 X 7.4	1.00	0.10	2.32
3.	C.C.W. 1:4:8	1	3.14 X 7.4	1.00	0.15	3.48
4.	Brick Masonary 1:4	1	3.14 X 7.4	0.80	0.40	7.43
			3.14 X 7.4	0.60	0.40	5.57
			3.14 X 7.4	0.40	0.90	8.36
			3.14 X 3.4	0.40	0.20	0.85
					Total	22.21
5.	Filling Of Earth Work	1	3.14 X 5.4	1.60	0.75	20.34
6.	C.C.W. 1:4:8	1	3.14 X 5.4	1.60	0.75	20.34
7.	C.C.W. 1:2:4	1	[(3.14 X 7.8 X 7.8)/4 - (3.14 X 3.8 X 3.8)/4] X 0.05			1.821
8.	Raised Pointing	1	3.14 X 7.8	-	0.90	22.04

CONSUMPTION OF MATERIALS

S.No.	Description of Work	Quantity	Cement	Coarse Sand	Bricks	G.S.B. 25-40	Grit 10-20
			Bags	(cum)	(No.)	mm (cum)	mm (cum)
1.	Sand Laying	2.32 cum	-	2.320	-	-	-
2.	C.C.W. 1:4:8 (4.06 + 3.48)	7.54 cum	25.63	3.393	-	7.012	-
3.	Brick Masonary 1:4	22.21 cum	39.97	5.996	10217	-	-
4.	C.E.W. 1:2:4	1.821 cum	11.10	0.764	-	-	1.547

5.	Raised Pointing	22.04 m^2	1.01	0.103	-	-	-
Total		77.71	12.576	10217	7.012	1.547	
Say		78 Bags	12.57 cum	10220	7.01	1.55	

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	78 Bags	255.00/Bag	19890.00
2.	Coarse Sand	1257 cum	910.00/cum	11438.70
3.	Bricks	10220 cum	4050.00/Thousand	41391.00
4.	Granite Stone Ballast 25-40 mm	7.01 cum	855/cum	5993.55
5.	Granite Stone Grit 10-20 mm	1.55 cum	1250.00/cum	1937.50
			Total	80,650.55

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	48.22 cum	36.66/cum	1769.01
2.	Sand Laying	2.32 cum	33.33/cum	77.32
3.	C.C.W. 1:4:8	7.54 cum	492.00/cum	3709.68
4.	C.C.W. 1:2:4	1.821 cum	492.00/cum	894.11
5.	Brick Masonary	22.210 cum	370.00/cum	8217.70
6.	Raised Pointing	22.04 m^2	51.61/m ²	7.48
7.	Curing 22.21	22.210 cum	25.00/ cum	555.25
8.	Chowkidar	13 Man days	100.00/Man day	1300.00
9.	Head Load & Transportation			8065.00
	Charges 10% of cost of materials			
			Total	24,595.55

LABOUR CHARGE

TOTAL EXPENDITURE				
1. Cost of Materials	80,650.55			
2. Labour Charges & Transportation	24595.55			
Total	105246.10			
Say Rs. 1,05,250.00 Only				

DRAWING 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	1.20	1.10	21.12
	Short Wall	2	4.00	1.20	1.10	10.56
	Total					31.68 cum
2.	Laying of Sand					
	Long Wall	2	6.60	1.00	0.10	1.32
	Short Wall	2	3.60	1.00	0.10	0.72
	Total					2.04 cum
3.	C.C.W. 1:4:8					
	Long Wall	2	6.60	1.00	0.15	1.98
	Short Wall	2	3.60	1.00	0.15	1.08
	Total	·				3.06 cum
4.	Brick Masonary work 1:4 in Foundation & Super Structure					
	1 st Footing					
	Long Wall	2	6.40	0.80	0.40	4.096
	Short Wall	2	3.80	0.80	0.40	2.432
	2 nd Footing					
	Long Wall	2	6 20	0.60	0.40	2,976
	Short Wall	2	4.00	0.60	0.40	1.920
	Super Structure					
	Long Wall					
	Short Wall	2	6.00	0.40	0.90	4.320
		2	4.20	0.40	0.90	3.024
	Total					18.768 cum
5.	Earth Work in Filling	1	5.20	4.20	0.75	16.38 cum
6.	C.C.W. 1:4:8	1	5.20	4.20	0.15	3.276 cum
7.	C.C.W. 1:2:4	1	6.00	5.00	0.05	1.500 cum
8.	Raised Pointing 1:3					
	Lang Wall	2	6.00	-	0.90	10.80
	Short Wall	2	5.00	-	0.90	9.00
	Total					19.80 m ²

DETAIL ESTIMATE OF KRISHAK VIKAS MANCH

ABSTRACT OF WORK

1.	Earth Work	31.68 + 16.38	48.06 cum
2.	Sand Laying		2.040 cum
3.	C.C.W. 1:4:8	3.060 + 3.276	6.336 cum
4.	Brick Masonary		18.568 cum
5.	C.C.W. 1:2:4		1.500 cum
6.	Raised Pointing 1:3		19.80 m ²

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (cum)	Coarse Sand (cum)	Bricks (Nos)	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	18.768 cum	33.78	5.067	8633	-	-
4.	C.C.W. 1:2:4	1.500 cum	9.15	0.630	-	-	1.275
5.	Raised Pointing	19.800 m ²	0.91	0.093	-	-	-
	Total		65.38 Bags	11.995	8633	5.892	1.275
	Say		65 Bags	12.000	8640	5.900	1.280

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1	Comont	77 Dogo	255.00/Dog	10625.00
1.	Cement	// Dags	255.00/Bag	19033.00
2.	Coarse Sand	12.00 cum	910.00/cum	10920.00
3.	Bricks	8640 Nos	4050.00/Thousand	34992.00
4.	G.S.B. 25-40 mm	5.900 cum	855.00/cum	5044.00
5.	G.S. Grit 10-20 mm	1.280 cum	1250.00/cum	1600.00
		Total		Rs. 72,191.00

LABOUR CHARGES

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	48.06 cum	36.66/cum	1761.87
2.	Sand Laying	2.060 cum	33.33/cum	68.65
3.	C.C.W. 1:4:8	6.336 cum	494.00/cum	3129.98
4.	C.C.W. 1:2:4	1.500 cum	494.00/cum	741.00
5.	Brick Masonary 1:4	18.768 cum	370.00/cum	6944.16
6.	Raised Pointing 1:3	19.800 m^2	51.61/m ²	1021.87
7.	Curing Charges	18.768 cum	25.00/ cum	469.20
8.	Chowkidar	6 Man days	100.00/Man day	600.00
	Rs. 14,736.73			

DRAWING OF CULVERT



TOTAL EXPENDITURE						
1. Cost of Materials		72,191.00				
2. Labour Charges		14,736.73				
	Total	86,927.73				
Say Rs. 87,000.00 Only						

DETAIL ESTIMATE OF CULVERT

S.No.	Description of Work	No.	L.	В.	D/H	Quantity
1		1	10.00	2.00	0.45	12.50
1.	By Transport	1	10.00	3.00	0.45	13.50
2.	Earth Work in Digging	1	3.00	1.20	0.92	3.31
		2	2.00	0.5	0.92	1.84
		Т	otal			5.15
3.	Sand Laving in Foundation	1	3.00	1.20	0.10	0.36
		2	2.00	0.47	0.10	0.18
		Т	otal	1 1		0.54
4.	B.B.W. in Foundation (1:4:8)	1	3.00	1.20	0.20	0.72
		2	2.00	0.47	0.20	0.37
		Т	otal	· · ·		1.09
5.	Brick Work (1:4)	1	3.00	1.20	0.11	0.396
	(a) Bed	2	3.00	0.35	0.50	1.050
	(b) Inner Wall	2	2.00	0.47	1.00	1.880
	(c) Side Wall	2	2.00	0.47	0.31	0.583
		3.909				
	Deduction From Brick Work	2	0.50	0.47	0.50	0.235
	Net Brick Work	-	-	-	-	3.674

6.	R.C.C. Work (1:2:4)	1	3.94	1.30	0.20	1.024
7.	Plaster Work (1:4)	2	2.00	1.30	-	5.20
		2	2.00	0.31	-	1.24
		2	2.00	0.47	-	1.88
		4	0.35	0.31	-	0.43
		8.75				

CONSUMPTION OF MATERIALS

S.No.	Description of Work	Quantity	Brick (Nos)	Cement (Bags)	Coarse Sand	Brick Ballast	M.S.Bar 10 mm	10-20 mm Stone Grid
1.	Sand Laying	0.54	-	-	0.54	-	-	-
2.	B.B.W. (1:4:8)	1.09	-	3.69	0.49	1.01	-	-
3.	Brick Work (1:4)	3.674	1690	6.61	0.99	-	-	-
4.	R.C.C. Work (1:2:4)	1.024	-	6.24	0.43	-	100.50 kg	0.87
5.	Plaster Work (1:4)	8.75	-	0.96	0.16	-	-	-
	Total		1690	17.50	2.61	1.01	100.50 kg	0.87

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Brick I st Class	1690 Nos	4050.00	6844.50
2.	Cement	17.50 Bags	255.00	4462.50
3.	Coarse Sand	2.61 m^3	910.00	2375.10
4.	Brick Ballast	1.01 m^3	1450.00	1464.50
5.	M.S.Bar 10 mm	100.50 Kg	34.50	3467.25
6.	10-20 mm Stone Grid	0.87 m^3	1250.00	1087.50
	Total			Rs. 19,701.35
	Say			Rs. 19,700.00

LABOUR CHARGES

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work in Filling	13.50 cum	130.00/cum	1755.00
2.	Earth Work in Digging	5.15 cum	33.33/cum	171.65
3.	Sand Laying	0.54 m ³	33.33/m ³	18.00
4.	B.B.W. (1:4:8)	1.09m ³	492.00/m ³	536.28
5.	Brick Work (1:4)	3.674m ³	370.00/m ³	1359.38
6.	R.C.C. Work (1:2:4)	1.024m ³	560.00/m ³	573.44
7.	Plaster Work (1:4)	8.75 m ²	40.00/m ²	350.00
		Rs. 4763.75		
		Say		Rs. 4764.00 Only

Total Expenditure				
Material	19,701.00			
Labour	4764.00			
Head Load & Transportation	2446.00			
Total	Rs. 26,911.00			
Say Rs. 27,000.00 Only				

INSTITUTION & CAPABILITY BUILDING

DRAWING OF NADEF COMPOST STRUCTURE



3. Thickness of wall = 0.23 m.

4. Total height of Structure = 1.20 + 0.30 = 1.50 m.

(Not to Scale)

PREPARATION OF COMPOST BY NADEF METHOD

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

First of all best soil of pond of 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 pity 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.

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

ESTIMATE OF COMPOST BY NADEF METHOD

	Short Wall Glazed	2	2.40	0.23	0.60	0.662
		Total				1.616 cum
3	Plastering Work Long Wall	2	3.46	-	0.60	4.152
	Short Wall	2	2.40	-	0.60	2.880
	Top of Long Wall	2	3.46	0.23	-	1.591
	Top of Short Wall	2	2.40	0.23	-	1.104
		Total	1		•	9.727 m ²

ABSTRACT OF WORK

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

CUNSUMPTION OF MATERIALS

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

COST OF MATERIALS

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

S.No.	Particulars	Quantity	Quantity Rate	
1	Cement	7 Bags	255.00/Bag	1785.00
2	Coarse Sand	1.02 cum	910.00/cum	928.20
3	1 st class Brick Work 1:4	1500 Nos	4050.00/thousand	6075.00
		Total		Rs. 8,788.20

LABOUR CHARGES

TOTAL EXPENDITURE				
1. Cost of Materials	8788.20			
2. Labour Charges	1616.14			
Total	Rs. 10,404.34			
Say Rs. 10,400.00 only				

DAIRY WORK

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

Establishment of Goat Units for S.H.G.'s formed in I.W.M.P. 3rd

Project

District Fatehpur is situated in middle zone 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 ad vitamins, mineral- supplement to the goat 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

Middle zone region, due to the geo-climate conditions and land pattern is favorable for goat husbandry. Goats thrive well in dry and semidry climate with bushes and thorny vegetation. Presently in this area, farmers rear goats for their livelihood. If goat husbandry would be transformed to inte4nsive husbandry, there shall be more economic stability of farmers, more economic stability of farmers, more profit sharing and availability of running capital for future expansion, keeping in view the above facts, goat units shall be formed in the area in intensive way.

16 Goat Units are proposed in I.W.M.P. 3rd 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.

S.No.	Component	Amount
1	Cost of 10 Goats of improved breed (not less than 6 months of age) @ Rs. 3000.00 each.	30000.00
2	Cost of 1 buck of improved breed @ Rs. 5000.00	5000.00
3	Cost of insurance @ 11.63/unit	4070.00

FINANCIAL COMPONENT

4	Feed cost for 3 months @ 250 gm/day for goats @ Rs. 11.84/250 gm	2930.00
5	Provision of deworming, mineral and vitamin supplement, treatment, vaccination @ Rs. 160/animal	
6	The expanse including monitoring expenses, register and records @ Rs 170.00/unit	170.00
	Total	Rs. 43,930.40
	Say Rs. 43,950.00	•

ESTIMATE OF LIVESTOCK DEVELOPMENT ACTIVITIES

Total Number of female animals :		Buffalo	-	9616	
		Cow	-	2380	
		Total	-	11996	
1. Artificial Insemination (A.I.): 3	3% of total and	imals per y	vear, i.e., 3	3959 (say 400	0 Nos)
Amount required for A.I.	by Baif @ 100	0.00/anima	1		
Т	'otal Amount		- R	s. 4.,000.00	
2. Vaccination: Total number of animals	s in I.W.M.P. I	st –	22658 No	DS	
1. H.S. +	B.Q.	@ 5.50	1,2	4,124.00	
2. F.M.D.	•	@ 10.50	2,3	6,964.00	
	(Twice	in a year))		
Т	'otal Amount	-	Rs. 3,61,0	88.00	
3. Deworming: Adult Animals - 14	4043				
Child Animals -	8615				
Albendazole for	14043 an	imals	@ .	40.56	5,69,584.00
	8615 cł	nild animal	ls @ 2	20.28	1,74,712.00
Т	'otal Amount			- Rs. 7	,44,296.00

4. Mineral Mixture: Agrimine Forte Chelated for 18009 animals @ 115.00 Rs. 20,71,035.00

GRAND TOTAL - Rs. 32,16,419.00

DRAWING AND DETAIL ESTIMATE OF THE WATERSHED DEVELOPMENT WORKS IN WATERSHED WORK PHASE





DESIGN OF CONTOUR BUND

Type of Soil Rain fall Field Stop, 1%	-Clay -24 hr in cm -25 cm
Vertical Interval (VI)	$= [s/3+2] \times 0.3$ = [1/3+2] × 0.3
Horizontal Interval (HI)	$= 100 \times V.l/s$ = 100 x 0.7/1
Height of bund h	$= \sqrt{(\text{Re x VI})/50}$ Re=maximum rainfall in cm = $\sqrt{(25 \times 0.7)/50}$
	$=\sqrt{0.35}$
	Sav 0.60 m
Free board	=15% of height minimum -10 cm
Height	= 0.60 + 0.10
	= 0.70 m
Taking top width of bund 0.50 m a	nd side slope 1.5:1
Then base of Bund	= 0.50 + (1.50 d) x 2
	= 2.60 m
Cross-Section of bund	= (0.50 + 2.60) x 0.70 / 2
	$= 1.085 \text{ m}^2$
Length of bund	= 100 s / V.I.
	= 100 x 1 / 0.70
	=142.85 m/ha
	Say 150 m/ha
Earth work/ha	= 150x1.085
	= 162.75 cum
Cost Rs. / ha	= 162.75 x 39.16 = 6373.29
	Say 6375.00

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DESIGN OF SUBMERGENCE BUND

Types of soil –Clay	Rainfall intensity for 24 hrs – 25cm
Field slope 3%	V.I.=[s/3+2]x0.30
	=0.90 m
Horizontal Interval = (100xV.I.)/s	= (100x0.90)/3
Height of bund h= $\sqrt{(\text{Re x V. I.})/50}$	=30 m = $\sqrt{(25 \times 0.90)/50}$ = $\sqrt{0.45}$ = 0.67 m. Say 0.70m
Free board 20% of height minimum 20cm Total Height Taking top width of bund 0.70m and side sl	=0.90m ope 1.5:1
Bottom of bund	= 0.70+2 x 1.5d = 0.70+2.70
Cross Section of Submergence Bund	$= (0.70+3.40) \times 0.90 / 2$ = 1.845 m ²
Length of bund	= 100 s / V.l. = (100 x 3) /0.90
Feasible length	-555 100 + 25 + 25 = 150 m
Earth work/ha	=150 x 1.845 =276.75
Cost per ha	=276.75 x 39.16 =10,837.53 Say 10,850=00
	[111]

TYPICAL SECTION OF FIELD BUND

Top width	= 0.50 m
Side slope	= 1:1
Height of bound	= 0.50 m
Bottom Width	= 1.50 m
Cross section	$= (0.50+1.50) \times 0.50/2 = 0.50 \text{ m}^2$
Length per hectare	= 200 m
Earthwork	= 200 x 0.50 = 100 cum
Cost 39.16/cum	= Rs. 3916.00
Cost per hectare	= Rs. 3916.00
TYPICAL SECTION OF	P.B., M.B., S.B.

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Top width	= 0.70 m
Side slope	= 1.5:1
Height	= 1.30 m
Bottom	= 4.60 m
Cross section	= (0.70+4.60)x1.30/2
	$= 3.445 \text{ m}^2$
Cost/ meter	= Rs. 142.00

TYPICAL SECTION OF EARTHEN CHECK DAM / GULLY PLUG

Top width		= 1.50 m
Side slope		= 2:1
Height		= 2.10M
Bottom Width		= 9.90 m
Cross section		= (1.50 + 9.90) x 2.10 / 2
		= 11.97 m ²
Cost per meter		= Rs. 551.45
	TYPICAL SECTION OF CHEC	K DAM / GULLY PLUG
Top width	TYPICAL SECTION OF CHEC	K DAM / GULLY PLUG = 2.00m
Top width Side slope	TYPICAL SECTION OF CHEC	<u>K DAM / GULLY PLUG</u> = 2.00m = 2:1
Top width Side slope Height	TYPICAL SECTION OF CHEC	K DAM / GULLY PLUG = 2.00m = 2:1 = 2.50 m
Top width Side slope Height Bottom Width	TYPICAL SECTION OF CHEC	K DAM / GULLY PLUG = 2.00m = 2:1 = 2.50 m = 12.00 m
Top width Side slope Height Bottom Width Cross Section	<u>TYPICAL SECTION OF CHEC</u>	K DAM / GULLY PLUG = 2.00m = 2:1 = 2.50 m = 12.00 m = (2.00 + 12.00) x 2.50 / 2

Cost /meter

= Rs. 839.12

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TYPICAL SECTION OF W.H.B

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

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 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 nust 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:

(i) Lack of Suitable agro-technique for degraded lands

- (ii) Lack of trained resource persons
- (iii) Inadequate dissemination of the technology
- (iv) lack of community approach
- (v) High Biotic Interference
- (vi) Lack of Infrastructure including marketing.

(B) Soil Constraints:

- (i) Poor Nutrient Status of the soil
- (ii) Physical Impediment
- (iii) Moisture Stress / Water Logging / Inadequate Drainage

(C) Plant Related Constraints:

- (i) Problem of plant Establishment
- (ii) Physiological Disorders
- (iii) Fruit Drop and Poor Productivity
- (iv) 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.

CONCEPT AND ADVATAGES OF CONSERVATION HORTICULTURE:

Conservation horticulture or horticulture and use based on soil and water conservation principle is a suitable alternative for utilization and management of land under rain fed condition. Thus horticulture development in watershed management appears to be the most appropriate technique for sustained productivity as well as for restoration of degraded land . In fact horticulture system meets all the basic need-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 evaporation aspiration, 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 land provide higher returns and offer alternative opportunity in non-arable areas where cropping may not be possible.

CONSERVATION HORTICULTURE PRACTICES

Some of the important practices are given below

<u>1-Selection of suitable fruits types</u>:- For the success of conservation horticulture ,selection of hardly varieties resistant to diseases and pests and use of local or other hardy root stock for raising fruit-trees is great importance. The major part of the reproductive cycle i.e. 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 plant which fulfill this requirement and all these fruit plant

are most suitable for Bundelkhand region.

<u>2-Panting Techniques.</u> For degraded lands, pits should be dug of 1m x1m x 1m size, the excavated soil is mixed Farmyard Manure (FYM)@5-10 kg/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.

Use Of Root Stocks. 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 path of wild root stock is available. The budded/grafted stock need intensive management as it is required to be protected from the wild animals, birds, pests, etc. The wild root stock develops efficient top root to provide moisture and nutrients to the scion. Amla, Bel is other example of raising the improved cultivation the wild root stock.

IN SITE WATER HARVESTING

Since on sloppy lands, runoff water is considerably higher, therefore, it should be harvested and used. The runoff 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 fruit yield.

Run of 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 the dry months. Counter trenches will dug between the rows of fruit trees because this is effective in conserving moisture and providing soil erosion.

MULCHING

Mulching is practiced to conserve moisture. It prevents the loss of moisture by evaporation and improve water intake by the soil. Various organic (straw, hay, manure, tree leaves, dry wads) mulches are used for mulching. Use of plastic mulch has been taken in rain fed and dry farming condition to increase the productivity by minimizing evapo transpiration losses.

DRIP IRRIGATION

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

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

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

S.No.	Particulars	Quantity	Rate	Amount	Remark					
A. Ho	A. Horticulture									
1.	Soil working 1m x 1m x 1m size pits	270.00	36.66/cum	9898.20	Since, the project is to be					
	(270 Nos) including cost of refilling	cum			operated in a participatory mode,					
2.	Application of Farmyard Manure,		L.S.	450.00	contribution in the form of					
	Including Cost				Labour input for pit digging,					
3.	Cost of NPK mixture, neemicide	-	L.S.	400.00	FYM and its applications,					
	@250 gm/plant				weeding and hoeing are to be					
4.	Cost of plants (including 15% etc. for	310 Nos	15.00/Plant	4650.00	provided by the participating					
	mortality) including transportation				farmers, hence the costs are not					
	and planting				including in the estimates.					
5.	Casualty replacement @ 10% of item			465.00						
	No. 4 & 5									
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 II nd year onwards -			900.00						
	15% of I st year cost									
	For next 5 years i.e. Rs. 900 x 5			4500.00						
	Total Cost			Rs. 10,500.00						
	Say			Rs. 10,500.00						
B. Agr	co-Horticulture (Cost per Ha)	•		-						
1.	Cost of raising 270 plants up to 5			10,500.00	The remarks mentioned under					
	years @ Rs. 10,000.00				Horticulture are also applicable					
2.	Cost of raising agricultural crops @			5,000.00	for Agro-Horticulture.					
	Rs. 5,000 per Hectare per year									
3.	Fencing			45,300.00						
	Total			Rs. 60,800.00						

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

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

ESTIMATE FOR SILVI-PASTORAL SYSTEM (RS. HA⁻¹) PLANTATIONS (800 PLANTShA¹)

S.No.	Particulars of Works	Rate (Rs.)	Cost (Rs.)	Remarks
1.	Clear felling or bush clearance of area	LS	550.00	The area is to be through
	protected infected with Lantana etc.			bio-fencing
	including Cost of burning			
2.	Soil Working - earth work, Digging of	LS	6085.00	
	Pits/holes 60 cm deep, 30 cm dia -800			
	Nos including cost of refilling and			
	trenching (400 trenches/Ha)			
			2050.00	D 200 D
3.	Cost of seeding for 900 Nos. and grass	-	2050.00	Rs. 2.00 Per
	seeding/legumes seeds and			
	planning/sowing	I G	200.00	
4.	Weeding and hoeing (2 Nos.)	LS	300.00	
	Total		8985.00	
	Maintenance		1350.00	
	II^{nd} year 15% of the 1st year			
	expenditure including being up of I st			
	year failure			
	Grand Total		Rs. 10,335.00	
	Say		Rs.10,350.00	



DUG WELL RECHARGING STRUCTURE

S.No.	Name of work	Nos	L x B x D/H	Unit	Quantity
1.	Earth work in excavation hard soil				
	mixed with Kankar gravel, etc. in				
	foundation.				
(a)	Setting pit (i) Long Wall	4	0.65 x 1.75 x 0.10/2	m ³	0.09
		2	1.50 x 0.62 x 0.75	<u>m³</u>	1.39
	(ii) Short Wall	4	0.55 x 0.75/2 x 0.10	<u>m³</u>	0.08
		2	1.00 x 0.55 x 0.75	m^3	0.82
(b)	Filtering Pit	8	1.85 x 1.00 x 1.00/2 x 0.10	m^3	1.19
		2	1.5 x 1.62 x 0.90	m^3	4.37
(c)	Drain -Filter Zone	1	1.50 x 1.50 x 1.10	m^3	2.47
		1	7.10 x 0.75 x 0.25	m^3	1.86
(d)	Excavation for laying of P.V.C. pipe &				
	Filling after laying of P.V.C. pipe				
		1	4.35 x 2.00 x 0.80	m^3	6.96
		1	1.35 x 0.90 x 2.00/2	m^3	1.21
		1	3.00 x 2.00 x 0.90	m^3	5.40
	Tota	<u>l</u>		<u>m³</u>	25.84
2.	C.C. in 1:3:6 setting pit	1	1.00 x 1.50 x 0.20	<u>m³</u>	0.30
	Filtering pit filter zone	1	1.50 x 1.50 x 0.30	m^3	0.67
	Drain - Filter Zone	1	7.00 x 0.75 x 0.10	m^3	0.52
	Tota	l		m ³	1.49
3.	Brick Work 1:4				
(a)	Setting pit Long Wall	4	1.05 x 0.55 x 0.10/2		0.11
		2	1.50 x 0.62 x 0.05		0.09
	Setting pit Short Wall	4	0.55 x 0.55 x 0.10/2		0.06
		2	1.00 x 0.62 x 0.05		0.06
(b)	Filtering pit	8	1.85 x 1.62 x 0.05/2		0.60
		2	1.50 x 1.62 x 0.05		0.24
	Tota	1		m ³	1.16
4.	Plaster Work 1:2				
	Drain-Bottom	1	7.00 x 0.25	m^2	1.75
	Drain-Side	2	7.00 x 0.25	m^2	3.50
	Selting Base	1	1.50 x 1.00	m^2	1.50

DETAILS OF MEASUREMENT (DUG WELLS RECHARGING)

	Filtering Base	1	1.50 x 1.50	m^2	2.25
	Tota	m ²	9.00		
5.	Supply & Fixing of 110 mm P.V.C.	1	6.00	m	6.00
	Pipe				
6.	Slotted Cap of 110 mm P.V.C.	1	-	No.	1.00
7.	P.V.C. Bend 110 mm	1	-	No.	1.00
8.	P.V.C. coupler 110 mm	1 x 2	-	No.	2.00
9.	Mesh ss S/F between	1 x 2	-	Job	2.00
10.	S/O Stone sign board	1	-	Job	1.00
11.	Filter Material of 20-40 mm blast	1	1.50 x 1.50 0.80	m ³	1.80
12.	Slotted pipe P.V.C.110 mm	1	1 x 1	m	1.00

ABSTRACT OF COST HARD ROCK W/O JAGAT

S.No.	Name of Work	Quantity	Unit	Rate	Amount
1.	Earth Work	25.84	m ³	36.36	947.29
2.	C.C.W Work in 1:3:6	1.49	m ³	2766.00	4121.34
3.	Brick Work	1.16	m ³	4000.00	4640.00
4.	Plaster Work in 1:2	9.00	m ³	81.98	737.80
5.	S/F of 110 mm P.V.C. Pipe	6.00	R.M.	150.00	900.00
6.	Slotted Cap 110 mm P.V.C.	1	No.	150.00	150.00
7.	P.V.C. Bend 110 mm	1	No.	130.00	130.00
8.	P.V.C. Coupler 110 mm	2	No.	100.00	200.00
9.	Mesh ss S/F between	2	Job	100.00	200.00
10.	S/O Fixing of Sign Board	1	Job	1850.00	1850.00
11.	Filter Material of 20-40 mm blast	1.8	m ³	855.00	1539.00
12.	Slotted Pipe P.V.C.110 mm	1	R.M.	250.00	250.00
		Rs. 15,665.43			
		Rs. 15,700.00 only			
DRAWING OF SPILLWAY OF CREST LENGTH 0.5 m



DESIGN OF DROP SPILLWAY FOR 1.00 HA CATCHMENT AREA

Design of Drop Spillway to be constructed at a place in a gully having width of 1.0 m and catchment area 1.00 Ha and net drop 0.50 m taking rainfall intensity for duration equal to time of concentration of watershed and design return period 25 years, as 120 mm/hr. The coefficient of runoff for the watershed is 0.3.

1. <u>Hydrologic Design</u>: The design peak runoff rate (m^3/s) for the watershed from Rational Formula is given as :

$$Q = C.I.A. = 0.3 \times 120 \times 1.00 = 36/360 = 0.10 \text{ cum/second}$$

360 360

2. <u>Hydraulic Design :-</u> The maximum discharge capacity of the rectangular weir given by -

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

To find suitable value of L & H

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

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

Test: L/H = 0.50 = $2.0 \ge 2.0$ hence O.K. 0.25h / f = 0.25 = $0.50 \le 0.5$ hence O.K. 0.50

3. <u>Structural Design :</u>

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

 $E = 3 \ge 0.5 + 0.6$ or $1.5 \ge 0.50$

E = 2.10 m or 0.75 m

Adopted 2.10 m

- 2. Length of apron basin $L_B = f (2.20 \text{ h/f} + 0.54) = 0.50 (2.20 \text{ x } 0.5 + 0.54)$ = 0.50 x 2.74 = 1.37 m says 1.40 m
- 3. Height of end sill, S = h / 3 = 0.50 / 3 = 0.16 m says 0.20 m

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

 $J = 2h \text{ or } [f + h + S - (L_B + 0.10)/2] \text{ whichever is greater}$ = 2 x 0.50 or [0.50 + 0.50 + 0.16 - (1.37 + 0.10)/2] = 1.0 or [1.16 - 0.735] = 1.0 or 0.425 Adopt J = 1.00 m

5.
$$M = 2 (f + 1.33 h - J) = 2 (0.50 + 1.33 x 0.25 - 1.00)$$
$$= 2 x (-0.167) = -0.335 m$$

6.
$$K = (L_{B} + 0.1) - M = (1.37 + 0.1) - 0.335$$
$$= 1.47 - 0.335$$
$$= 1.135 m$$

Toe and cut off walls
Normal scour Depth (N S D) = 0.473 x (Q / f)1/3
$$= 0.473 x (0.1 / 1)1/3$$
$$= 0.473 x 0.464$$
$$= 0.219$$

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

Depth of cutoff / Toe Wall

Apron thickness : For an over fall of 0.5 m. The Apron thickness in concr4ete construction is 0.20m since the structure is constructed in masonry; the Apron thickness will be 0.20 x 1.50 = 0.30m

Says 0.35 m

= 0.35 m

 $= 1.5 \times 0.219$

= 0.328 m

Wall thickness	The thickness	of different wa	all of the structure ((masonry constru	ction) is given be	elow:
				\	/ .	

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

DETAIL ESTIMATE OF DROP SPILLWAY OF CREST LENGTH 0.5 METRE

1. <u>Earth work in cutting in foundation:</u>

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

2. Laying of sand in the bed of foundation:

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

3. <u>C.C.W. 1:3:6 in foundation</u>

S. No.	Description of work	No.	L	B	D/H	Quantity
1	Cut off wall	1	4.7	0.80	0.15	0.564
2	Head wall	1	0.50	0.40	0.15	0.030
3	Side wall	2	1.50	1.00	0.15	0.450
4	Wing wall	2	1.15	0.80	0.15	0.276
5	Toe wall	1	0.50	0.80	0.15	0.066
6	Apron	1	0.50	1.50	0.15	0.112
	Total					1.492 cum

4. <u>Brick masonry 1:4</u>

S. No.	Description of work	No.	L	В	D/H	Quantity
1	Cut off wall	1	4.70	0.80	0.45	1.692
		1	4.70	0.60	0.45	1.269
2	Head wall	1	0.50	1.10	0.45	0.247
		1	0.50	1.00	0.45	0.225
		1	0.50	(0.40+1.00)/2	0.60	0.180
3	Head wall extension	2	2.10	0.80	0.45	1.512
		2	2.10	0.60	0.45	1.134
		2	2.10	0.60	0.60	1.512
		2	2.10	0.40	0.70	1.176
4	Side wall	2	1.50	1.00	0.45	1.350
		2	1.50	0.80	0.45	1.080
		2	1.50	0.80	0.60	1.440
		2	1.50	0.60	0.40	0.720
		2	(0.35+1.50)/2	0.40	0.30	0.222
5	Wing wall	2	1.15	0.80	0.45	0.828
		2	1.15	0.60	0.45	0.621
		2	1.15	0.40	(1.00+0)/2	0.460
6	Toe wall	1	0.50	0.80	0.45	0.180
		1	0.50	0.60	0.45	0.135
		1	0.50	0.40	0.20	0.040
			Total			16.360 cum

5. <u>C.C.W. 1:2:4 on the wall:</u>

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

6. <u>Raised Pointing 1:3</u>

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

CONSUMPTION OF MATRIALS

S. No.	Particulars	Quantity	Cement	Coarse Sand	Bricks (NOS.)	G.S.B 25-40	G.S. Grit 10-20
			(Bags)	(cum)		mm (cum)	mm (cum)
1	Sand laying	0.995 cum	-	0.995	-	-	-
2	C.C.W. 1:3:6	1.492 cum	6.41	0.671	-	1.342	-
3	Brick Masonry	16.360 cum	29.44	4.417	75.25	-	-
4	C.C.W. 1:2:4	0.130 cum	0.79	0.054	-	-	0.110
5	Raised Pointing 1:3	9.62 m^2	0.44	0.045	-	-	-
Total			37.08	6.182	75.25	1.342	0.110
	Say		37				

COST OF MATRIALS

S. No.	Name of materials	Quantity	Rate	Amount		
1	Cement	37 Bags	255.00/Bag	9435.00		
2	Coarse sand	6.182 cum	910.00/cum	5625.62		
3	Bricks	75.25	4.50/	3.476.25		
4	G.S.B. 25-40 mm	1.342 cum	855.00/cum	1147.41		
5	Grit 10-20 mm	0.110	1250.00/cum	137.50		
	Total					

LABOUR CHARGE

S. No.	Particulars	Quantity	Rate	Amount
1	Earth Work	13.23 cum	36.66/cum	485.01
2	Sand Laying	0.995 cum	33.33/cum	33.16
3	C.C.W. 1:3:6	1.492 cum	494/cum	737.04
4	Brick masonry	16.36 cum	370/cum	6053.20
5	C.C.W 1:2:4	0.130 cum	494/cum	64.22
6	Raised Pointing	9.62 m^2	51.61/m ²	496.48
7	Curing	13.36 cum	25.00/cum	409.00
8	Chowkidar	6 Man Days	100.00/Man Day	600.00
9	Head load & local transportation cost 10% cost of material	-	-	4682.17
	Total			13560.28

S.No.	Total Expenditure				
1	Cost of materials	46821.78			
2	Labour Charges	13560.28			
	Total	60382.06			
		Say Rs. 60400.00			

DRAWING OF SPILLWAY OF CREST LENGTH 1.0 m





DESIGN OF DROP SPILLWAY FOR 5.00 HA CATCHMENT AREA

Design of spillway to be constructed at a place in a gully having width of 2.0 m and catchment area 5.0 ha net drop 1.0m. Taking rainfall intensity for duration equal to time of concentration of watershed and design return period of 25 years, as 120mm/hr. The coefficient of runoff for the watershed is 0.3.

1. <u>Hydrologic design</u> - The design peak runoff rate (m^3/s) for the watershed from Rational Formula is given as:

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

2. <u>Hydraulic design</u> - The maximum discharge capacity of the rectangular weir given by

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

To find suitable value of L & H

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

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

L H^{3/2} = 1.20 X 0.5 / 1.711 = 0.350 H^{3/2} = 0.375 / 1.711 X 4 H = $(0.350)^{2/3}$ = 0.49 m says 0.50 m Test L / h = 1.00 / 0.50 = 2.00 > 2.0 hence O.K.

 $h/f = 0.50 / 1.00 = 0.5 \le 5$ hence O.K.

Hence the designed hydraulic dimensions of the spillway are:

Crest Length (L) = 1.00 mWeir depth (h) = 0.50 m

3. <u>Structural design -</u>

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

Е	=	3 x 0.50 + 0.60	or	1.5 x 1
Е	=	(1.5 + 0.60)	or	21.50 m
	=	2.10 or 1.50		

2- Length of apron basin $L_8 = f (2.28 \text{ h} / f + 0.54) = 1 (2.28 \text{ x} 0.50 / 1.0 + 0.54)$

= 1.14 + 0.54 = 1.68 m

3- Height of end sill, S h/3 =0.50/3 0.16 m = = 4- Height of wing wall and side wall at junction: $J = 2h \text{ or } [f + h + S - (L_B) + 0.10)/2]$ whichever is greater $= 2 \times 0.50 \text{ or } [1.0+0.50+0.16 - (1.68 + 0.10)/2]$ = 1.0 or [1.66 - 0.89]= 1.00 or 0.77adopt J = 1.00 m**5-** M = 2(f + 1.33 h - J) = 2 (1.0 + 1.33 x 0.50 - 1.00) = 2 (1.665 - 1.00) = 1.33 m**6-** K = (L_B + 0.1) - M = (1.68 + 0.1) - 1.33 = 0.45 mToe and cut off walls $0.473 \text{ x} (\text{Q/f})^{1/3}$ Normal scour depth (N S D) =

 $= 0.473 \text{ x } (0.5/1.0)^{1/3} \text{ taking f} = 1$ = 0.473 x (0.5/1.00)^{1/3} = 0.473 x 0.793 = 0.375 m Maximum Scour depth (M S D) = 1.5 x N S D = 1.5 x 0.375

120

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

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

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

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

DETAIL ESTIMATE OF DROP SPILLWAY CREST LENGTH 1.00 meter

1. Earth work in cutting:

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

2. Laying of sand in the bed & foundation:

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

3. <u>C.C.W. 1:3:6 in foundation:</u>

S. No.	Description of work	No.	L	В	D/H	Quantity
1	Side wall	2	1.70	1.00	0.15	0.510
2	Head wall	1	1.00	0.40	0.15	0.060
3	head wall extension	2	2.10	0.80	0.15	0.378
4	Toe wall	1	1.00	0.80	0.15	0.120
5	Cut off wall	1	5.20	0.80	0.15	0.624
6	Apron	1	1.60	1.00	0.10	0.160
7	Wing wall	2	1.30	0.80	0.15	0.312
	2.164 cum					

4. Brick masonry

S. No.	Description of work	No.	L	В	D/H	Quantity	
1	Cut off wall	1	5.20	0.60	0.60	1.872	
2	Head wall	1	1.00	1.00	0.90	0.900	
		1	1.00	(0.40 + 1.00)/2	1.00	0.700	
3	Side wall	2	1.70	1.00	0.45	1.530	
		2	1.70	0.80	0.45	0.918	
		2	1.70	0.80	0.60	1.020	
		2	1.70	0.60	0.40	0.544	
		2	(1.70+0.45)/2	0.40	0.50	0.430	
4	Head wall extension	2	2.10	0.80	0.65	2.184	
		2	2.10	0.60	0.45	1.134	
		2	2.10	0.40	1.30	2.184	
5	Wing wall	2	1.30	0.80	0.45	0.936	
		2	1.30	0.60	0.45	0.702	
		2	1.30	0.40	(1.00+0)/2	0.520	
6	Toe wall	1	1.00	0.80	0.45	0.360	
		1	1.00	0.60	0.45	0.270	
7	Apron	1	1.70	1.00	0.45	0.765	
8	Longitudinal sill	2	1.70.	0.20	0.20	0.136	
9	Transverse sill	1	1.00	0.20	0.20	0.040	
Total							

5. <u>C.C.W. 1:2:4 on the wall and Apron:</u>

S. No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1	1.00	0.40	0.025	0.010
2	Side wall	2	0.45	0.40	0.025	0.009
		2	1.35	0.40	0.025	0.027
3	Head wall extension	2	2.10	0.40	0.025	0.042
4	Wing wall	2	1.60	0.40	0.025	0.032
5	Longitudinal sill	2	1.70	0.20	0.025	0.017
6	Transverse sill	1	1.00	0.20	0.025	0.005
7	Apron	3	1.60	0.20	0.0258	0.024
	0.166 cum					

6. Raised Pointing 1:3

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

CONSUMPTION OF MATERIALS

S. No.	Particulars	Quantity	Cement	Sand	Brick	G.S. Grit 25-40	Grit 10-20 mm
			(Bags)	(cum)	(No.)	mm (cum)	(cum)
1	Sand laying	1.580	-	1.580	-	-	-
		cum					
2	C.C.W. 1:3:6	2.164	9.95	0.973	-	1.947	-
		cum					
3	Brick	17.145	30.86	4.629	7887	-	-
		cum					
4	C.C.W. 1:2:4	0.166	1.01	0.069	-	-	0.141
		cum					
5	Raised Pointing 1:3	12.13 ²	0.55	0.057	-	-	-
	Total		42.47	7.308	7887	1.947	0.141
	Say		42	7.31	7890	1.95 cum	0.14 cum

COST OF MATERIALS

S.No.	Name of materials	Quantity	Rate	Amount
1	Cement	42 Bags	255.00	10710.00
2	Course sand	731 cum	910.00	6652.10
3	Bricks	7890 cum	4050/thousand	31954.50
4	G.S.B. 25-40 mm	1.95 cum	855.00	1667.25
5	G.S. Grit 10-20 mm	0.14 cum	1250.00	175.00
	Rs. 51158.85			

LABOUR CHARGE

S.No.	Particulars	Quantity	Rate	Amount
1	Earth work	15.60 cum	36.66/cum	571.89
2	Sand Laying	1.580 cum	33.33/cum	52.66
3	C.C.W. 1:3:6	2.164 cum	494/cum	1069.01
4	C.C.W. 1:2:4	0.166 cum	494/cum	82.00
5	Brick Masonry	17.145 cum	370/cum	6343.65
6	Raised Pointing	12.13 m^2	51.61/m ²	626.02
7	Curing	17.145 cum	25.00/cum	428.62
8	Chowkidar	6 Man Days	100.00/Man Day	600.00
9	Head load & local transportation 10% cost of materials	-	-	5115.88
	Total			Rs. 14889.73

Total Expenditure					
1. Cost of Matrial	51158.85				
2. Labour Charges	14889.73				
Total	Rs. 66048.58				
Say Rs. 66050.00					

DRAWING OF SPILLWAY OF CREST LENGTH 2.0 m



All Dimensions in Metre

DESIGN OF DROP SPILLWAY FOR 2.00 HA CATCHMENT AREA

Design of Drop Spill way to be constructed at a place in a gully having width of 3-0 m and catchment area 20.00 ha net drop 1-5 m taking rainfall intensity for duration equal to time of concentration of watershed and design return period of 25 years, as 120mm/hr. The coefficient of runoff for the watershed is 0.3.

1. <u>Hydrologic design</u> - The design peak runoff rate (m³/s) for the watershed from Rational formula is given as:

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

2. <u>Hydraulic design</u> - The maximum discharge capacity of the rectangular weir given by

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

To find suitable value of L & H

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

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

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

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

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

Test: L/h = 2.00 / 0.75 = 2.666 \ge 2.0 hence O.K.

h / f = 0.75 / 1.50 = $0.50 \le 0.50$ hence O.K.

Hence the designed hydraulic dimensions of the Spillway are:

Crest Length (L) = 2.00 m

Weir depth (h) = 0.81 m

3- Structural design -

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

 $E = 3 \times 0.81 + 0.6 \text{ or } 1.5 \times 1.50$ E = 3.03 m or 2.25 Adopted 3.03 m 2- Length of apron basin $L_8 = f (2.28 \text{ h} / f + 0.54) = 1.58 (2.28 \times 0.8 / 1.5 + 0.54)$

= 1.50 (1.20 + 0.54) = 2.61 m

3- Height of end sill, S = h / 3 = 0.81 / 3 = 0.27m

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

 $J = 2h \text{ or } [f + h + S - (L_B + 0.10)/2]$ whichever is greater $= 2x \ 0.81 \text{ or } [1.50 + 0.81 + 0.27 - (2.61 + 0.10)/2]$ = 1.62 or [2.58 - 1.35] = 1.62 or 0.123adopt J = 1.62 m0 (1 50 1 00 0 01 1 00 m

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

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

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

Toe and cut off walls

Normal scour depth (N S D) = $0.473 \times (Q/f)^{1/3}$ $= 0.473 \text{ x} (2/1)^{1/3}$ = 0.473 x 1.2590.595 m Maximum Scour depth (M S D) = $1.5 \times N S D$

> $= 1.5 \times 0.595$ = 0.89 m

Depth of cutoff/Toe wall = 0.89 m Apron thickness: For as over fall of 1.5m is concrete construction is 0.30 m since the structure is constructed in masonry, the Apron thickness will be $0.30 \times 1.50 = 0.45$ m

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

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

DETAIL ESTIMATE OF DROP SPILLWAY OF CREST LENGTH 2.00 METRE

1. Earth work in cutting in foundation:

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

2. Laying of sand in the bed of foundation:

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

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

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Cut-off wall	1	8.10	0.90	0.15	1.093
2	Side Wall	2	2.65	1.20	0.15	0.954
3	Head Wall	1	2.00	0.70	0.15	0.210
4	Head wall Extension	2	3.05	0.10	0.15	0.091
5	Wing wall	2	1.95	0.90	0.15	0.526
6	Toe wall	1	2.00	0.90	0.15	0.270
7	Apron	1	2.00	2.65	0.15	0.795
Total						3.939 cum

4. Brick masonry 1:4

S.No.	Description of work	No.	L	В	D/H	Quantity
1	Cut off wall	1	8.10	0.90	0.90	6.561
2	Head wall	1	2.00	1.60.	0.45	1.440
		1	2.00	1.50	0.45	1.350
		1	2.00	(0.45 + 1.40)/2	0.85	1.527
3	Head wall extension	2	3.30	0.90	0.45	2.673
		2	3.30	0.80	0.45	2.376
		2	3.30	0.60	0.60	2.376
		2	3.30	0.50	0.60	1.980
		2	3.30	0.40	1.15	3.036
4	Side wall	2	2.65	1.10	0.90	5.247
		2	2.65	1.10	0.45	2.623
		2	2.65	1.00	0.65	3.789
		2	2.65	0.80	0.60	2.544
		2	2.65	0.60	0.45	1.431
		2	(0.80+2.65)/2	0.50	0.70	1.207
5	Wing wall	2	1.90	0.90	0.45	1.539
		2	1.90	0.80	0.45	1.368
		2	1.90	0.60	(1.65+0)/2	1.881
6	Toe wall	1	2.00	0.90	0.45	0.810
		1	2.00	0.80	0.45	0.720
		1	2.00	0.40	0.30	0.240
7	Longitudinal sill	2	2.65	0.20	0.30	0.318
8	Apron	2	2.65	2.00	0.45	4.770
Total						

5. <u>C.C.W. 1:2:4 on the wall:</u>

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

6. Raised Pointing 1:3

S.No.	Description of work	No.	L	B	D/H	Quantity
1	Head wall	1	2.00	-	0.85	1.70
		1	2.00	-	1.27	2.54
2	Side wall	1	2.65	-	1.65	4.37
		1	(0.80+2.65)/2	-		1.20
3	Head wall extension	2	3.30	-	0.70	9.90
4	Wing wall	2	1.90	-	(1.665+0)/2	3.13
Total						22.84m ²

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement	Coarse	Brick	G.S.B 25-40	G. S. Grit 10-
			(Bags)	Sand (cum)	(No.)	mm (cum)	250 mm (cum)
1	Sand laying	2.627 cum	-	2.627	-	-	-
2	C.C.W. 1:3:6	3.939 cum	16.93	1.772	-	3.545	-
3	Brick Masonry 1:4	51.806 cum	93.25	13.987	23830	-	-
4	C.C.W. 1:2:4	0.294 cum	1.79	0.123	-	-	0.249
5	Raised Pointing 1:3	22.84 m ²	1.05	0.107	-	-	-
	Total	•	113.02	18.616	23830	3.545	0.249
	Say		113 Bags	18.616	23830	3.55 cum	0.250 cum

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1	Earth work	38.95 cum	36.66/cum	1427.90
2	Sand Laying	2.627 cum	33.33/cum	87.55
3	C.C.W. 1:3:6	3.939 cum	494/cum	1945.86
4	C.C.W. 1:2:4	0.2939 cum	494/cum	145.18
5	Brick	51.806 cum	370/cum	19168.22
6	Raised Pointing	22.84 m^2	51.61/m ²	1178.77
7	Curing	51.806 cum	25.00/cum	1295.15
8	Chowkidar	13 Man Days	100.00/Man Day	1300.00
9	Head load & local transportation cost 10% cost of material	-	-	14561.48
	Rs. 41010.11			

LABOUR CHARGE

S.No.	Name of Materials	Quantity	Rate	Amount
1	Cement	113 Bags	255.00/bags	28815.00
2	Coarse sand	18.616 cum	910.00/cum	16940.56
3	Bricks	23.830 cum	4050/thousand	96511.50
4	G.S.B. 25-40 mm	3.55 cum	855.00/cum	3.35.25
5	G.S. Grit 10-20 mm	0.250 cum	1250.00/cum	312.50
	Το	Rs. 1,45,614.81		

TOTAL EXPENDITURE					
1. Cost of Material	145614.81				
2. Labour Charges	41010.11				
Total Rs. 1,86,624.92					
Say Rs. 1,86,650.00					

DRAWING OF SPILLWAY OF CREST LENGTH 3.0 m



All Dimensions in Metre

DESIGN OF DROP SPILLWAY FOR 30.00 HA CATCHMENT AREA

Design of Drop spillway to be constructed at a place in a gully having width of 4.0 m and catchment area 30 ha net drop 1.5m 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. <u>Hydrologic design</u> - The design peak runoff rate (M^3/s) for the watershed from Rational formula is given as :

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

2. <u>Hydraulic design</u> - The maximum discharge capacity of the rectangular weir given by

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

To find suitable value of L & H

Let us assume L = 3.0 m (since width of gulley is 4.00 m) $3.0 = 1.711 \text{ L H}^{3/2} / (1.1+0.01 \text{ x } 1.5) = 1.711 \text{ L H}^{3/2} / (1.1+0.15)$ $L \text{ H}^{3/2} = 3.00 \text{ x } 1.25 / 1.711$ $\text{H}^{3/2} = 3.75 / 1.711 \text{ x } 3 = 0.73$ $\text{H} = (0.73)^{2/3} = 0.80 \text{ m}$

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

h / f = $0.80 / 1.50 = 0.53 \le$ 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 x 0.80 + 0.6 or 1.5 x 1.50 E = 3.0 m or 2.25 m

Head wall extension = 3.0 m

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

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

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

3- Height of end sill, S = h / 3 = 0.80 / 3 = 0.26 m

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

 $J = 2h \text{ or } [f + h + S - (L_B + 0.10)/2]$ whichever is greater $= 2 \times 0.80 \text{ or } [1.50 + 0.80 + 0.26 - (2.63 + 0.10)/2]$ = 1.6 or [2.56 - 1.365]= 1.6 or 1.195 adopt J = 1.60 m $5 - M = 2(f + 1.33h - J) = 2(1.50 + 1.33 \times 0.80 - 1.60) = 2(2.564 - 1.60)$ = 1.928 m6- K = $(L_B + 0.1)$ - M = (2.63 + 0.1) - 1.93 = 0.80 mToe and cut off walls Normal scour depth (N S D) = $0.473 \text{ x} (\text{Q/f})^{1/3}$ $= 0.473 \text{ x} (3/1)^{1/3}$ = 0.473 x 1.442= 0.68 mMaximum Scour depth (M S D) = $1.5 \times N S D$ $= 1.5 \ge 0.68$ = 1.02 mDepth 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		

DETAIL ESTIMATE OF DROP SPILLWAY OF CREST LENGTH 3.00 METRE

1. Earth work in cutting in foundation

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

2. Laying of sand in the bed of foundation:

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

3. <u>C. C. W. 1:3:6 in foundation:</u>

S.No.	Description of work	No.	L	В	D/H	Quantity		
1	Cut off wall	1	9.00	1.00	0.15	1.35		
2	Head well	1	2.00	0.60	0.15	0.27		
2	Head wall	1	5.00	0.00	0.15	0.27		
3	Side wall	2	3.40	1.00	0.15	1.02		
4	Wing wall	2	1.80	1.00	0.15	0.54		
5	Toe wall	1	3.00	0.80	0.15	0.36		
6	Apron	1	3.00	2.65	0.15	1.192		
Tatal								
10041								

4. Brick Masonry 1:4

S.No.	Description of work	No.	L	В	D/H	Quantity
1	Cut off wall	1	9.00	1.00	0.90	8.100
2	Head wall	1	3.00	1.50	0.90	4.050
		1	3.00	(1.50 + 0.50)/2	1.50	4.500
3	Head wall extension	2	3.00	0.80	0.45	2.160
		2	3.00	0.60	0.45	1.620
		2	3.00	0.60	0.60	2.160
		2	3.00	0.50	0.60	1.800
		2	3.00	0.40	1.30	3.120
4	Side wall	2	3.40	1.00	0.45	3.060
		2	3.60	0.80	0.45	2.592
		2	3.80	0.60	0.60	2.736
		2	3.90	0.50	1.00	3.900
		2	(4.00+1.40)/2	0.40	1.50	3.240
5	Wing wall	2	1.80	1.00	0.45	1.620
		2	1.80	0.80	0.45	1.296
		2	1.80	0.50	(1.60+0)/2	1.440

6	Toe wall	1	3.00	0.80	0.45	1.080
		1	3.00	0.60	0.45	0.810
		1	3.00	0.40	0.30	0.360
7	Apron	1	3.00	2.65	0.45	3.577
8	Longitudinal sill	2	2.60	0.20	0.45	0.468
					Total	53.689 cum

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

S.No.	Description of work	No.	L	В	D/H	Quantity		
1	Head wall	1	3.00	0.50	0.025	0.037		
1		1	5.00	0.50	0.025	0.037		
2	Side wall	2	1.40	0.40	0.025	0.028		
		2	3.00	0.40	0.025	0.060		
3	Head wall extension	2	3.00	0.40	0.025	0.060		
5		2	5.00	0.40	0.025	0.000		
4	Wing wall	2	2.40	0.50	0.025	0.060		
5	Longitudinal sill	2	2.65	0.20	0.025	0.026		
6	Apron	3	2.65	0.86	0.025	0.170		
Total								

6. Raised Pointing 1:3

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

COST OF MATERIALS

S.No.	Particulars	Quantity	Cement	Sand	Brick	G.S.B 25-40	G.S. Grit 10-20
			(Bags)	(cum)	(No.)	mm (cum)	mm (cum)
1	Sand laying	3.155 cum	-	3.155	-	-	-
2	C.C.W 1:3:6	4.732 cum	20.34	2.129	-	4.258	-
3	C.C.W. 1:2:4	0.411 cum	2.69	0.185	-	-	0.374
4	B/M 1:4	53.689 cum	96.64	14.496	24697	-	-
5	Raised Pointing 1:3	39.86 m ²	1.83	0.187	-	-	-
	Total		121.50	20.152	24697	4.258	0.374
	Say		122	2015	24700	4.26	0.374

LABOURCHARGE

S.No.	Name of materials	Quantity	Rate	Amount
1	Cement	122 Bags	255.00/bag	31110.00
2	Coarse Sand	20.15	910.00/cum	18336.50
3	Bricks	24700	4050/thousand	100035.00
4	G.S.B. 25 - 40 mm	4.26	855.00/cum	3633.75
5	Grit 10-20 mm	0.374	1250.00/cum	467.50
	То	tal 152		1,53,582.75

S.No.	Particulars	Quantity	Rate	Amount		
1	Earth Work	46.12 cum	36.66/cum	1690.75		
2	Sand Laying	3.155 cum	33.33/cum	105.15		
3	C.C.W. 1:3:6	4.732 cum	494/cum	2337.60		
4	C.C.W. 1:2:4	1.441 cum	494/cum	217.85		
5	B/M	53.689 cum	370/cum	19864.93		
6	Raised Pointing	39.86 m ²	51.61/m ²	2057.17		
7	Curing	53.689 cum	25.00/cum	1342.22		
8	Chowkidar	13 Man Days	100.00/Man Day	1300.00		
9	Head load & local transportation cost 10% cost of material	-	-	15358.27		
Total						

Total Expenditure				
1. Cost of materials	153582.75			
2. Labour Charges	44273.94			
Total	Rs. 1,97,856.69			
Say Rs. 1,97,900.00				

DRAWING OF SPILLWAY OF CREST LENGTH 4.0 m



All Dimensions in Metre

DESIGN OF DROP SPILLWAY FOR 50.00 HA CATCHMENT AREA

Design of drop Spillway to be constructed at a place in a gully having width of 5.0 m and catchment area 50.00 ha and net drop 2.0m Taking rainfall intensity for duration equal to time of concentration of watershed and design return period of 25 years, as 120mm/hr. The coefficient of runoff for the watershed is 0.3.

1. <u>Hydrologic design</u> - The design peak runoff rate (m^3/s) for the watershed from rational formula is given as:

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

2. <u>Hydraulic design</u> - the maximum discharge capacity of the rectangular weir given by

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

To find suitable value of land L and H

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

 $5 = 1.711 \text{ x } 4.0 \text{ x } \text{h}^{3/2} / (1.10 + 0.01 \text{ x } 2)$ $\text{h}^{3/2} = 5.0 \text{ x } 1.12 / 6.844 = 5.60 / 6.844 = 0.818$ $\text{h} = (0.818)^{2/3}$

h = 0.874 m says 0.90 m

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

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

Hence the designed hydraulic dimensions of the Spillway are:

Crest Length (L) = 4.0 mWeir depth (h) = 0.90 m

3- Structural design -

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

E = 3 x 0.9 +0.6 = 3.3 or 1.5 x 2 = 3.00 m E = 3.30 m

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

 $= 2(0.99 + 0.54) = 2 \times 1.536 = 3.06 \text{ m Says 3.10}$

3- Height of end sill, S = h / 3 = 0.9 / 3 = 0.3 m

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

 $J = 2h \text{ or } [f + h + s - (L_B + 0.10)/2]$ whichever is greater $= 2 \times 0.9 \text{ or } [2 + 0.9 + 0.30 - (3.06 + 0.10)/2]$ = 1.8 or [3.20 - 1.58]= 1.8 or 1.62 Hence adopt J = 1.8 m $= 2(2 + 1.33 \times 0.9 - 1.8)$ 5 - M = 2(f + 1.33h - J)= 2x 1.397 = 2.794 Says 2.80 m 6- K= (L_B + 0.1) - M = (3.06 + 0.1) - 2.80= 0.36 mToe and cut off walls Normal scour depth (N S D) = $0.473 \text{ x} (\text{Q/f})^{1/3}$ $= 0.473 \text{ x} (5/1)^{1/3}$ = 0.473 x 1.7099 = 0.808Maximum Scour depth (M S D) = 1.54 x N S D $= 1.5 \times 808$ = 1.212Says 1.21 m Depth of cutoff/Toe wall = 1.21 m

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

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

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

DETAIL ESTIMATE OF DROP SPILLWAY OF CREST LENGTH 4.00 METRE

<u>1. Earth work in cutting in foundation:</u>

S.No.	Description of work	No.	L	В	D/H	Quantity
1	Side wall	2	3.20	1.20	1.15	8.32
2	Head wall	1	4.00	1.60	1.15	7.36
3	Head wall extension	2	3.30	1.00	1.15	7.59
4	Wing wall	2	2.20	1.00	1.15	5.06
5	Toe wall	1	4.00	1.00	1.15	4.60
6	Cut off wall	1	10.60	1.00	1.15	12.19
7	Apron	1	4.00	3.20	0.70	8.96
Total						54.08 cum

2. Laying of sand in the bed of foundation

S.No.	Description of work	No.	L	В	D/H	Quantity
1	Side wall	2	3.20	1.20	0.10	0.768
2	Cut off wall	1	10.60	0.90	0.10	0.954
3	Head wall	1	4.00	0.60	0.10	0.240
4	Head wall Extension	2	3.30	0.40	0.10	0.264
5	Wing wall	2	2.20	0.90	0.10	0.396
6	Toe wall	1	4.00	0.90	0.10	0.360
7	Apron	1	4.00	3.20	0.10	1.280
Total						4.262 cum

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

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

4. Brick masonry 1:4

S.No.	Description	No.	L	B	D/H	Quantity
1	Cut off wall	1	10.60	0.90	0.90	8.586
2	Head wall	1	4.00	1.40	0.90	5.040
		1	4.00	(0.50+1.40)/2	1.00	3.800
3	Head wall extension	2	3.30	0.90	0.45	2.673
		2	3.30	0.80	0.45	2.376
		2	3.30	0.60	0.60	2.376
		2	3.30	0.50	0.60	1.980
		2	3.30	0.40	1.20	3.168
4	Side wall	2	3.20	1.20	0.45	3.456
		2	3.20	1.00	0.45	2.790
		2	3.20	0.80	0.60	3.072
		2	3.20	0.60	0.60	2.304
		2	3.20	0.50	0.60	1.920
		2	(0.40+3.20)/2	0.40	0.60	0.768
5	Wing wall	2	2.20	0.80	0.45	1.584
		2	2.20	0.60	0.45	1.188
		2	2.20	0.50	(1.80+0)/2	1.980
6	Toe wall	1	4.00	0.80	0.60	1.920
		1	4.00	0.60	0.60	1.440
		1	4.00	0.40	0.30	0.480
7	Longitudinal sill	2	3.20	0.20	0.30	0.384
8	Apron	1	4.00	3.20	0.45	5.760
	59.045 cum					

S.No.	Description of work	No.	L	В	D/H	Quantity
1	Head wall	1	4.00	0.50	0.025	0.050
2	Side wall	2	0.40	0.40	0.025.	0.008
		2	2.86	0.40	0.025	0.057
3	Head wall extension	2	3.30	0.40	0.025	0.066
4	Wing wall	2	2.84	0.50	0.025	0.071
5	Longitudinal sill	2	3.20	0.20	0.025	0.032
6	Apron	3	3.20	1.20	0.025	0.192
7	Toe wall	1	4.00	0.40	0.025	0.040
Total						

6. Raised Pointing 1:3

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

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement	Coarse	Brick (No)	G.S.B. 25-	G.S. Grit
			(Bags)	Sand (cum)		40 mm	10-20 mm
						(cum)	(cum)
1	Sand laying	4.262 cum	-	4.262	-	-	_
2	C.C.W. 1:3:6	6.393 cum	27.48	2.876	-	5.75	-
3	C.C.W. 1:2:4	0.445 cum	2.71	0.186	-	-	0.378
4	Brick Masonry 1:4	59.045 cum	106.28	15.942	27160	-	-
5	Raised Pointing 1:3	35.120 m ²	1.61	0.165	-	-	-
	Total		138.08	23.431	27160	5.75	0.378
	Say		138	23.431	27160	5.75 cum	0.38 cum

COST OF MATERIALS

S.No.	Name of materials	Quantity	Rate	Amount
1	Cement	138 Bags	255.00/bag	35190.00
2	Coarse sand	23.431	910.00/cum	21322.21
3	Bricks	27160	4050/thousand	109998.00
4	G.S.B 25-40 mm	5.75 cum	855.00/cum	4916.25
5	G.S> Grit 10-20 mm	0.38	1250.00/cum	475.00
		Total		Rs. 171901.46

LABOUR CHARGE

S.No.	Particulars	Quantity	Rate	Amount
1	Earth Work	54.08 cum	36.66/cum	1982.57
2	Sand laying	4.262 cum	33.33/cum	142.05
3	C.C.W. 1:3:6	6.393 cum	494/cum	3158.14
4	C.C.W. 1:2:4	0.445 cum	494/cum	219.83
5	Brick masonry	59.045 cum	370/cum	21846.65
6	Raised Pointing	35.12 m ²	51.61/m ²	1812.54
7	Curing	59.045 cum	25.00/cum	1476.12
8	Chowkidar	13 Man Days	100.00/Man Day	1300.00
9	Head load & local transportation cost 10% cost of material	-	-	17190.14
	Total			Rs. 49,128.04

TOTAL EXPENDITURE			
1. Cost of materials	171901.46		
2. Labour charges	49128.04		
Total	Rs. 2,21,029.50		
Say Rs. 2,21,050.00			

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

DEMONSTRATION OF WHEAT

1- Variety recommended for District - Fatehpur

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	1.0 ha	1000.00/ha	1000.00	Since the project is to be operated in a participatory
2.	Cost of Seed	100.00 kg	18.00/kg	1800.00	Mode, contribution in form of the tillage
3.	Sowing by seed drill	1.0 ha	1000.00/ha	1000.00	sowing, irrigation and
4.	D.A.P. 18:46	160 kg	573.00/50 kg	1833.60	harvesting done by farmer is not included in the
5.	Urea	210 kg	270.00/50 kg	1134.00	estimates
6.	Potash (M.O.P.)	150 kg	300.00/50 kg	900.00	
7.	Irrigation (three irrigation)	1.00 ha	650.00/ha	650.00	
8.	Harvesting	1.00 ha	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

Rain fed - J.G.-315, Avrodhi

2- Seed Rate - 50-55 Kg/hectare

3- Requirement of fertilizers/ha N-25.0 Kg, P-80 Kg., K-30 Kg.

S.No.	Particulars	Quantity	Rate	Amount	Remark
1.	Tillage operation or Preparation of field and seed sowing	1.0 ha (Twice)	1000.00/ha	2000.00	Since the project is to be operated in a
2.	Cost of Seed	55 kg	90 /kg	4950.00	participatory Mode,
3.	D.A.P.	175 kg	573.00/50 kg	2005.50	farmer of the
4.	M.O.P.	65 kg	300.00/50 kg	390.00	tillage, sowing, operation sowing
5.	Medicine	1.00 ha	Lump Sum	1250.00	and harvesting is
6.	Harvesting	1.00 ha	700.00/ha	700.00	estimates
	Total			8595.50	
	Say			8600.00	

ESTIMATE FOR DEMONSTRATION OF GRAM (Per Ha)

Hence demonstration cost of Gram / ha is Rs. 8600.00

DEMONSTRATION OF ARHAR IN WATERSHED AREA (Per Ha)

- 1- Variety -Malviya-13, Narendra-1, Amar
- 2- Seed Rate 30 Kg/hectare
- 3- Requirement of fertilizers/ha N-20.0 Kg, P-50 Kg., K-40 Kg.

ESTIMATE FOR DEMONSTRATION OF GRAM (Per Ha)

S.No.	Particulars	Quantity	Rate	Amount	Remark
1.	Tillage operation or Preparation	1.0 ha	1000.00/ha	2000.00	Since the project is to be operated in a
2.	Cost of Seed	30.0 kg	120.00 /kg	3600.00	participatory Mode,
3.	Nitrogen N.P.K. 16:32:16	190.0 kg	470.00/50 kg	1786.00	farmer in the form
4.	M.O.P.	-	-	-	of tillage,
5.	Urea	-	-	-	and harvesting is
6.	Medicine	1.00 ha	Lump Sum	1000.00	participating
7.	Harvesting	1.00 ha	650.00/ha	650.00	farmers, hence this is not included in the estimates
	Total		•	6386.00	
	Say			Rs. 6400.00	

Hence per Hectare of demonstration - Rs. 6400.00

DEMONSTRATION OF HYBRID BAJRA IN WATERSHED AREA (Per Ha)

1- Requirement of Seed Rate - 10 Kg/hectare

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

ESTIMATE FOR DEMONSTRATION OF BAJRA (Per Ha) RAIN FED

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

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

AGRO-FORESTRY



DEMONSTRATION OF AGRO-HORTICULTURE USING PLASTIC DRUM OF 200 LITRES CAPACITY

District Fatehpur is situated in Middle Zone region where there is scarcity of water and in summer temperature rises up to 38^oC causing upper layer of fields dry and therefore mortality rate of plants is very high. Farmers usually like to grow grain crops only. They are not interested in horticulture because of Anna Pratha and less holding. The production of crops decreases below the tree.

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

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

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

DETAIL ESTIMATE OF DEMONSTRATION OF HORTICULTURE AND MIXED CROPPING

S.No.	Description of Work	No.	L	В	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	156 x 10	3.14 x 1.00	-	-	1560 kg
3	Filling of earth work with farm yard manure	156	0.20	0.20	1.20	587.80 cum
4	C.C.W. 1:2:4 for fencing poll	133	1.80	-	0.20	1.064 cum
5	Angle iron for poll	133	400	-	-	239.40 m
6	Barbed wire	3	-	-	-	1200.00m
7	Plants	156	-	-	-	156 Nos
8	Plastic drums (200 liter)	156	-	-	-	156 Nos

CONSUMPTION OF MATERIALS

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

COST OF MATERIALS

S.No.	Particulars	Quantity Rate		Amount
1	Farm yard manure	1560.0 kg	10.00/kg	15600.00
2	Barbed wire	1200.0 m/120.0 kg	6.50/kg	726.00
3	Angle iron	239.40 m/785 kg	40.50/kg	31792.50
4	Plastic drum	156 Nos	690.00 each	107640.00
5	Cement	6.50 bags	255.00/bag	1657.50
6	Coarse sand	0.450 cum	910.00/cum	409.50
7	G.S. Grit 10-20 mm	0.900 cum	1250.00/cum	1125.00
8	Plants	156 Nos.	18.00 each	2808.00
	Rs. 1,68,292.50			

LABOUR CHARGES

S.No.	Particulars	Quantity	Rate	Amount
1	Earth work	1514.02 cum	36.66/cum	55503.97
2	C.C.W. 1:2:4	1.064	492.00/cum	523.88
3	Fixing of angle iron	10 Man Days	100/Man Day	1000.00
4	Fixing of barbed wire	15 Man Days	100/Man Day	1500.00
	Rs. 58,527.85			

TOTAL EXPENDITURE				
1. Cost of materials	1,68,292.50			
2. Labour Charges	58,527.85			
Total Rs. 2,26,819.50				
Say Rs. 2,26,820.00 only				

DEMONSTRATION OF GREEN MANURING

Green Manuring is very useful but due to sowing of Kharif season crop, lack of suitable type of seeds, and limitation of moisture, it is not widely practiced. Green Manuring brings immediate advantage because of its quick decomposition where as FYM and compost improves the soil physical condition in the long-run. Benefits of Green Manuring accrue from substitution of chemical fertilizers; enhance soil biological activities and erosion control due to vegetative cover.

Sesbania Species (Dhaincha) and Crotolaria Juneea (Sunhemper Sanai) are most common green manure crops. they accumulate about 100 kg N/ha in their biomass and 64-88% of this is derived from atmosphere. Apart from direct benefit of green Manuring as a source of nutrients and organic matter, it has the capacity to mobilize soil phosphorus and other nutrients. it also helps in reclamation of problem of soil, e.g., *Sesbania* helps in removing exchangeable sodium and reclamation of salt affected soils.

In District Fatehpur more fields are kept fallow and only single crop in Rabi is grown.

Therefore, this area is suitable for Green Manuring. Therefore, in I.W.M.P. Ist Project, efforts will be made to oblige the farmers for Green Manuring.

A Typical Estimate is made for Green Manuring is given below:

ESTIMATE FOR GREEN MANURING IN THE WATERSHED (PER ha)

S.No.	Particulars	Rate	Cost	Remark
1	Seed of Sesbania (Dhaincha)25kg/ha	25.00/kg	625	Since the project is to be operated in a
2	Tillage operation before sowing and to	1000/ha Before and	2000.00	participatory mode, contribution in
	plough the plants of Dhaincha after 40-50	after saring		the form of tillage will be done by
	days of sowing for Green Manuring.			farmers is not included in the
				estimate.
	Total		Rs. 625.00	

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

PASTURE MANAGEMENT

Introduction: The sound animal industry in any country centers around good quality feed and fodders. The livestock population in India is nearly 12% 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 tons by 2010 A-*D, while the present feed and fodder resources in the country can meant 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 of without non-grass vegetation (such as legumes) that are created with selected high forage-yielding grass and legume species and with inputs like fertilizers and irrigation and carefully managed to exclude all other vegetation. Pastures are usually fenced and used for grazing, for gay and silage making or for both.

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

Zone wise crop rotation yield (t/ha)	Green fodder
Cenntral 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

<u>Conservation on of Forages</u>: 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.

<u>Agro-forestry system for fodder production</u>: A number of fodder trees play an important role in human food se4curity through their function as animal food sources, especially as drought services. Agro-forestry systems consisting of such tress and animals and/or pasture are called Silvi-Pastoral system.

Silvi-Pasture (or Silvi-pastoral system) is the most promising alternate land use system shich 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 System
Semi arid	Integration of Agro-Silvi-Pasture, dry land agriculture on cultivated
	Land. 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.

PHOTOGRAPHS OF THE VILLAGERS AND SELF HELP GROUPS (SHG's) DURING PARTICIPATORY RURAL APPRAISAL






SOCIAL MAPS OF THE VILLAGE























THEMATIC MAPS OF THE PROJECT AREA





Slope Map









DETAIL PROJECT REPORT PREPARATION TEAM

Detail Project Report(DPR) of Integrated Watershed Management Programme IWMP-3rd had been prepared through base line/ Bench Mark Survey for Physiography Climate, Soil, Land use/Cover, 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, Fatehpur, Toposheets (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 (2009-10 to 2014-15).

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

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