Integrated Watershed Management Programme –III BAGPAT (IWMP-III BAGPAT)

DETAIL PROJECT REPORT (DPR)





Submitted by:

BSA RAMGANGA COMMAND PROJECT, MEERUT, U.P. Department of Land Resources, Ministry of Rural Development, Government of India

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Department of Land Resources, Ministry of Rural Development, Government of India

BLOCK	:	BINAULI
TEHSIL	:	BARAUT
DISTRICT	:	BAGPAT

Contents

S. No.	Particular	Page No.
1	Executive summary	5
2	Introduction	7
3	Project Objective	7
4	Basic information	8
5	Village wise detail of watershed	13
6	Demographic feature	14
7	Land feature	24
8	Climatic and hydrological feature	29
9	Detail of existing livelihood for poor	23
10	PRA exercise social maps	33
11	Problem typology of the watershed	43
12	SWOT Analysis	45
13	Proposed land use	54
14	Socio economic analysis of the project	57
15	Planning process	63
16	Entry Point Activity	75

17	Estimate	76
18	Horticulture Development for Water Shed management	92
19	Farming System and Micro Enterprises	94
20	Estimate of Goat Unit for SHG	102
21	Drawing of NADEP compost structure	110
22	Demonstration	113
23	Pasture Management	122
24	Role of vegetative coverage in soil conservation work	123
25	Establishment of Farm Implement Center	128
26	Economic Analysis	129
27	Constitution of PIA, WDT, USER GROUP	131
28	Phasing of work financial & Physical	139
29	Work Calendar	146
30	Location (Road map)	148
31	Micro watershed map of Bagpat	149

Integrated Watershed Management Programme, Bagpat-III EXECUTIVE SUMMARY

The IWMP-III Bagpat watershed comprises of nineteen villages namely **Grampanchayay** – Pusar, Adampur, Adreeshpur, Mangauli, Kanharh, Gangauli, Mojijabad Nagal, Dodhat, Chittamkheri, Nirpura, Teekari, Padla,Padli, Viddhyavati,Bamrauli, Shahajahapur,Biral, block **Bonauli** of Bagpat district of Uttar Pradesh. This watershed has been identified by the state department under

Integrated Watershed Management Programme scheme by proper prioritization of different parameters for watershed selection Criteria. The watershed is located in the north of Bagpat district. It lies between longitude 77^o 7'30''to 77^o 12'30'' Latitude 29^o 22'30''to29^o30' (Code No. 2C6A3a3i. 2C6A3a3d. 2C6A3a3e. 2C6A3a3h. 2C6A3a3g. 2C6A3a3f. 2C6A3a4a. 2C6A3a4j. 2C6A3a4j. 2C6A3a4j. 2C6A3a4b. 2C6A3a4b. 2C6A3a4b.)Its altitude ranges from22Oto 236m above the mean sea level (MSL). The total area of watershed is 7308.88 ha.

The climate of the region is characterized as arid to semi-arid with average annual rainfall less 650 mm annually with an average of 35 rainy days. Out of which about 85 percent is received during the monsoon season from July to September. The area receives very less rainfall in the winter season. Temperature ranges from as high as 44° C in the May-June to as low as 2° to 3° C during December-January. The trend of rainfall is highly erratic and maximum water goes as runoff.

The topmost portion (western & northwest part) of the watershed is flat with occasional depressions. These soils are sandy, sandy loam the soils of the flat area are loamy sand to sand with occasional thin layers of silt in small patches. The middle portion of watershed is relatively flat land with fine soil texture. These soils are black in colour and are inherently high in fertility status. Soil texture is silty clay loam particularly in depressions and loam in the elevated portion.

Agriculture is the main occupation of the dwellers of the watershed. The main crops raised are wheat, sugarcane, mustard, gram, bar sesame and pearl millet. Most of the lands are kept fallow during the *kharif* season. Mustard and wheat are the most preferred crops grown during the *rabi* season. About 38% area under agriculture is cropped during *kharif* season in the watershed. Among various crops bajra shares maximum area (25%), followed by sesame (10%), jowar (5%) and pulses *i.e.* black gram and green gram (2%).

Natural vegetation of the watershed is very poor. The forest vegetation is predominant with Vilayati Babul (*Prosopis juliflora*) followed by Babul (*Acacia nilotica*). There are occasional occurrence of Neem plants (*Azadirachta indica*), Papdi (*Holopteila integrifolia*), Shisham (*Dalbergia sissoo*), Karanj (*Pongamia glabra*) and Chonkra (*Prosopis cineraria*). There is no grass land in the watershed. Grass patches are seen only on the bunds, road sides and other such places. The principal grasses are Anjan grass, Munj and Gandher.

The problem of erosion of the watershed is to be tackled by harvesting additional water in existing water harvesting structures, which have lost most of their capacity due to siltation and creating new water bodies. Water stored in the water harvesting structures shall be properly recycled to provide supplemental irrigation at critical growth stages of crops and for the establishment of fruit orchards and forest trees. In agricultural land will treated with buding along with minor leveling. Waste land will be treated with the engineering measures like staggered trenches and a forestation etc.

S. No.	Budget Component		Total (Lakhs)
Α	MANAGEMENT COSTS	12%	59.93
В	PREPARATORY PHSES	10%	49.944
С	WATERSHED WORKS		
	a. WATERSHED DEVELOPMENT WORKS	50%	249.72
	b. LIVILIHOOD PROGRAMME(Community based)	10%	49.944
	c. PRODUCTION SYATEM AND MICRO ENTERPRISES	13%	64.973
D	CONSOLIDATION PHASE	5%	24.972
	G. TOTAL		499.440

BUDGET FOR THE VARIOUS COMPONENTS IS GIVEN BELOW:

1. Watershed area

7308.88 ha

2. Rain fed area4625.00 ha3. Treatable area4162.00 ha4. Total expenditure on project499.44 lakes

Introduction

IWMP-III BAGPAT watershed with Code No. (Code No. 2C6A3a3i. 2C6A3a3d. 2C6A3a3e. 2C6A3a3h. 2C6A3a3g. 2C6A3a4i. 2C6A3a4j. 2C6A3a4i. 2C6A3a4b. 2C6A3a4c. 2C6A3a4h.), having area 4759.00 ha located in north-west part of BAGPAT district of Uttar Pradesh has been taken up by,(PIA) Bhoomi Sanrakshan Adhikari Ramganga command Project, Meerut (UP) for development under National Watershed Development Project for Rain-fed Areas (NWDPRA) scheme funded by Department of Land Resources Ministry of Rural Development, Government of India. The IWMP-III Bagpat watershed has been also taken up program implementation comprising of development and management plan during next five years (2010-11 to 14-15). The details of the project plan are described as follows.

Project Objectives:

- 1. Conservation, development and sustainable management of natural resources including their uses.
- 2. Enhancement of agricultural production and productivity in a sustainable manner.
- 3. Restoration of ecological balance in the degraded and fragile rain-fed ecosystem.
- 4. Reduction in regional disparity between rain-fed and irrigated areas.
- 5. Creation of sustainable employment opportunities for the rural community for livelihood security

Basic Information and Location:

Location of the watershed	
Name of the district	BAGPAT
Name of the Block	Binauli, Baraut
Name of the Gram Panchayats	Pusar ,Adampur, Idreeshpur, Kanharh, Gangauli, Mojijabad Nagal,
	Dodhat, Nirpura, Teekari, Padla, Padli, Himtpur sujati, Bamrauli,
	Viddhyavati,Shahajahapur,Biral,
Name of the habitations	Chittamkheri, Mangrauli
Longitude	77 ⁰ 25'30" to 77 ⁰ 22'30"
Latitude	29 ⁰ 15'0''to29 ⁰ 12 0'
Elevation from MSL:	
Highest Elevation in the watershed (above MSL)	235.00
Lowest Elevation in the watershed (above MSL)	220.00
Relief Height difference (m)	15.00

The IWMP-III Bagpat watershed in Binauli block of Bagpat district (U.P.) is located on Meerut-Baraut high way about 40 km from Bagpat and 20 km from Baraut Tahsil between longitude 77⁰ 25'30'' to 77⁰ 22'30'' Latitude 29⁰ 15'0'' to 29⁰ 12 0'



Source: India. gov.in/maps/Fig 1.

Location of IWMP-III Bagpat watershed



Fig 2



Fig 3:Delineation of IWMP-III Bagpat watershed on toposheet

Area:

Total area of the watershed is 7308.88 ha treatable area 4162.00 ha

Shape:

The watershed shape is elongated type. The maximum length and width of the watershed are 11500 m and 3850 m, respectively with the length: width ratio of 2.99 : 1

Physiographic:

The watershed is in the mid of the Krishna and Hindan river having precipitous slopes and drains into the river Hindan through Drains stream near Varnava village. (Krasna > Hindan> Yamuna > Ganga) About 33.5 % of the watershed area has slope more than 6 % and upright ridges. The top of the watershed exhibits extremely precipitous and manifesting moderate to severe erosion class. The lower portion of the watershed has moderate slopes (less than 2.3%). At the outlet of the watershed small gullies are noticed, covered with sparse vegetation. Total 6 (1^{st} order -2 numbers, 2^{nd} order-3 numbers and 3^{rd} order -1 number) numbers of streams of different orders are found in the watershed, with total stream length 202020 m. of Stream characteristics of the watershed are presented in the Table .

Stream order	Stream Number	Mean stream length (m)
1 st order	2	510
2 nd order	3	560
3 rd order	1	950
Total	6	2020

Stream characteristics of IWMP-III Bagpat watershed

S.no.	N0. of Micro	Area of micro						1	Name Gram	Panchaya	ıt					
	watershed	watershed	Pusar	Adampur	mangauli	Idarisgpur	Kanharh	Mo.Nagal	Gangauli	Dodhat	Chitmkheri	Nirpura	Teekari	Him.sujti	Padli	Begmabad
1	2C6A3a3i	726.5668	130.14	67.99	99.10										178.25	251.08
2	2C6A3a3d	793.5392	253.43	210.62	179.39	150.10										
3	2C6A3a3e	683.6970				226.22		457.47								
4	2C6A3a3h	568.3095		78.06			415.15								75.11	
5	2C6A3a3g	748.1759								683.10	65.10					
6	2C6A3a3f	830.6675						196.51	266.70	367.45						
7	2C6A3a4a	578.0250							294.86				123.57	159.60		
8	2C6A3a4j	356.2245									74.00	135.23	147.00			
9	2C6A3a4i	514.7664										225.00	289.76			
10	2C6A3a4b	602.9255											335.26	267.66		
11	2C6A3a4c	596.3393											486.23	110.10		
12	2C6A3a4h	309.6500										184.55	125.10			
	Total	7308.89	383.57	356.67	278.49	376.32	415.15	653.98	561.56	1050.55	139.10	544.78	1506.92	537.36	253.36	251.08
	Treated Area	4162.00	218.42	203.10	158.58	214.29	236.40	372.40	319.78	598.23	79.21	310.22	858.11	306.00	144.27	142.98
	Total cost	499.44	26.21	24.37	19.03	25.72	28.37	44.69	38.37	71.79	9.51	37.23	102.97	36.72	17.31	17.16
	4%	19.98	1.05	0.97	0.76	1.03	1.13	1.79	1.53	2.87	0.38	1.49	4.12	1.47	0.69	0.69
	50%	249.72	13.11	12.19	9.52	12.86	14.18	22.34	19.19	35.89	4.75	18.61	51.49	18.36	8.66	8.58

IWMP-III BAGPAT

1. Demographic feature:

Total population of project area having Twelve micro watersheds (contains) 18 villages and 86748 people and also average family size 5.83 persons. Peoples are the most important resource for the project. These data details obtained from PRA exercise in social mapping and house hold survey by WDT and watershed committee.

(a) Population

Out of the total population 86748 the watershed, a majority *i.e.* more than 75 % has farming as their major source of livelihood followed by 18 % labour and 7 % service + business class.

s	Dortioulor	Name of Grampanchayat														
No.		Pusar	Adamp ur	Mangauli	Idarisg pur	Kanh arh	Mo.Na gal	Gangaul i	Dodhat	Chitmkh eri	Nirpur a	Teekar i	Him.sujti	Padli	Begmaba d	Total
1	No. of families In watershed	641	359	457	623	356	1632	1223	2385	199	2733	2238	935	642	455	14878
2	Human population	3849	2157	2285	3738	2140	8160	7343	14314	1195	16398	13429	5608	3852	2275	86748
3	Male	1991	1187	1256	2055	1177	4488	4038	7872	657	9018	7308	3084	2118	1251	47500
4	Female	1858	970	1029	1682	963	3672	3304	6442	537	7379	6131	2524	1733	1024	39248
	Total	13819	2157	2285	3738	2140	8160	7343	14314	1195	16398	13429	5608	3852	2275	86748
	Children	133	203	218	378	205	421	1286	1002	108	983	826	358	1348	155	7624
6	S.C.male	457	234	194	398	267	358	345	316	72	1008	316	322	658	265	5210
7	S.C.Female	373	191	156	325	198	257	283	258	59	825	259	257	539	212	4192
	Total	830	425	350	723	267	615	629	574	132	1833	576	579	1197	477	9402

Human population in the IWMP-III Bagpat watershed

(b)Livestock Details:

Total livestock population of the watershed is 19281 Buffalo is preferred as milch animal compared to cow, but milk yield is very low. Goats are also kept for milk as well as for meat purpose. The breakup of livestock population is as follows

1. Livestock population in IWMP-III Bagpat watershed

S.N.	Type of Animals	Existing Nos.	Milk production (Ltrs/day)	Milk quantity sold (Ltrs/day)	Income generated per annum (lac)
1	2	3	4	5	6
1	Cow	3556	3.5	889000	778.05
2	Buffalo	19281	6.5	115685	8445
3	Goat/sheep	1986	1	1898	123.91
4	Ox	185	-	-	-
5	He buffalo	2025	-	-	-
6	Poultry	12685	-	-	-
7	Piggery	584	-	-	-
8	Other animals (specify)	-	-	-	-

2. Village wise live stock detail

SNo.	Villages	Buffaloes Cows		Bullocks	Goat	Hen	Pig
1	2	3	4	5	6	7	8
1	Pusar	943	345	25	23	-	-
2	Adampur	336	95	55	110	-	
3	Idarish Pur	736	178	21	-	20	20
4	Kanhar	444	115	106	8	-	-
5	Mojijabad Nagal	615	210	118	140	40	3
6	Dodhat	2406	632	110	120	150	110
7	Nipura	3120	834	229	995	300	100
8	Tikari	6278	546	1200	283	117	263
9	Himmat Pur ,Sujati	1275	173	25	110	12	-
10	Parli	1115	65	205	175	26	12
11	Gangauli	1355	253	91	10	-	73
12	Magrauli	477	100	25	10	20	3
13	Chittamkheri	181	110	-	-	-	-

(c) Operational holding & socio-economic status:

The cauterization of the villagers according to their land holding is necessary for better targeting project benefits and selection of stock holders for various activities. This will help in maintaining for focus on the poor and economic up-lift-ment.

S. No.		Total H.Hs	No of BPL			Land Ho	lding(ha)	Ar	Annual Gross Income(Rs) in Laces						
	Туре				Rain fed			Irrigated							
				SC	ST	Others	SC	ST	Others	SC	ST	Others	Total		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	Marginal (wet1.25acdry2.50ac)	5106	-	90.25	-	2124.45	-	-	681.60	10.56	-	157.44	168	2224.82	
2	Small farmer (Wet2.5acdry 5.00ac)	10393	-	-	-	921.90	-	-	277.40	-	-	141.49	141.49	1885.69	
3	Big farmer	2794	-		-	1014.44	-	-	126.00	•	-	237.19	237.19	3198.37	
4	Landless	2405	218		-	-	-	-	-	•	-	•	0.003	-	

Land holding

Majority of the farmers are in the category of marginal (< 1 ha) and small (1-2 ha) with average land holding of about 2.4 ha. These small land holding are further scattered at different places, which makes cultivation very difficult. Distribution of farm families according to the size of the land holdings are given in the following table:

Distribution of farm families according to their size of landings

	Land															
SN	holding	Pusar	Adamp ur	manga uli	Idarisgpur	Kanha rh	Mo.N agal	Gangauli	Dodhat	Chitmk heri	Nirpura	Teekari	Him. .sujti	Padli	Begma bad	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18
	Marginal (wet1.25acdry 2.50ac)	63	61	208	45	107	1229	862	305	297	255	1124	361	93	96	5106
2	Small farmer (Wet2.5acdry 5.00ac)	447	458	1077	495	618	1229	911	922	35	1465	2310	280	62	84	10393
3	Big farmer	32	21	94	254	34	201	185	695	16	380	610	160	51	61	2794
4	Landless	96	88	37	145	117	38	229	339	21	225	210	128	322	410	2405
5	Total	638	628	1416	929	876	2697	2187	2261	369	2325	4254	929	528	651	20698
6	S.C	115	70	35	92	97	118	121	223	30	215	90	336	8	16	1566
7	S.T.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(d) 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 1.855 lakes will be generated during the implementation of the project activities. However, a change in the land use pattern and adoption of new enterprises is needed.

Migration: Seasonal migration is one of the key features of dry land area and draught prone region normally youth man and women migrate to different places living behind them the old and children at home. These data obtained by WDT and Watershed committee though PRA exercise and house hold survey.

S.No.	No. of persons migrating		No. of days per	Major reason(s)	Distance of destination of	Occupation	Income from	Remark	
	Μ	F	Total	Year of migration	migration	Migration from the village(km)	migration	Occupation	
1	2	3	4	5	6	7	8	9	10
1	1865	452	2317	About 3month	Not sufficient work Lower wages in rural area than urban area	40	Labour Work	3600/month	-

(e) **Details of CBOs already existing:** People institution and platform are essential mechanism for participate development. This institution empowers the communities and facilitates oriented planning and institution of project. These also ensure that the implementation is in a transparent and essentials manner. There are 8 SHG existing.

SNo.	Туре		Total no. CBOs			N	0. memb	ers		No.	of ST	`in each	N	o. of SC	in each	No. of BPL in each		in each	No. of Others in		s in	Bank Linkage	
	of		1				1		1		categ	ory	1	catego	ory		catego	ory	eac	h catego:	ry		T
	Group	With Only men	With Only women	With both	To tal	Group	М	F	Tota 1	М	F	Total	М	F	Total	М	F	Total	М	F	Tota 1	N0.of SHGs	Amount (RS)
1	2	3	4	5	6	7	8	9	10	11	1	13	14	15	16	17	18	19	20	21	22	23	24
											2												
						(i)Landl ess	45	3 3	58	-	-	_*	14	8	22	-	-	-	-	-	-	7	NA
1	SHG	8	3	-	11	(ii)MF	173		63	-	-	-	-	-	-	-	-	-	58	-	63	11	NA
						(iii)SF				-	-	-				-	-	-		-		-	-
						(iv)LF				-	-	-				-	-	-			-	-	-
	Total	8	3	-	11		263	3 3	121	-	-	-	-	-	-	-	-	-	-	-	-	11	NA
2	UGS	-	-	-	_	(i)Landl ess	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						(ii)MF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						(iii)SF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						(iv)LF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	WUA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	VO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(f) Infrastructure facilites :

Infrastructure social factures

The availability of infrastructure and institution indicate the social capital at the villages. The watershed has moderate communication facilities and all twelve villages are approachable through pacca road. Literacy rate in the watershed is very low because all villages are having education up to junior high school. All the villages are electrified and have TV & telephonic connection. Nearest small market is at Dadhat about 4-5 km and nearest big market of Baraut is about 20 km from the watershed. Religious and ritual features are almost common as in other part of the U.P. Small land holding (average less than 2 ha) with large family size (average7 person) and more than 45 % of the labour force of the total population living below poverty line indicate poor socio economic status of the watershed community. However, strong community spirit among the villager's show positive indication for the success of any programmed to be implemented in participatory mode. Traditionally the entire village community participates in the individual works. Soil map of one of the watershed village drawn by villagers themselves, depicting various village features is shown in following table:

SNo.	Type of Infrastructure	No. / Quantity	Status
1	2	3	4
1	Education institutions		
	• Angwady	65	Continue
	Primary school	20	Continue
	Secondary school	8	Continue
	Govt. collage	-	Continue
	Vocational institutions	-	-
2	Service institutions	-	-
	• Bank	8	Continue
	Post office	7	Continue

	Primary Health care center	4	Continue
	Veterinary center	2	Continue
	Market / shanties	4	Continue
3	N0. of bore wells / pump sets(functional)	945	Continue
4	No. OF Milk collection center(union society,pvt.Agency, oters)	7	Continue
	Total quantity of surplus milk	na	Continue
5	Road connectivity to main road by anal weather Road(yes/no)	yes	
6	Bus Facility (Yes/No)	yes	
7	No. of HHs provided electricity	yes	
8	Others specify ()		
9	No. of HHs with Access to drinking water	1	
10	Access to Agro Industries (Yes/No.)	-	
11	Any other facilities (specify)		

Venn diagram

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



Venn Diagram of village Teekari

2. Land features

(a) Land use pattern:

This information will provide the land use detail in the village area under forest tree cover pasture as follows should be known to generate various solutions and obtains for the development of the selected project as well as watershed area. The watershed has diversified land uses namely agriculture, waste land (open scrub), seasonal water bodies etc. The varied present land use and area under different categories in watershed is shown in following Table. The mixed land use followed in the watershed is almost similar in other parts of the UP. During PRA exercise, the villagers prepared land use.

Present land under different categories in the IWMP-III BAGPAT watershed

(Total category wise area of concern villages)

S.No	Village		Land uses (ha)												
•		Agricultural	Waste land(all types)	Seasonal water bodies	Village, road etc.	Total									
1	2	3	4	5	6	7									
1	Pusar	339.906	43.675	7.432	10.331	401.344									
2	Adampur	264.614	33.207	8.603	15.397	321.821									
3	Idarish Pur	320.367	56.221	8.985	26.433	412.006									
4	Kanhar	415.149	41.531	6.670	31.247	494.597									
5	Mojijabad Nagal	653.986	23.015	4.056	28.050	709.107									
6	Dodhat	1050.750	106.514	6.513	25.927	1189.704									
7	Nipura	901.525	15.250	19.500	29.750	911.878									
8	Tikari	1358.045	3.315	10.665	51.207	1423.232									
9	Himmat Pur Sujati	427.263	53.770	12.298	26.300	519.631									
10	Parli	260.892	16.172	4.017	32.668	313.749									
11	Gangauli	461.00	40.106	3.083	19.372	473.561									
12	Magrauli	418.256	15.651	4.235	6.238	394.380									
13	Chittamkheri	139.039	60.478	0.954	3.633	204.104									
14	Begmabad	452.235	7.561	5.156	2.058	467.104									
	Total	7308.88	514.466	102.167	308.611	8236.1274									

(b) Details of CPR

Normally CPR community's properties resources are given priority in planning and implementation the watershed project. In this regard the type extends and area available for treatment is important from the planning prospective. These details have obtained by secondary data through WDT and Watershed committee.

S.	CPR		Total Ar	ea (ha)		Area	available for	r treatme	nt (ha.)
No.	Particulars	Ar	ea owned/in	possessi	on of				
		Pvt.	Govt.	PRI	Any other	Pvt.	Govt.	PRI	Any other
		Persons	(Sp.Dept.)		(Pl.Specify)	Persons	(Sp.Dept.)		(Pl.Specify)
1	2	3	4	5	6	7	8	9	10
1	Wasteland/Degrated land	2723.520	-	198.00	-	4022.817	-	-	-
2	Pastures	25.78	-	-	-	8.23	-	-	
3	Orchards	-	-	-	-	-	-	-	-
4	Village Woodlot	-	-	-	-	-	-	-	-
5	Forest	-	129.657	-	-	-	95.00	-	-
6	Village Ponds/Tanks	346.00	-	-	-	23.69	-	-	-
7	Community Buildings	18.160	-	-	-	12.263	-	-	-
8	Weekly markets	-	-	-	-		-	-	-
9	Permanent markets	-	-	-	-	-	-	-	-
10	Temples/Places of worship	4.372	-	-	-	-	-	-	-
11	Others (Pl. Specify)	-	-	-	-		-	-	-
	Total	3117.832	129.657	198.00	-	4067.00	95.00	-	-

(c) Agriculture implements

These agricultural implement indicate the level of agriculture mechanization in the project area and availabilities of various farm machinery and tools.

S.N.	Implements	Nos.	Remarks
1	2	3	4
1	Tractor	210	
2	Sprayers-manual/power	65	
3	Cultivators/Harrows	185	
4	Seed drill	16	

(d) Crop classification:

Crops classification gives on idea how much area is in intensive cultivation and the scope for agriculture Development in single cropped areas and the objective would be to provide food and employment security.

Crop Calendar: The present crop calendar in the watershed comprise of fallow-mustard, fallow-wheat, sugarcane-wheat, bajramustard, wheat, mustard, jowar-wheat, jowar-mustard, black gram-wheat, black gram-mustard, green gram-wheat, green grammustard, fallow-berseem etc. Fallow-mustard is the most prevailing crop rotations on the agricultural lands both in rain-fed and irrigated conditions in the watershed. Organized vegetable cultivation, fruit plantation and traditional agro-forestry systems are lacking widely in the watershed. The limited vegetable cultivation in the watershed is confined either to kitchen gardens or to the irrigated conditions in a scattered manner on extremely small area with view to meet out the domestic demand for vegetables. The cultivation of cash crops other than the mustard also lacks in the watershed

S.N.	Crop Classification	Area (Hact.)
1	2	3
1	Single Crop	1818.00
2	Double Crop	1250.00
3	Multiple Crop	1094.00
4	Relay Crops	-

(e) Crops & cropping pattern:

Season wise, crop wise and whether they are irrigated area not detail obtained from resource mapping and revenue record production and productivities and cost of cultivation is obtained through focus group discussion and secondary data of agricultural statics for the concern project area.

S.N	Season	Crop Sown		Rai	in fed			Ir	rigated		Total				
			Area (Hac t.)	Product ivity (Kgs/Ha.)	Product ion (Ton/yr)	Cost of cultivatio n (Rs./Hact.)	Area Hact.	Produ ctivity (Kg/Ha)	Prod uction (Ton/yr)	Cost of cultivati on (Rs./Hac t	Area Hact.	Produ ctivity (Kg/Ha)	Rat e Rs/ ha	Prod uction (Ton/yr)	Cost of cultivation (Rs./Hact
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Kharif	Jwar	235	906	122.31	18120	12	1050	12.6	21000	147	978	20	134.91	19560
		Maize	10	2300	23	36800	55	2430	133.65	38880	65	2365	16	156.65	37840
		Arhar	55	980	53.9	58800	0	0	0	0	55	980	40	53.9	58800
		Munge/urd	25	400	10	26000	5	450	2.25	29250	30	425	45	12.25	27625
		Sugarcane	1746	610	1065.06	1525	290	700	203	1750	2036	655	2.5	1268.06	1638
					0	0			0	0	0	0		0	0
2	Rabi	Wheat	1389	3669	5096.24	51366	124	4010	497.24	56140	1513	3839.5	14	5593.48	53753
		Mustard	21	1000	21	24000	0	0	0	0	21	1000	24	21	24000
		Berseem	15	2500	37.5	6250	15	2550	38.25	6375	30	4437.5	2.5	75.75	11094
		Pea	10	1229	12.29	61450	0	-	0	0	10	1229	50	12.29	61450
3	Summer	Tomato	0	0	0	-	12	1200	14.4	18000	12	1200	15	14.4	18000
		Ladyfinger	0	0	0	-	5	1250	6.25	18750	5	1250	15	6.25	18750
		Cucurbits					15	1050	15.75	15750	15	1050	15	15.75	15750
	Total		3478				684	-	-		4162				

(f) Soil Classification

Sail type, slope and erosion status are the critical for the planning soil and water conservation. These details obtained by transect of the project area and soil sampling.

Fine textured alluvial soils

These soils are the most extensive soil group found in the Binauli IWMP-III Bagpat watershed. The middle portion of watershed is relatively flat land with fine soil texture. These soils are Yellow in colour and are inherently high in fertility status. These yellow soils are calcareous and on drying develop numerous some and fissures. Soil texture is silty clay loam particularly in depressions and loam in the elevated portion. The soils of the lower horizon are invariably heavier than the surface, being a zone of compaction and invariably a zone of chikni mitty in the form of *hard soil*. A subsurface indurate pan of clay or mixtures of both locally called as chikni mitty soils are prevalent, which impede the downward movement of water thereby creating problems of high runoff.

Coarse textured alluvial soils

These soils are lying mostly near the adjoining areas of Krishna River near the outlet and around the lower portion of river down steam of watershed. These soils are coarser in texture and are relatively poor in fertility status. The soils are loamy sand in texture. These soils also occupy significant area of the watershed.

So. No.	Soil Type	Total extent (Hact.		Based on Depth (cms) (Mention area in Hact.)					Based on Slop (%) (Mention Area in Hact.					Erosion (mention area in Hact.)			
)	V.Shallo	Shallow	Moderatly	Deep	Very	Nearly	Moderat	Strong	steep		Water		Win		
			w (0-75)	(7.5-22.5)	d eed (22.5-	(45.0- 90.0)	deep (>90)	(0-2)	e e slope	slope (6-15)	(>15)	Sheet	Ril	Gully	d		
					45.00)				(2-6)					-			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
1	Sandy Soil	3653.9	2631.04	840.15	182.78	-											
		7						3811.61	3288.99	208.26	-	2535	1268	343	NA		
2	Sandy Loam	2923.2	2104.31	671.23	147.66	0	-										
	Soil	0															
3	Loam Soil	731.71	462.90	168.36	36.16	64.29											
	Total	7308.8	5198.25	1679.74	366.60	64.29											

4. Climate & Hydrological feature

Intensity of draught and flood in village and others metrological data gives the brides eye view for the watershed in term of whether and physical parameters.

The watershed falls under the semi-arid region of tropical climate. The average annual precipitation is 650 mm spreading over 35 rainy days. Most of the rainfall (about 85 %) is received during July to September. The rainfall is of moderate to high intensity. The area receives no or scanty rainfall in the winter season. The temperature variation ranges from as high as 44° C in the month of May - June to as low as 1- 3° C in December - January.

(a) Irrigation facilities

S.No.	Type of the Source	Nos.	Irrigated area in Hac.	Remark
1	2	3	4	5
1	M.I.tanks	-	-	-
2	Open wells	-	-	-
3	Bore Wells	568	1420	
4	Canal irrigation	-	-	
5	Natural spring head	-	-	-

(b) Status of Water Table

S.No.	Name of the farmer	S.No.	Source(open/	Date of	Depth of water	Source located	Remar
			bore	recording	table for ground level	at(right/middle/valley	ks
			well)		(in mts))	
1	2	3	4	5	6	7	8
1	Shri Mukesh s/o Jagmer	1	bore well	25-2-11	17.50	valley	
2	Shri Pradeep s/o Indarpal	1	bore well	27-2-11	21.00	ridge	
3	Shri Syam Singhs/o Lalchand	1	bore well	27-1-11	20.50	middle	
4	Shri Sahdevs/o Jaypal	1	bore well	16-1-11	19.40	middle	
5	Shri Rakesh s/oShivsaran	1	bore well	17-2-11	19.60	middle	
6	Shri Verendar s/o Vijaypal Kishanpal	1	bore well	28-2-11	22.00	ridge	

(c) Quality of Drinking Water One of the objectives of the watershed project is to insure at least drinking water even during time of drought

S.No.	Source (Bore/well/OHS) etc	Location	Date of collection of sample	No. of samples collected	Specific remarks of the lab report	stage of ground water development (safe/semi critical/ critical/over exploited)	reasons for over exploitation
1	2	3	4	5	6	7	8
1	Hand pump	maxim in	25-2-11	1	Check by	safe	-
		side			Pradhan		
2	Hand pump	maxim in	27-2-11	2	Check by	safe	-
		side			Pradhan		
3	Hand pump	maxim in	27-1-11	1	Check by	safe	-
		side			Pradhan		
4	Hand pump	some on	16-1-11	1	Check by	unsafe	due to sugar
		road			Pradhan		mill
5	Bore	On Road	17-2-11	1	Check byPradhan	safe	_

(d) Availability of Drinking Water

S.No.	Item	Units	Quantity	Remarks
1	2	3	4	5
1	Drinking water requirement	Ltrs/day	662110	
2	Present availability of drinking water	Ltrs/day	593580	
3	No. of drinking water sources available	Nos	7412 hand pump	
	a) Functional	Nos.	5830 hand pump	
	b) Need repairs	Nos.	1250 hand pump	
	c)Defunct	Nos.	332 hand pump	
4	Shortfall if any	Ltrs/day	68530	
5	No. of families getting drinking water from out side the Micro watershed area	Nos.	NA	
6	Requirement of new drinking water sources (if any)	Nos.	8 Overhead community tank	

(e) Ground Water Structures to be repaired:

S.No.	Type of structure	No. available				
		No. to be Repaired	No. to be rejuvenated	No. with no interventions required	Total	
1	Indian mark hand pump and traditional hand pumps	1062	332	188	1580	
	Total	1062	332	188	1580	

5. Details of Existing Livelihoods

The information of the existing livelihood activities in the project area is essential to understand the scope of introducing how livelihood as well as an estimate for no of family to be covered for income generating activities.

S.N.	Name of	activity		No. of beneficiaries					
			SC	ST	Others	Total	Women		
1	Cows	Dairy	25	-	387	412	11	2850	
	Buffaloes		55	-	198	253	118	3850	
	Goat, Sheep)	56	-	191	247	8	2400	
2	Poultry		102	-	-	102	15	2500	
3	Piggery		22	-		22	12	2300	
4	Others		-	-	-	-	-	-	

PRA EXERSISE & SOCIAL MAPS


















PROBLEM TYPOLOGY OF THE WATERSHED

Problem 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. **Poor lively hood, poor farming system & poor livestock.**

Problems identified and prioritized the transect walk and PRA exercise in all 13 villages have pooled and list of 10 (ten) problems representing the whole watershed was prepared. Rank of the problem of all 13 villages was workout by the matrix ranking procedure. Lack of irrigation water is the greatest problem experienced by the people followed by low productivity of field crops, lack of fodder availability and lower production of livestock.

S.No.	Problems	Rank
1	Low production of Agriculture crops	7
2	Lack of irrigation water with poor water productivity	8
3	Lack of drinking water as well as for house hold uses	3
4	Non availability of fuel wood	6
5	Lack of inputs like quality seeds, fertilizers, pesticides etc.	2
6	Poor management and health care facilities for milch and other animals	5
7	Lack of fodder availability and lower productivity of animal	5
8	Lack of medical, educational and transportation facilities peoples	4
9	Deterioration in soil health and fertility (decrease of Soil Organic Matter status)	7
10	Un /under employment for rural youth and out migration	6

STRENGTH, WEAKNESS, OPPORTUNITY AND THREAT (SWOT) ANALYSIS

A SWOT analysis of watershed is is a useful decision support tool presented as below:

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

1. Climate:

The watershed falls under the semi-arid region of tropical climate. The average annual precipitation is 650 mm spreading over 35 rainy days. Most of the rainfall (about 85 %) is received during July to September remaining 15 of rains occur during winter season. The rainfall is of moderate to high intensity. The area receives no or scanty rainfall in the winter season. The temperature variation ranges from as high as 44°C in the month of May - June to as low as 1- 3°C in December - January. Frost and fog are the common phenomenon in the month of December and January.

2. Geo-morphology and Soils:

A. Geo-morphology

The IWMP-III Bagpat watershed is located North corner of the Bagpat district. The entire watershed is topographically divided into three major landforms. Accordingly, the soils of watershed can be grouped into two major categories. Such as

i) Plain land

ii) Ravenous land

B. Soils

1. Fine textured alluvial soils

These soils are the most extensive soil group found in the Binauli IWMP-III Bagpat watershed. The middle portion of watershed is relatively flat land with fine soil texture. These soils yellow are in colour and are inherently high in fertility status. These yellow soils are calcareous and on drying develop numerous some cracks and fissures. Soil texture is silty clay loam particularly in depressions and loam in the elevated portion. The soils of the lower horizon are invariably heavier than the surface, subsurface indurate pan of *hard soil* or clay or mixtures of both locally called as chikni mitty soils are prevalent, which impede the downward movement of water thereby creating problems of high runoff.

2. Coarse textured alluvial soils

These soils are lying mostly near the adjoining areas of Krashana River near the outlet and around the lower portion of river down steam of watershed. These soils are coarser in texture and are relatively poor in fertility status. The soils are loamy sand in texture. These soils also occupy significant area of the watershed.

2. Drainage

Due to prevalence of mild to steep slopes and presence of a number of drainage lines in the watershed, the drainage system is adequate. The watershed forms part of **Ganga basin**.

3. Vegetation / Natural vegetation

Natural vegetation of the watershed is very poor. The forest vegetation is predominant with Vilayati Babul (*Prosopis juliflora*) followed by Babul (*Acacia nilotica*). There are occasional occurrence of Neem plants (*Azadirachta indica*), Papdi (*Holopteila integrifolia*), Shisham (*Dalbergia sissoo*), Karanj (*Pongamia glabra*) and Chonkra (*Prosopis cineraria*). There is no grass land in the watershed. Grass patches are seen only on the bunds, road sides and other such places. The principal grasses are Anjan grass, Munj, Kans and Gandher.

Forests

The watershed has vast tract of denuded boulder and rock wasteland. These wastelands do not have any tree vegetation. It typically falls under "Northern tropical thorn forest" according to Champion and Seth classification of forest type of India. Horticulture/Agro-forestry

No horticulture and Agro forestry practices were observed in the watershed.

Agro forestry

The agriculture fields of the village have some forest or horticultural plantation. At places, some isolated trees of *Acacia* nilotica can be seen, whose frequency is less than one thirteen per running length of 100 m. The agro-forestry practices are highly lacking in the watershed though it has good potential under existing dispositions and may play a vital role particularly with respect to minimization of cropping risk, build up soil fertility and productivity, soil conservation, partly meeting out the fire wood demand of rural community and moreover, optimizing the economical return from system as a whole under typical semi arid climate in the

watershed. The other agro-forestry systems like agri-silvi, silvi-pastoral, bund and boundary plantations also have good potential to cater the fire wood and fodder demands of the rural community in the watershed. The existing area under agro-forestry is almost negligible. *Prosopis juliflora* may be planted as block or sole plantation specifically on marginal and degraded lands in the watershed. The agro-forestry interventions comprising of ber, bail, aomla, guava, popular etc may be applied for benefit of the farmers under rainfed to irrigated production systems on leveled to sloping 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:

There is no back yard horticulture or commercial horticultural plantation in the villages except few scattered mango and guava fruit plants The subtropical fruits and vegetables have very good potential in the watershed. The fruit trees h limited in number like mango, guava, papaya, lemon, lime, ber, aonla well ,mango as vegetables like cucurbits, okra, radish, tomato, cauliflower, cabbage, garlic, onion, brinjal, chilly but they are found surviving well in the watershed villages. Organized orchards, commercial vegetable cultivation, horti-agri and other systems of agro-forestry etc are lacking but have good potential in the watershed.

4. Agriculture, horticulture and agro-forestry

The agriculture land use constitutes about 57% of the total watershed area. Both rain-fed and irrigated agriculture are practiced in the watershed. Mono cropping is dominant in the rain fed production system while double cropping is limited to the irrigated lands, which constitutes about 30% of the total area under agriculture. Rain-fed agriculture is mostly mono cropping with invariably low productivity. These areas constitute about 70% of total agriculture area. The food and livelihood security is primarily driven by the natural weather factors of rain and its distribution specifically across the cropping season. Only about 37% area under agriculture is cropped during *kharif* season in the watershed. Among various crops bajra, urd, shares maximum area (15%), followed by sesame (10%), jowar (5%) and pulses *i.e.* black gram and green gram (2%). Farmers use high yielding varieties of bajra (JK, Pioneer, Aarti, Boss, PAC 9444, Mahyco Bajra) and sesame (Nitya) which are mostly truthfully lebelled seed from private seed companies. The productivity of *kharif* crops is low and fluctuates depending upon rainfall pattern, use of fertilizer and incidence of diseases and insect

pests. Low yielding local varieties of jowar are grown without fertilization for grain and fodder production. The local jowar varieties are one of the various constraints in fodder production in the watershed. The green fodder production through various sources like crops, grasses and limited forest trees is clearly inadequate for maintaining proper health of existing animals. Also no use of manure and fertilizer in sesame, no seed treatment with *Rhizobium* culture in pulses are the other salient production constraints in the watershed. Watershed has good scope for lowland and semi deep water rice cultivation in seasonally submerged area, which remains unutilized during *kharif* season. Almost in all villages of the watershed, no compost pits exists and fresh to semi decomposed farm yard manure is applied directly to the agriculture fields. The green manures like *dhaincha*, sun-hemp, *neel* have good potential in the watershed however the practice of green manure is meager and unpopular in the watershed, in spite of the fact that organic matter status as well as fertility of the agricultural soils are poor to fairly good. The cultivated fallow lands dominate in the watershed which contributes to accelerated soil erosion as well as runoff yields in the watershed.

Various agricultural land uses in the watershed are extended to diversified land capabilities starting from marginal to good class II lands. The watershed distinctly has three types of lands 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 under agriculture in the watershed is_about 7308.88 ha out of which 3650.ha is irrigated while 4162.00 ha are under rain-fed agriculture. The water (both irrigated and drinking) is most scarce natural resource in the watershed. The operation of tube wells for irrigation of agricultural crops frequently leads to the drinking water problem to the farmers of watershed forcing them to carry drinking water from out side the watershed area. The agricultural field bunds are common in the watershed, however, they frequently breach on heavy rains adversely affecting the *in situ* percolation of rain water in the soils.

The agriculture soils in the watershed have diversified texture i.e. loam sand, silty clay loam and sandy which are located in patches through out the watershed. The heavy soils are almost kept fallow during rainy season. The agricultural soils also have hard soil at variable depths. The irrigation water is conveyed in earthen channels and surface irrigation methods following mainly border method or flood method of irrigation by the farmers in the watershed. These factors substantially reduce the water use efficiency of limited available and valuable irrigation water in the watershed. The quality of irrigation water needs to be tested for assessing fitness of the quality for irrigation and other purposes.

Among *Rabi* crops, mustard occupies the largest area under agriculture (70 to 80%) followed by the wheat (10%) and pulses like gram and lentil (5%). Farmers are using high yielding varieties of *rabi* crops like Karan, Krishna, Kranti, Sharda, Moti, Chambal, Nath, Sona, Raj Luxmi, Pioneer, T-59, Rohini, AK-47 in mustard and UP 343, UP 2329, UP 2338, HD 2009 and even very old varieties like Lok-1 in wheat crop. Beside this, *desi* varieties of gram and lentil are also used by the farmers. Imbalanced fertilizer use in the *rabi* crops both under rain-fed and irrigated areas, absence of S containing fertilizers and inadequate pest control measures with respect to aphid and white blister in mustard and pod borer in gram are some of the reason of low productivity of these crops.

The agricultural productivity is primarily driven by the amount and distribution of rain water specifically during two cropping seasons i.e. *rabi* and *kharif*. Productivity of *kharif* crops is also affected by the late onset or early withdrawal of monsoon as well as intermittent droughts of variable duration and intensity. The farmers also do not have suitable cropping systems to deal aberrant weather. Weeds impose considerable constraint in productivity of both *kharif* and *rabi* crops under irrigated as well as rain-fed production system. Farmers undertake normally one manual weeding in mustard and other valuable crops however, practice is energy and time consuming. Use of weedicide is rare in the watershed.

The mixed cropping is in practice in limited area with *kharif* crops like bajra +urd, jowar +urd, but it is not only irrational but also unscientific and beset with low productivity. Subsequent *Rabi* crops in general and mustard crop in particular are raised on residual soil moisture under rain-fed production system during post 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 plowing for enhanced *in situ* residual soil moisture conservation and higher production is also not followed in the watershed. The shallow plowing tractor drawn tillage implements are available with the farmers in the watershed but deep plowing implements yet need to be introduced.

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

The majority of farmers of the watershed are facing considerable problem of fire wood, fodder due to meager or almost negligible forest area, lack of traditional agro-forestry practices and pastures. Cow dung, Stover of mustard, sesame and dhaincha and scattered trees of *Prosopis juliflora* are main sources of fire wood specifically to small, marginal and landless farmers in the watershed. The organized orchards as well as forest area are widely lacking in the watershed. The watershed has a good potential of fruit and forest tree species like ber, bail, aonla, papaya, guava, citrus species, *lasoda*, karonda, *ramda*, *shisam*, *tamarind*, *neem*, popular, Acacia, *Palash*, *Prosopis juliflora* as agro-forestry systems both under rain-fed and irrigated production systems on leveled to sloping agriculture lands as well as on degraded lands provided proper planting techniques involving appropriate termite control measures are used. The multipurpose trees have also very good potential for supplementing fuel and fodder demands in the watershed and marginal lands also have good potential in the watershed to cater the need of firewood demand. The main source of green fodder for animals is limited to jowar, berseem and grasses in the watershed. Though the vegetables have good potential in the watershed however, their cultivation is limited mostly to kitchen gardens. Almost all tropical/ sub tropical vegetable may be successfully grown in the watershed. The vegetables grown in the watershed are cucurbits, okra, radish, tomato, cauliflower, cabbage, garlic, onion, brinjal and chilly etc.

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

Indigenous technological knowledge (ITK)

The agriculture is an old traditional practice of farmers in the watershed who have improved themselves with passage of the time according to their domestic need and technological reforms in the nearby areas. The villagers have their traditional village ponds, practice of field bunding which typically constitute agriculture related Indigenous technological knowledge in the watershed. The mustard being a cash/ fire wood crop of the watershed is being cultivated in self designed manner by the farmers. However, limited fertilizer application specifically the DAP came in to practice since about 20 years.

Natural resource base

Out of total area 7308.88.00 ha area of IWMP-III BAGPAT watershed, an area of 5279.00 ha (72.24 %) is under rain fed agriculture and 261827.00 ha (25.00%) under waste land, (1451.00 ha is untreatable area), seasonal water bodies occupying about 1094.73 ha (14.98%) and village land and road etc. is 181.96 Ha (2.49 %). Main sources of irrigation are the seasonal water bodies for pre sowing irrigation only. Transact of the watershed showed typical land use profile consisting of plain agricultural land and ravinous lower ridge Importance of development institutions

Means of communication

IWMP-III Bagpat watershed can approach either from all villages (5-6 km) or all villages are also interconnected by village Pucca road. One side of the watershed (Valley) is having Block **Baraut**, Boundary.

5. Dependency on forest for fuel wood and fodder:

a) Fuel wood

Villagers in the village do not use LPG to meet their cooking energy requirements. The main source of fuel is from cow dung cake, woody stem of Arhar and Mustard crop. About 90 percent of the domestic energy requirement is met from the agro-byproduct and cow dung cake. Rest is met out from the forest outside the village and watershed boundary. Most preferred fuel wood is *Nilotica aciatica*. Fuel wood is obtained from the forest standing along the river Krishna situated outside the watershed boundary.

b) Fodder:

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

	Item	
S.No.		Availability in a year
		(No. of days)
1	2	3
1	Food grains (Wheat, Rice and pulses)	280
2	Work (no. of days/annum)	210
3	Green Fodder (Abundant/Sufficient/Source)	115
4	Dry Fodder (Abundant/Sufficient/Source)	195
5	Fuel (Abundant/Sufficient/Source)	185

Availability of food grain, fodder, fuel and employment is as follows:

6. Proposed Land Use

Watershed management plan for IWMP-III Bagpat 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 along with economic and environmental securities, crop and tree selection and area distribution is done as per farmers 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:

S.No.	Land use	Present (ha)	Proposed(ha)
1	Agriculture		
a	Rain fed	4625.00	4162.00
	(i) Crop	3650.00	3727.76
	(ii)Agro-forestry	90.26	433.28
b	Irrigated (Tub well)	630.81	1093.52
	(i)Assured	-	-
	(ii)Partial (private resource)	271.74	429.11
2	Wasteland	1271.26	1105.00
	(i)Afforestation	-	343.00
	(ii)Pasture	25.08	25.08
	(iii)Untreatable	373.00	373.00
3	Village land	384.54	384.54
	Total	7308.88	7308.88

Present and Proposed land use plan of the selected 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 use for irrigation. Present assured/Partial irrigation is done by private tube wells.

Proposed Plan for Irrigation of Water Resources: Sprinkler sets for irrigation from private tube well are distributed by Agriculture Department to Tube well holders on the basis of & Irrigation group. Effort will made to help the tube well holders of selected area to form group and to get sprinkler sets. Therefore, more area will be irrigated by the available irrigation water.

New Water Harvesting Structures: In the 330.00 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 42 Nos of recharge filters and 70 of recharge pits are planned in the selected area. Detail is given in detail estimate enclose

Crop Production: In the light of the land capability classification of the watershed and need of the farmers, the reallocation of watershed area rainfed 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:

Sustainable and Eco-friendly Farming System: This farming System will be achieved in the following manner:

- a) Recycling of crop and farm residues in the Integrate plant Nutrients System (IPNS)
- b) Provision of legumes incorporation in the existing cropping system.
- c) Rapid composting; using crop residue, domestic & farm waste and cattle dung
- d) **Mulching and Crop Residue Management:** Sources of mulch material includes weeds, pruning from agro-foresting trees and *in situ* grown legumes and green manure crops. The concept of live mulching 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 is incorporated into the soil at an appropriate stage to act as a mulch. Application of organic mulch material 4-5 t / ha is recommended.

- e) **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 in to the soil. In 1966, ha area green manuring is planned.
- f) Seed Treatment with Bio fertilizers Culture: The seed of leguminous crop like black gram, lentil, gram, arhar, pea, etc. should be treated with *Rhyzobium* and PSB culture before sowing. While non legume will be treated with other suitable bio fertilizers.
- g) **Tillage operation:** 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.
- h) **Introduction of Improved Seeds/Varieties:** Short duration and high yielding varieties suitable for this region have been proposed in long duration verities. Demonstrations of High Yielding Varieties (HYVs) of different crops in 257.32.00 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.
- i) **Sowing Methods:** Agronomical practices like contour cultivation, FIRB, seed drilling, 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.
- j) **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 strategies common disease in the mustard crop pests and diseases will also be demonstrated in the watershed the management of these insects, for benefit of the growers.
- k) **Dry Land Horticulture:** In the selected area 325.0 ha land is planned for horticulture and agro horticulture. Species like aonla, guava, ber, bel, lemon will be planted at suitable spacing in the watershed.

SOCIO ECONOMIC ANALYSIS OF THE PROJECT

Sustainability and Environmental Security:

In the proposed watershed management plan of IWMP-III Bagpat 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 (rainfed and irrigated), pure horticulture, agro-horticulture and silvi pastoral (Silvi-Pastoral + sericulture). Net present value (NPV), Benefit:Cost Ratio (BCR), Payback Period (PBR) and internal rate of return (IRR) criteria is employed to judge the economic efficiency of each enterprise, sector and project as a whole.

Labour Requirement:

Labour requirement was found to be the maximum during Oct.–Nov, when the harvesting of *kharif* and sowing of *rabi* crops are done simultaneously. The crucial periods are March/April coinciding harvesting and threshing of Rabi crops and July/August when sowing of *kharif* crops take place. Other income generating enterprises having potential during the remaining period can be planned.

Crop Calendar:

The present crop calendar in the watershed comprise of fallow-mustard, arhar-wheat, bajra-wheat, bajra-mustard, sesame-wheat, sesame-mustard, jowar-wheat, jowar-mustard, black gram-wheat, black gram-mustard, green gram-wheat, green gram-mustard, fallow-berseem, etc. Fallow-mustard is the most prevailing crop rotations on the agricultural lands both in rain-fed and irrigated conditions in the watershed. Organized vegetable cultivation and medicinal and aromatic crops in fruit plantation and traditional agro-forestry systems are lacking widely in the watershed. The limited vegetable cultivation in the watershed is confined either to kitchen gardens or to the irrigated conditions in a scattered manner on extremely small area with view to meet out the domestic demand for vegetables. The cultivation of cash crops other than the mustard also lacks in the watershed.

Historical timeline

An historical timeline is the chronological record of important events in the history of the village which is useful in understanding its background in the context of IWMP-III BAGPAT watershed. Historical timeline depicting important events in respect of different villages of the watershed was prepared through PRA. Historical timeline for village Teekri is given in following Table .

Historical time line for village Teekari

S.N0.	Activities	Year
1	Established	1720
2	Opening up Primary school	1945
3	Kacha road	1955
4	Introduction of Tractor	1970
5	Bituminous road	1970
6	First Tube well	1980
7	First Motorcycle	1980
8	Electricity in the village	1980
9	Temple renovation	1980
10	TV and DVD player	1988
11	Establishment of Gobar gas plant	1990
12	Introduction of thresher	1990
13	Over head water tank	2004
14	Planning for watershed project	2010

SOIL AND LAND CAPABILITY CLASSIFICATION

A. Soil morphology

The IWMP-III Bagpat watershed is located south west corner of the Bagpat district. The entire watershed is topographically divided into three major landforms. Accordingly, the soils of watershed have been grouped in three major categories.

- i) Plain land
- ii) Ravinous land

Soil profile- A representative soil profile (Dominant soil-Table 8)



Horizon	Depth (cm)	Morphology
		yellow in color, clay content 28%, with free CaCO ₃ , sticky when moist, hard when dry, high elasticity,
Α	0-150	fissures and cracks, occasional occurrence of free calcium carbonate granules pH 8.3-8.7
В	150-600	Whitish-yellow in colour, high effervescence with dilute HCl, very fine mixed with free CaCO ₃ and granules, very hard when dry, compact & indurate hard pan, restricting development of root and downward water transmission (locally called as <i>Potni</i> soil)
С	> 600	Red and white sandstone, Regolith (Parent material)

B. Morphology of a typical soil profile of IWMP-III Bagpat watershed (dominant soil)

C. Soil characteristics and fertility status

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

Soil properties	LCC II	LCC IV	LCC VII/VIII
Sand (%)	47.04	75.04	73.04
Silt (%)	24.6	18.6	20.3
Clay (%)	28.36	6.36	6.66
Texture	Sandy clay loam	Loamy sand	Loamy sand
pH (1: 2)	8.41	8.67	6.85
$EC (dS m^{-1})$	0.47	0.12	0.16
Organic carbon (%)	0.37	0.12	0.19
Available N (kg ha ⁻¹)	316	173	224
Available P (kg ha ⁻¹)	29	15	5-8
Available K (kg ha ⁻¹)	189	325	230

*Values correspond to soil fraction < 2mm

Land Capability Classification (LCC)

Land capability classification was done to classify the soils in different groups based upon the limitations and to emphasize the hazards prevailing in the watershed under different kinds of soils. Initially reconnaissance survey was carried out for entire watershed in order to find out the different topo-sequences, landforms, and soil depth and erosion hazards. This was followed by the detailed investigation of selected landforms to bring out the LCC classes of the IWMP-I BBagpat Watershed. Three classes of land capability namely II, IV, and VII were demarcated in the watershed. The areas under different classes are sown in table.

S.No.	Land Capability Class	Area (ha)
1	II	4348.16
2	IV	1315.56
3	VII	1168.90
4	VIII	476.26
	Total	7308.88

Area under different land capability class under IWMP-III BAGPAT watershed

Land capability class II (Yellow)

This group is one of the most extensive LCC class of the IWMP-III Bagpat watershed. This group of soil is occupying around 2855.40 ha of the watershed area. The soils are clay loam or silty clay loam in texture. The land under this class is nearly level to mild slopping area of watershed is seasonally waterlogged comes under this LCC class, primarily found near the earthen check. These areas are subject to water logging in most part of the year. The lands are almost flat, silty clay or clay loam in texture, deep and very mild slopping. These lands have no major limitations other than occasional water logging. During *rabi* season, the water is drained out and

cultivation is carried out. These lands potentially very productive but due to water logging during the rainy season, it could not be brought out under cultivation during the *kharif* season. The mapping unit for this class is given as under:

Land capability class $II_e = scl-d_5/B-e_1$

Land capability class IV (Blue)

A considerable area of watershed *i.e.* 1315.56 ha is under class IV. This class is found in lower portion i.e. near the outlet of watershed. The soils are coarser in texture (loamy sand/sand), deep, susceptible to erosion hazard and undulating in topography. Rill and initiation of gully can be seen near the outlet of the watershed. Where soils are coarser in texture and shallow in depth, is also coming under this class. The mapping unit for this class is as follows:

Land capability class $IV_e = ls - d_5/C - e_3$, $IV_{es} = ls - d_3/D - e_3$

Land capability class VII/VIII (Brown/Purple)

These lands are occupying an area of 761.10 ha of the watershed. This class of land is mostly found in waste land are of watershed. The soils are very shallow underlying hard soil, steep slope (>30%) and coarser in texture. Mostly hard soils are found under this class. Class VII and VIII are intermixed in top of the foot ridge of watershed. Mostly class VIII (476.26 ha) lands are located on sloppy plain area, where soil depth is almost negligible. Soils with admixture of gravels fragments are found in these classes of lands. The mapping unit for this class of land is as follows:

Land capability class VIIe = $gls-d_1/H/I-e_4$

Conclusions

The land capability classification of IWMP-III BAGPAT watershed provides reasonable good information with regard to capability of soil that could be used for agriculture, agri-horticulture, and silviculture and pasture development. The majority of land form is coming under class II, which give an insight of good agriculture production potential of this watershed. The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like mild leveling, bunding, diversion drain and in-situ moisture conservation practices. The reasonable area is under class VII indicating greater potential of this watershed for forestry and pasture development. The major physical limitations in case of agriculture soils are the sub soil hardness, low water infiltrability and slope. The most pronounced limitation of soil depth was noticed followed by severe erosion hazard and coarse soil texture. A small portion of watershed is under seasonally waterlogged. The soils under waterlogged area could be used for some other beneficial farming activities during the *kharif* season also.

PLANNING PROCESS

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

Ground water recharge:



In order to augment the flow in the drainage line, it is necessary undertake to moisture conservation and water recharge measure in the watershed area. For the purpose of ground water recharge, the area of the upper side of some villages is recommended for ground water recharge. For ground water recharge and moisture conservation, contour trenches (2m in staggered length with cross section of 0.3 X 0.3 m and having intensity of 150 trenches / ha) may be constructed covering an area 50 ha and 10 numbers of recharge filter are proposed in the watershed. Details of the recharge filter are given in Fig. 4

Fig. 4

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Detailed estimate of recharge filter Cost of Recharge filter with connecting pipe to the defunct well or bore well at IWMP-IIII Bagpat watershed

S.No	Item of 'W ork	No.	L	B	H/D	quantity	
1	E/w in foundation	T	2.35	2.35	1.5	8.28m	
2	C:C.Work (I :3:6) in foundation Long wall	2	2.35	0.5	1.5	0.352	
	C:C.Work (I :3:6) in foundation Shortall	2	1.35	0.5	0.15	0.203	0.555cMT
3	B/w 1:4 in wall Long \\all	2	2.2	0.35	2.5	3.85	
	<i>B/w</i> 1:4 in wall Short wall	2	1.5	0.35	2.5	2.625	6.475
4	Plaster (1:4) outside	4	2.35	2.5		23.5	
	Plaster (1:4) inside		1.5	2.5		15	38.50sqm
5	100 mm. dia PYC pipe for filter pit	Ι	8	0	0	8.00m	
6	Barring for recharge shaft	Ι	13.00m	0	0	13.00 m	
7	Coarse Sand in Shaft	Ι	3.14x	x.0.125x0.1254x4.30		0.21	
8	B/Ballast 40 mm gauge	Ι	3.14x	x.0.125x0.1254x4.30		0.21	
9	Stone Grit 12-20 mm. gauge	Ι	3.14x	x.0.125x0.1254x4.30		0.21	
10	Coarse sand for pits	e sand for pits I $1.50 \times 0.50 =$					
	•	N	ATERAIL REOUIRED	IN WORK			
			<u>_</u>				
S.No.	Work	qty	Bricks	Cement	StoneGrite	PVCPipe	Sand
1	CC work 1 :3:6	0.555	189	2.53	0	0	0.255
2	B/w 1:4	6.4 75	3000	12.95	0	0	I. 748
3	Plaster	38.5	0	4.24	0	0	5.77
4	Shaft Material	13.00m	0	0	0.21	0	0.21
	filling and filler		0	0	0	8	1.31
	Total		3189	20	0.21	8	7.545
	Rate		3200	290	1500	250	1500
	Amount		10405	5800	315	2000	11317.5
	Total						29837
Labour charge cost of material 40%						11025	
	Labour charge cost of mater	riai 40%					11955
	Labour charge cost of mater Carriage Charges cost of ma	nai 40%					2984
	Labour charge cost of mater Carriage Charges cost of ma	terial 10%					2984 44756

EST MATE OF PERCOLATION TANK



Drawing of Bathroom& Cloth Changing Room for Woman

S.N.	Description of work	No.	Length	Width	Height/Depth	Quantity	
			(M)	(M)	(M)		
1	Earth work in digging	2	3.30	0.60	0.80	3.168	
		2	1.33	0.60	0.80	1.276	
		1	1.33	0.30	0.80	0.319	
			Total				
2	C.C.W. 1:4:8 in foundation	2	3.11	0.37	0.10	0.230	
		2	1.36	0.37	0.10	0.100	
		1	1.36	0.15	0.10	0.020	
		•	·		Total	0.350 cum	
3	Brick work 1:6 in foundation up to plinth	2	3.11	0.37	0.15	0.345	
		2	1.36	0.37	0.15	0.150	
		1	1.36	0.11	0.15	0.022	
		2	2.97	0.23	0.75	1.024	
		2	1.50	0.23	0.75	0.517	
		1	1.50	0.11	0.75	0.123	
	Super Structure	2	2.97	0.23	2.70	3.688	
	-	2	1.50	0.23	2.70	1.863	
		1	1.50	0.11	2.70	0.445	
		Tota	Total				
4	D.P.C. 1:2:4	2	2.97	0.23	0.025	0.034	
		2	1.50	0.23	0.025	0.017	
		1	1.50	0.11	0.025	0.004	
		Tota	Ì			0.005 cum	
5	Lintel 1:2:4 for door	2	1.00	0.23	0.10	0.046	
	R.C.C. for window	2	0.75	0.23	0.10	0.034	
		Tota	l			0.080 cum	
6	Deduction from Brick work						
	door	1	0.80	0.23	1.80	0.331	
	window	2	0.80	0.23	0.60	0.220	
		Tota	l			0.882 cum	
	Net brick masonary work	8.17	77 - 0.882			7.295 cum	
7	Plastering 1:4	2	3.11	-	3.00	18.66	
		2	1.96	-	3.00	11.76	
		4	1.20	-	2.70	12.96	
		4	1.50	-	2.70	16.20	
		2	1.20	1.50	-	3.60	
		Tota	1			63.18	
	Deduction for doors	1	0.80	-	1.80	1.44 sq.m	

Detail estimate of proposed woman cloth changing and bath room:

	Net plastering work		63.18 - 2.88				
8	Flooring C.C.W. 1:4:8	2	1.50	1.20	0.075	0.270 cum	
	C.C.W. 1:2:4	2	1.50	1.20	0.025	0.090 cum	
9	white washing	2	3.11	-	3.00	18.66	
		2	1.96	-	3.00	11.76	
		4	1.20	-	2.70	12.96	
		4	1.50	-	2.70	16.20	
		2	1.20	1.50	-	3.60	
		Tota	1			63.18 sq.m	
	Deduction for doors	1	0.80	-	1.80	1.44 sq.m	
	Net white washing		63.18 - 2.88				
10	Roof R.C.C. 1:2:4	1	3.57	1.96	0.10	0.699 cum	

Consumption of materials;

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

Labour rate

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

Cost of materials

S.No.	Particulars Quantity Rat		Rate (Rs)	Amount			
1.	Cement	27 bags	290/bag	7830			
2.	Coarse sand	3.87 cum	1500/cum	5805			
3.	Bricks	3360 Nos.	3200/thousand	10752			
4.	M.S. Bar 8 mm Ø	61.15 Kg.	400/qtl	2446			
5.	G.S.B 25-40 m	0.576 cum	855/cum	492.48			
6.	G.S. Grit 10-20 mm	0.742 cum	1250/cum	927.50			
7.	Doors with frame	2 Nos.	3850.00 each	7700.00			
8.	White lime	6 Kg.	8.00/kg	48.00			
	Total						

Labour charges

Total Cost						
1. Cost of materials	35952					
2. Labour charges	7,014.66					
Total	Rs. 42968					
	Say Rs. 43000 only					

DRAWING OF RECHARGE PITS



DESCRIPTION.

- A 0.10 x 0.20 Grit.
- B Coarse Sand.
- C 0.10 x 0.20 Grit.
- D 025 x 0.50 Grit.
- E Cut Stone / Random Rubble.
- F Brick wall 0.11 m x 0.25 m Width channel
- Note: All dimensions are in meter

Detail estimate of recharge pit & channel of length 1.50 m

S.No.	Description of Work	No.	L	В	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 blast	1	3.14 x 0.75 x 0.75	-	0.60	1.059 cum	
3	Laying G.S.B. 25-50 mm	1	3.14 x 0.75 x 0.75	-	0.45	0.794 cum	
4.	Laying of G.S.Grit 10-20 mm	1	3.14 x 0.75 x 0.75	-	0.15	0.264 cum	
5.	Laying of G.S.B. 25-50 mm	1	3.14 x 0.75 x 0.75	-	0.15	0.264 cum	
6.	Earth work	1	1.50	0.50	0.40	0.30 cum	
7.	Brick work 1:4	1	1.50	0.47	0.11	0.077 cum	
10.	Brick work 1:4	1 x 2	1.50	0.11	0.15	0.049 cum	
	Total of (9.) + (10.) Brick work 1:4.						
11.	Plastering 1:4	1 x 2	1.50	0.56	-	1.680 m^2	

Abstract of measurement

1.	Earth work 2.64 + 0	0.30	2.94 cum
2.	Laying of Brick ballast		1.059 cum
3.	Laying of G.S.B. 25-50 mm 0.794 + 0	.264	1.058 cum
4.	Laying of G.S.Grit 10-20 mm		0.264 cum
5.	Laying of coarse sand $0.264 + 0$	0.070	0.334 cum
6.	Brick work 11cm 1:4		0.126 cum
7.	Plastering 1:4		1.680 m^2

Consumption of material

4.

5.

6.

7.

G.S.Grit laying

Brick work 1:4

Plastering 1:4

Curing

S.No.	Description of work	Quantity	Cement (bag)	Brick (nos)	Khanda (cum)	G.S.B. 25- 50 mm	G.S.Grit	Coarse Sand	
			(Nug)		(cum)	(cum)	(cum)	Sund	
1.	Laying of Brick Blast	1.059 cum	-	-	1.059	-	-	-	
2.	Laying of G.S.B.	1.058 cum	-	-	-	1.058	-	-	
3.	Laying of G.S.Grit	0.264 cum	-	-	-	-	0.264	-	
4.	Brick work 1:4	0.126 cum	0.17	60	-	-	-	0.030	
5.	Plastering 1:4	1.680 m^2	0.18	-	-	-	-	0.025	
	Total		0.35	60	1.059	1.058	0.264	0.389	
Cost of materials									
S.No	. Parti	iculars		Quantity		Rate	Amount		
1.	Bricks Blast		1.059 cum		10	1025/cum		1085.47	
2.	Cement			0.35 Bags		90/Bag	102.	.00	
3.	Brick			60 nos 3200/Thousan		/Thousand	192.00		
4.	Coarse Sand	Coarse Sand		0.389 cum	15	1500/cum		.00	
5.	G.S.B. 25-50 mm	25-50 mm		1.058 cum	85	855/cum		.59	
6.	G.S.Grit			0.264 cum 1500/cum		396			
		al			Rs. 3	262			
Lab	our charges								
S.No	P. P.	articulars		Quantity		Rate		Amount	
1.	Earth work		2.94 cum		36.66/cum		7.78		
2.	Brick blast			1.059 cum		33.33/cum		35.29	
3.	G.S.B. laying			1.058 cum		33.33/cum	35	5.26	

Total

0.264 cum

0.126 cum

 1.680 m^2

0.126 cum

33.33/cum

370.00/cum

 $40.00/m^2$

25.00/cum

8.79

46.62

67.20

3.15

Rs. 315.22

Total Expenditure						
1. Cost of materials	3262.00					
2. Labour Charges	315.22					
Total	Rs. 3577.20					
Say	Rs. 3580.00					

Detail estimate of recharge 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.	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
		0.082 cum				
3.	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
		0.630 m^2				
4.	Steel Filter 4" Ø	1				1 nos.
5.	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 Filter
			(bags)	(cum)	(nos.)	110 mm Ø	
1.	Brick Work 1:4	0.082 cum	0.11	0.019	39	-	-
2.	Steel Filter 4"	1 nos.	-	-	-	-	1 nos.
3.	P.V.C. Pipe 110 mm Ø	1.0 m	-	-	-	1.00 m	-
4.	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	1500/cum	83.00
2.	Cement	0.17 bags	290/Bag	49.00
3.	Brick	39 nos.	3200/Thousand	124.00
4.	Steel Filter 4" Ø	1 nos.	25.00 each	25.00
5.	P.V.C. Pipe 110 mm Ø	1.00 m	110/m	250
	Rs. 531			

Labour Charge

S.No.	Particulars	Quantity	Rate	Amount
1.	Earth Work	0.24 cum	36.66/cum	8.79
2.	Sand Brick ballast	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			

Total Expenditure			
1. Cost of materials	531.00		
2. Labour Charge	90.22		
Total	Rs. 621.00		
Say Rs. 620			
Total expenditure of	f soaking pit & silting tank		
1. Soaking Pits	3580.00		
2. Silting Tank	620.00		
Total Rs. 4200.00			
Say Rs. 4200.00 only			

Entry point activities:

S.N.	Village	Work	Amt. (Rs Lack)
1	Pusar	Kharnja Repair With channel 180m	1.05
2	Adampur	Community center roof R:C:C 5.00x3.70	0.97
3	Idarish Pur	Kharnja Repair With channel 300m	1.90
4	Kanhar	Kharnja Repair With channel 320m	2.20
5	Mojijabad Nagal	Kharnja new With channel 270m	2.47
6	Dodhat	-	-
7	Nipura	Kharnja Repair With channel 325m	2.46
8	Tikari	-	
9	Himmat Pur ,Sujati	Kharnja Repair With channel 3808m	2.28
10	Parli	Kharnja Repair With channel 190m	1.08
11	Gangauli	Kharnja new With channel 225m	2.30
12	Magrauli	Kharnja Repair With channel 125m	1.33
13	Chittamkheri	Kharnja Repair With channel 200m	1.25
14	Begmabad	Kharnja Repair With channel 80m	0.69
		Total	19.98

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

Gabion check dams will be constructed in the watershed:

Details of the gabion check dams and other treatments are given in following table. Estimate for Gabion Check Dam (span - 8m) for drainage line treatment

Sr.No.	Particulars	No.	L	В	D	Quantity	
	Super structure						
1.	Earthwork	1 No.	8.00	1.00	0.50	4.0 cum	
2.	Wire netting				·		
(i)	Upto spillway					37.20 sqm	
(ii)	Head wall extension					12.00 sqm	
	Total 2 (i) and (ii)					49.20 sqm	
3.	Collection of stone				·		
(i)	Upto spillway	1 No.	8.00	1.00	1.20	9.60 cum	
(ii)	Head wall extension	2 Nos.	1.50	1.00	0.60	1.80 cum	
	Total 3 (i) and (ii)					11.40 cum	
4	Hand packing of stone	Sama as itam N	Jo 3			11.40 and	
4.	into GI wire cages	Same as item No.3				11.40 culli	
	Apron construction						
5.	Earth work	1 No.	8.00	1.50	0.50	6.00 cum	
6.	Wire netting					21.5 sqm	
7.	Collection of stones	1	8.00	1.50	0.50	6.00 cum	
Q	Hand packing of stopes	Same as				6 00 cum	
0.	Traile packing of stolles	item No.7				0.00 cum	
	Total quantities						
	Farth work	(4+6) cum				10 cum	
		(410) cum				10 cum	
	Wire netting	(37.20+21.5) sqm				58.7 sqm	
	Collection of stones	(11.4+6.0) cum	1			17.4 cum	
	Hand packing	$(1\overline{1.4+6.0})$ cum	1			17.4 cum	
	GI wire 10 SWG	58.7 sqm@ Rs	.1.28 kg/sqm			75.14 kg	

Sr.No.	Particulars	Quantity	Rate/unit	Amount (Rs.)
1.	Earthwork	10 cum	Rs.90/cum	900.00
2.	Cost of GI wire 10 SWG	75.14 kg	Rs.40/kg	3005.60
3.	Collection and transportation of stone by head load upto 100 m distance	17.4 cum	@ Rs. 450/cum	7830.00
4.	Hand packing of stones in GI wire cages and tilting of Boxes	17.4 cum	RS.88/cum	1531.20
5.	Wire netting (labour charges)	58.70 sqm	@ Rs. 5/sqm	293.50
	Total			13560.30
	Contingencies 3%			406.80
	Grand Total			13967.10

Abstract of cost (for gabion check dam of span - 8m)

Say Rs. 14000.00 per structure

DRAWING OF KRISHAK VIKAS MANCH



4. Raised Pointing- 1:3.

DETAIL ESTIMATE OF KRISHAK VIKAS MANCH

S.No.	S.No. Description of Work			В.	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.	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
3.	Brick work 1:4 in foundation & super structure					
	1st Footing.					
	Long Wall	2	6.40	0.80	0.40	4.096
	Short Wall	2	3.80	0.80	0.40	2.432
	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	2	6.00	0.40	0.90	4.320
	Short Wall	2	4.20	0.40	0.90	3.024
	Total					18.768 cum
4.	Earth work in filling	1	5.20	4.20	0.75	16.38 cum
5.	C.C.W. 1:4:8	1	5.20	4.20	0.15	3.276 cum
6.	C.C.W. 1:2:4	1	6.00	5.00	0.05	1.500 cum
7.	Raised Pointing 1:3					
	Long Wall	2	6.00	-	0.90	10.80
	Short Wall	2	5.00	-	0.90	9.00
	Total					19.80 m ²

ABSTRACT OF WORK

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

CONSUMPTION OF MATERIALS

S.No.	Particulars	Quantity	Cement (cum)	Coarse Sand (cum)	Bricks	G.S.B. 25- 40 mm (cum)	Stone Grit 10-20 mm (cum)
1.	C.C.W 1:4:8	6.336 cum	21.54	2.851	-	5.892	-
2.	Brick Masonary	18.768 cum	45.04	6.381	9400	-	-
3.	C.C.W. 1:2:4	1.500 cum	9.15	0.630	-	-	1.275
4.	Raised Pointing	19.800 m^2	0.91	0.093	-	-	-
	Total		76.64	11.995	9400	5.892	1.275
	Say		77 Bags	12.000	9400	5.900	1.280

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	77 Bags	290/Bag	22330.00
2.	Coarse Sand	12.00 cum	1500/cum	18000.00
3.	Bricks	9400	3200/ th.	30080.00
4.	G.S.B. 25-40 mm	5.900 cum	1000/cum	5900.00
5.	G.S. Grit 10-20 mm	1.280 cum	1250.00/cum	1600.00
	Rs. 77910			

S.No.	Particulars	Quantity	Rate	Amount	
1.	Earth Work	48.06 cum	36.66/cum	1761.87	
2.	C.C.W. 1:4:8	6.336 cum	494.00/cum	3129.98	
3.	C.C.W. 1:2:4	1.500 cum	494.00/cum	741.00	
4.	Brick Masonary 1:4	18.768 cum	370.00/cum	6944.16	
5.	Raised Pointing 1:3	19.800 m^2	51.61/cum	1021.87	
6.	Curing Charges	18.768 cum	25.00/cum	469.20	
7	Chowkidar	6 Man Days	100.00/Man Day	600.00	
•					
	Total				

LABOUR CHARGES

Total Expenditure		
1. Cost of Materials	77910.00	
2. Labour Charges	14737.00	
Total	Rs. 92647.00	
Say	Rs. 92700.00 only	

DRAWING OF TREE GUARD



DESCRIPTION. 1. Brick work = 1:4.

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

Detail estimate of brick guard:

S.No.	Description of work	No.	L	В	D/H	Quantity	
1.	Earthwork for tree	1	0.60	0.60	0.60	0.2	216
	In foundation	1	3.14x1.09	0.20	0.30	0.2	205
	Total					0.	421
2.	Brick work 1:4					Solid	Glazed
	In foundation	1	3.14x1.09	0.11	0.40	0.151	-
	In super structure with glazed	1	3.14x1.09	0.11	0.48	-	0.181
	Solid	1	3.14x1.09	0.11	0.08	-	0.030
	Glazed	1	3.14x1.09	0.11	0.40	-	0.151
	Solid	1	3.14x1.09	0.11	0.16	0.060	-
	Total					0.211	0.362
3.	Plastering 1:4	1	3.14x1.20	-	0.07	0.264	
		1	3.14x1.20	-	0.15	0.565	
		1	3.14x1.09	-	0.07	0.239	
	Total					1.06	8 m^2

Consumption of materials

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

Cost of Materials:

S.No.	Particulars	Quantity	Rate	Amount
1.	Brick II nd class	190 nos.	3650.00	693.50
2.	Cement	0.65 Bags	290.00	189.00
3.	Coarse sand	0.110 cum	1500.00	165.00
	Total			Rs. 1047.00

Labour Charges

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

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

Total Expenditure						
1.	Material	1047.00				
2.	Labour	203.87				
3.	Head load and transportation	191.87				
	Total Rs. 1442.00					
	Say Rs. 1450.00 only.					





DESIGN OF CONTOUR BUND

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

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	$=(100 \times 0.90)/3$					
	=30 m					
Height of bund $h=\sqrt{(\text{Re x V. I.})/50}$	$=\sqrt{(25 \times 0.90)/50} =\sqrt{0.45} = 0.67$ m. Say 0.70m					
Free board 20% of height minimum 2	0cm					
Total Height	=0.90m					
Taking top width of bund 0.70m and s	ide slope 1.5:1					
	-					
Bottom of bund	$= 0.70 + 2 \times 1.5d$					
	= 0.70 + 2.70					
	= 3.40					
Cross Section of Submergence Bund	$= (0.70+3.40) \times 0.90 / 2$					
	$= 1.845 \text{ m}^2$					
Length of bund	= 100 s / V.I.					
	= (100 x 3) / 0.90					
	= 333 m					
Feasible length	100 + 25 + 25					
	= 150 m					
Earth work/ha	=150 x 1.845					
	=276.75					
Cost per ha	=276.75 x 39.16					
	=10,837.53					
	Say 10,850=00					

TYPICAL SECTION OF FIELD BUND

Top width Side slope Height of bound Bottom Width Cross section Length per hectare Earthwork Cost 39.16/cum Cost per hectare = 0.50 m = 1:1 = 0.50 m = 1.50 m = $(0.50+1.50)\times0.50/2 = 0.50 \text{ m}^2$ = 200 m = 200 x 0.50 = 100 cum = Rs. 3916.00 = Rs. 3916.00

TYPICAL SECTION OF P.B., M.B., S.B.

Top width	= 0.70 m
Side slope	= 1.5:1
Height	= 1.30 m
Bottom	= 4.60 m
Cross section	$= (0.70 + 4.60) \times 1.30/2$
	$= 3.445 \text{ m}^2$
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	$= (1.50 + 9.90) \times 2.10 / 2$
	$= 11.97 \text{ m}^2$
Cost per meter	= Rs. 551.45

TYPICAL SECTION OF CHECK DAM / GULLY PLUG

Top width Side slope Height Bottom Width Cross Section

Cost /meter

= 2.00m = 2:1 = 2.50 m = 12.00 m = (2.00 + 12.00) x 2.50 / 2 = 17.50 m² = Rs. 839.12

TYPICAL SECTION OF W.H.B

Top width	= 2.50 m
Side slope	= 2:1
Height	= 2.75 m
Bottom Width	= 13.50 m
Cross section	$= (2.50 + 13.50) \ge 2.75 / 2$
	$= 22.00 \text{ m}^2$
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 available soil moisture , collection of the runoff water from the catchment area to make up the deficit requirements as well as in situ water harvesting techniques are some of the measures . The in situ water harvesting techniques should be used for growing trees in such a way that each tree has its own micro catchment area. The success of the conservation of horticulture entirely depends on the selection of economically viable hardy varieties of fruit crops resistant to moisture stress or drought and other adverse climate conditions. The fruit crops selected for degraded lands must be such that their maximum growth take place during the period of maximum water availability in the soil and should have low demand.

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

(A) **Basic constraints**

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

(B) Soil constraints

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

(C) Plant related constraints

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

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

CONCEPTS AND ADVANTAGES OF CONSERVATION HORTICULTURE

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

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

CONSERVATION HORTICULTURE PRACTICES

Some of the important practices are given below

1. Selection of Suitable Fruits Types: For the success of conservation horticulture, selection of hardy varieties resistant to diseases and pests and use of local or other hardy root stocks for raising fruit-trees is of great importance. The major part of the reproductive cycle ie. Period from flowering to fruiting must also fall during maximum water availability period and the root ripening must be completed before the onset of dry summer (April-May).

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

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

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

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

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

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

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

Farming system and Micro Enterprises

Traditional cropping system is adopted by the farmer in the project area. So that other source of income is limited. It is essential to diversify the farming system for the prosperity of the farmers. The following system shell be insure the improvement of farming system as well as micro enterprises:

Farming System

- Vermi- composting and organic farming.
- Dairy
- Goat Farming
- Fisheries
- Poultry
- Fruit and vegetable farming
- Agro forestry
- Beekeeping
- Pig Farming
- Silviculture

Micro Enterprise

- Mini Dal Mil
- Rice Polisher
- Oil Speller
- Mini Crasher for Sugar Production
- Purchases Shop

- Mobile Repairing Shop
- Cycle/Motorcycle Repairing Shop
- Hand Pump Repairing Shop

Their estimate is given as under

Social Forestry

Through social forestry farmers can gain extra income other than agriculture. Sagaun and Popular plantation is proposed under social farming their sample estimate is given below:-

- Popular plantation
- Sagaun plantation
- Shoo babool

Livelihood activities for land less people and SHG

The following revenue generating activities in dal farming in the project area for the poorers, land less people and SHG to their

- prosperity
- Dairy Development
- Goat Farming
- Poultry
- Nursery
- Tailoring
- Vermi compost
- Organic Patricides Prop
- Food grain packaging & marketing
- Preparation of by Product of Agriculture Production

Live Stock Development

- Sterilization Deshi bull and ox.
- Devouring of cattle
- Artificial Inseminations
- Balance Feeding
- Proper medical facilities provide
- Awareness Trading Programme

In forest farming: To full fill the gap of fuel vilaitee babool plantation in waste land proposed Vilaitee Babool – 1.00 Hact.

Estimate of orchard Development in the watershed with Fencing A-HORTICULTURE Mango Orchard

S.N0.	Particulars		Quantities	rate	amount	remark
1	Soil working 1Mx1Mx1M					
	size pits1000No.incuding of refilling		1000	35	35000	
2	Application of Farmyard manure		1000	2	2000	
	including cost					
3	Cost of NPK mixture neemicide		1000	1.5	1500	
	Cost of plant(including transportation	and planting	1000	35	35000	
4		1 0				
	Casualty replacement@10 of					
5	itemNo.4		100	35	3500	
6	Cost of weeding and hoeing		1000	2	2000	
		Total			79000	
7	Contingency unforeseen (3%)				2370	
		Total		•	81370	
				Say	81500	
	Maintenance cost I year					
	15% of 1st year				12220	
	For next 5year i.e.12220x5		·		61100	
					142600	
8	Fencing				50000	
				Total		
				cost	192600	
	Farmer share	40%		·	77040	
	Govt. share	60%			115560	

S.N0.	Particulars		Quantities	rate	amount	remark
1	Soil working 1Mx1Mx1M					
	size pits 215No.incuding of refilling		215	35	7525	
2	Application of Farmyard manure		215	2	430	
	including cost					
3	Cost of NPK mixture, neemicide		215	1.5	322.5	
4	Cost of plant(and planting	including transportation	215	35	7525	
	Casualty replacement@10 of					
5	itemNo.4		21	35	735	
6	Cost of weeding and hoeing		215	2	430	
		Total			16967.5	
7	Contingency unforeseen (3%)				509.025	
		Total			17476.525	
				Say	17500	
	Maintenance cost IIyear15% of 1st yea	ar			2625	
	For next 5year i.e.2625x5				13125	
8	Cost of raising agricultural crops7500/	ha			7500	
	· <u> </u>			Total		
				cost	38125	
	Farmer share	40%			15250	
	Govt. share	60%			22875	

Estimate of Mango Orchard Development in the watershed

A. HORTICULTUREWITH JAYTROFA

S.N0.	Particulars		Quantities	rate	amount	remark
1	Soil working 1Mx1Mx1M					
	size pits1000No.incuding of refilling		1000	35	35000	
2	Application of Farmyard manure		1000	2	2000	
	including cost					
3	Cost of NPK mixture, neemicide		1000	1.5	1500	
	Cost of plant(including transportation	and planting	1000	35	35000	
4						
	Casualty replacement@10 of itemNo.4	1				
5			100	35	3500	
6	Cost of weeding and hoeing		1000	2	2000	
		Total			79000	
7	Contingency unforeseen(3%)				2370	
		Total			81370	
				Say	81500	
	Maintenance cost IIyear					
	15% of 1st year				12220	
	For next 5year i.e.12220x5				61100	
					142600	
				Total		
				cost	142600	
	Farmer share	40%			57040	
	Govt. share	60%			85560	

A. HORTICULTURE Papaya Plantation

S.N0.	Particulars		Quantities	rate	amount	remark
1	Soil working 1Mx1Mx1M					
	size pits 1000No.incuding of refilling		1000	10	10000	
2	Application of Farmyard manure		1000	2	2000	
	including cost					
3	Cost of NPK mixture, neemicide		1000	1.5	1500	
	Cost of plant(including transportation a	and planting	1000	10	10000	
4						
	Casualty replacement@10 of itemNo.4					
5			100	10	1000	
6	Cost of weddings and hoeing		1000	2	2000	
		Total			26500	
7	Contingency unforeseen(3%)				795	
		Total			27295	
				Say	27300	
	Maintenance cost IIyear					
	15% of 1st year				4095	
	For next 2year i.e.4095x2				8190	
					35490	
8	Fencing				50000	
				Total		
				cost	85490	
	Farmer share	40%			34196	
	Govt. share	60%			51294	

Estimate of Papaya plantation Development in the watershed

S.N0.	Particulars		Quantities	rate	amount	remark
1	Soil working 1Mx1Mx1M					
	size pits 215No.incuding of refilling		215	35	7525	
2	Application of Farmyard manure		215	2	430	
	including cost					
3	Cost of NPK mixture, neemicide		215	1.5	322.5	
	Cost of plant(including transportation and	planting	215	35	7525	
4						
5	Casualty replacement@10 of itemNo.4		21	35	735	
6	Cost of weeding and hoeing		215	2	430	
		Total			16967.5	
7	Contingency unforeseen (3%)				509.025	
		Total		•	17476.525	
			•	Say	17500	
	Maintenance cost I year					
	15% of 1st year				2625	
	For next 5year i.e.2625x5				13125	
8	Cost of raising agricultural crops7500/ha				7500	
				Total		
				cost	38125	
	Farmer share	ፈበማ			15250	
	Govt. share	<u> </u>			22875	

B AGRI-HORTICULTURE Popular Plantation

Estimate of Orchard Development in the watershed with Fencing

A. HORTICULTURE Mango Orchard

S.N0.	Particulars		Quantities	rate	amount	remark
1	Soil working 1Mx1Mx1M					
	size pits 100No.incuding of refilling		100	35	3500	
2	Application of Farmyard manure		100	2	200	
	including cost					
3	Cost of NPK mixture, neemicide		100	60	6000	
		including				
	Cost of plant(transportation	100	30	3000	
4	and planting					
	Casualty replacement@10 of					
5	itemNo.4		10	30	300	
6	Cost of weeding and hoeing		100	10	1000	
		Total			14000	
7	Contingency unforeseen (3%)				420	
		Total			14420	
				Say	14500	
	Maintenance cost IIyear					
	15% of 1st year				2175	
	For next 5year i.e.2175x5				10875	
					25375	
8	Fencing				14500	
				Total		
				cost	39875	
	Farmer share	40%			15950	
	Govt. share	60%			23925	

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

District Meerut is situated in U.P.West 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 deformed twice, there shall be increment of 4 kg in meat on an average, benefiting the farmers of the state.

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

Goat husbandry is profitable in western UP due favorable geo-climate conditions and land pattern. Goats thrive well in dry and semi-dry climate with bushes and thorny vegetation. Presently in this area, farmers rear goats for their livelihood. If goat husbandry would be transformed to intensive husbandry, there shall be more economic stability of farmers, more profit sharing and availability of running capital for future expansion. Keeping in view the above facts, goat units shall be formed in the area in intensive way. 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. *Ten Goat Units are proposed in III.I.W.M.P. Project for S.H.G. One unit constituting 20 goats and 1 buck will be distributed to one S.H.G.*

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

Financial Component

S.No.	Component	Amount
1.	Cost of 20 goats of improved breed (not less than 6 months of age) @ Rs. 4000.00 each	80000.00
2.	Cost of 1 buck of improved breed @ Rs. 5000.00	5000.00
3.	Cost of insurance @ 11.63 / unit	1220.00
4.	Feed cost for 3 months @ 250 gm/ day for goats @ Rs. 11.84/ 250 gm	22375.00
5.	Provision of deworming, mineral and vitamin supplement, treatment, vaccination @ Rs.160/ animal	3360 .00
6.	The expense including monitoring expenses, register and records @ Rs. 170.00/ unit	170.00
	Total	Rs. 112125.00
	Sa	y Rs. 112125.00

Dairy Farming

Regarding income generating activities through Self Help Group, landless and marginal farmers are advised to use three or four *Hybrid* cow or two or three buffalos of *MURRA* or *NEELI* breed, for their lively hood.

Estimate of Livestock Development Activities

Total number of fem	ale animals:	Buffalo	-	19281		
		Cow	-	3556		
		Total	-	22837		
1. Artificial Insemina	ation (A.I.): 339	6 of total and	imals per y	ear, i.e. 75	36	
Amou	int required for	A.I. by BAI	F @ 125/ a	nimal.		
	-	Total Amo	ount		Rs. 942	000
2. Vaccination: Tota	l number of anir	nals in I.W.	M.P. I	-	22837 no	os.
	1. H.S	. + B.Q.	@ 6.50)	148440	
	2. F.M	.D.	@10.50)	239788 (Twice in a year)
		Total Amo	ount		Rs	.776497
3. Deworming:	Adult animals	22837				
	Child animals	- 14:	50			
	Albendazole f	for 228	37animals	@ 40.56	Ď	926268
		145	0 child ani	mals @20	.28	29406
		Total Amo	ount		Rs.	955674
4. Mineral Mixture:	Agrimine For	te Cheated f	or 22837 ar	nimals @ 1	125.00	Rs. 285462
		GRAND T	OTAL		-	Rs. 2959633

S.NO.	Items	Unit		Rate	Amount
1	New Nursery Survey, Clarence, leveling	ha	1	100	100
2	Tillage work upto 0.30 mts.		1	525	525
3	Bunding & Partition, Channel, road, (lOx1.25 mts.) and mixing of manure	На		525	525
			1		
4	Preparation of seed showing	No.	800	12	9600
5	Seed Showing in Bags	No.	20,000	15.80/000	316
6	Plantation Development in Bags.	No.	800	0.16	128
7	Purchasing of soil, sand &	Cmt.	194	966.37	18747.58
	FYM(30x40cm) for Bags.				
8	Pesticides mixing in Bags	No.	20000	3600/000	72000
9	Pesticide purchasing &	No.	20000	10.89/000	475.8
	Utilization.			12.90/000	
10	Irrigation & sowing of seed (Preparation of Pricks)	No.	20000	88/000	1760
11	Printing work	No.	20000	90/000	1800
12	Changing of Place & yielding	No.	20000	124/000	2480
13	Changing place after 6 month	No.	20000	84/000	16800
14	Nirai & Gudai of Orchards	No.	20000	27/000	540
				Total	125796

Sample Estimate for Nursery Establishment IWMP-III BAGPAT Area 1.0 ha.

SNo.	Detail of work	Unit	Quantity	Rate	Amount	Remark
1	2	3	4	5	6	7
1	Safety Trenching at	Running mt.	500	34.48	17240	
	Border of area 1.2-1.0/2X.90					
2	Clearance of Plantation Spot area	На	1	157	157	
3	Excavation of pits (0.60rnXO.60rnXO.60m)	Nos.	1000	7.16	7160	
4	Purchasing of Farmyard manure (0.50 ct./fit)	Cu	500	8.5	4250	
S.	Filling of pits with mixing farmyard manure06mX.06mX.06m	Nos.	1000	0.8	800	
6	Cartage for Plants @3% loss	Nos.	1030	3.93	4047.9	
7	Local Cartage of Plants	Nos.	1000	1.412	1412	
8	Plantation work	Nos.	1000	4.3	4300	
9	Irrigation of Plants (16ton)	Nos.	16000	2.299	36784	
10	Mulching, Trraining and prooning of	Nos.	4000	0.52	2080	
	Plant (4 tunes)					
11	ides spray (2Tone)	Nos.	2000	0.5	1000100	
12	Plantation labour (July to march)	Nos.	78x1	100	7800	
13	Purchasing of Plants.	Nos.	1000	50	50000	
	Steel Board for					
14	Identification.	Nos.	1	1800	1800	
	Total	-	-	-	138831	

Detail Estimate for 1.00 Hact. Afforestation work in Project IWMP –III BAGPAT

Name of plan Citrus

Row to row distance-6mts.

Plant to Plant distance- 6mts.

Plants Area -1.00 ha.

Plant Population - 278 Nos.

Estimate for 1.00 ha Area,.

S.No.	Items	Unit	Qty.	Rate(Rs)	Amount.
1	2	3	4	5	6
1	Pit alignment	Nos	278	6/pits	4448
2	Excavation of foundation (0.60xO.60xO.60)	Nos	278	3/pits	834
3	Filling of Pit with Fertilizers	Nos	278	0.60/pits	167
4	Purcharge of seed ling with transportation.	Nos	278	50.00/pits	139
5	FYM with In-secticides.	Nos	278	0.80/pits	222
6	Plantation of seed ling.	Nos	278	4.30/pits	1195
7	Display Board	Nos	1 Nos.	1800 each	1800
	Total				Rs 8805

Sample Estimate for Production System & Micro Enterprises.

Estimate for demonstration: 40% amount Expend in Kharif Crop & 60% Amount Expended in Rabi crops against allocated fund for production system & micro enterprises. Management:

- Selection of seed; Draught resistance high yielding variety.
- Integrated Nutrient Management use 50% (FYM + Bio fertilizers)
- Integrated Weed & Paste management. 50% Chemical fertilizers
- Water Application; Sleeted Crops in Kharif & Rabi Season

Kharif - Bajara, Til, Moong, Urd, Fodder Bajara, Ohaincha.Rabi - Mustard, Wheat. Lantil, Gram, Jou (fodder), barseem.

		N	ame of the]	Kharif cron	s / per ha. cos	st
S	Item					
Ν		Bajara	Til	Urd	Moong	Bajarafodder
1	2	3	4	5	6	7
1	Quantity of seed in kg	6 kg	4kg	15kg	15kg	15-20kg
	Cost Rs./kg	200	150	125	100	200
	Cast of seed	1200	600	1875	1500	3000
2	Use of Fertilizer					
	Quantity of Urea in kg	80	15	4.5	4.5	85
	Rates/kg	5.3	5.3	5.3	5.3	5.3
	Amount	424	79.5	23.85	23.85	450.5
	Quantity of DAP in kg	65	45	45	45	65
	Rates / kg	10.5	10.5	10.5	10.5	10.5
	Amount In Rs.	682.5	472.5	472.5	472.5	682.5
	Quantity of MOP in kg	35	25	17.5	17.5	5.1
	Rates/kg	5.1	5.1	5.1	5.1	5.1
	Amount	178.5	127.5	89.25	89.25	26.01
3	Past and weed manage Rs.2500Rs./ha.	2500	2500	2500	2500	2500
	Water Application per ha.	0	0	0	0	0
	TOTAL	4985	3779.5	4960.6	4585.6	6659.01

Cost per na demonstration for Kabi crops	Cost per	ha demonstration	for Rabi crops
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	Items		Name of Ral	bi crops/ per h	ıa. Cost.		
S.N 0.		Mustard	Wheat	Lental	Gram	Jou	Barseen
1	2	3	4	5	6	7	8
1	Quantity of seed kg.	4.5	120-130	50 kg	15	100	30
	Seed cost Rs/ Kg	160	22	125	100.	20	120
	Cast of seed	640	2640	6250	1500	2000	5100
2	Use of Fertilizer						
	Quantity of Urea in kg	85 kg	105	-	-	87.5	26kg
	Rates	5.3	5.3	5.3	5.3	5.3	5.3
	Amount'	450.5	556.5	-	-	463.75	137.8
	Quantity of DAP in kg	65 kg	65 kg	65 kg	65 kg	55 kg	45 kg
	Rates / kg	10.5	10.5	10.5	10.5	10.5	10.5
	Amount	682.5	682.5	682.5	682.5	577.5	472.5
	Quantity of MOP in kg	35	35 kg	25 kg	25 kg	42.50 kg	17 kg
	Rate	5.1	5.1	5.1	5.1	5.1	5.1
	Amount	86.7	178.5	127.5	127.5	216.75	86.75
3	Paste & weed management 2500 Rs./ ha.	2500	2500	2500	2500	2500	2500
4	Water Application	3000	7500	1500	1500	1500	20000
	Total cost/ ha.	7359	14057	11060	14810	7258	28297
	Say Total	7400	14000	11 000	15,000	7300	28300

	A. Goat farming		
1	Purchase of Male Goat	@ 3000 each	60000
2	Purchase of Male Goat	@ 5000 each	5000
3	Medical Treatment	@ 50 Rs each/year	1050
		Total	66050
	Benefit	700 to1000 Rs. Per Goat due to milk & selling of goats	
	B. Poultry farming :(Broiler)		
	1. Cost of Chuja (Van Raja)	50 No.@ Rs 15	7500
	2. Cartage		500
	3. Medicine/-Medical Treatment		200
	4.Cage, housing etc.		5000
		Total	6200
	C Beekeeping		
	1.Purchage of bee box	10 no.@3000/box	30000
	2 .Colony	10 @1000 Rs/ colony	10000
	3.Equipments & Tools etc		10000
		Total	50000
	D. Mini Dal Plant		
	1. Purchase of Machine		15000
	2. Seed money for Purchasing grain		50000
	3.Sick machine Bag etc.		5000
		Total	70000
	E. Nursery Unit	Total	50000

Sample Estimate for Income generating activities through S.H.G. for land less & marginal formers


DRAWING OF NADEP COMPOST STRUCTURE

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Preparation of compost by NADEP method

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

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

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						
2.	Brick Work 1:4						
	Long Wall Solid	2	3.46	0.23	0.90	1.432	
	Short Wall Solid	2	2.40	0.23	0.90	0.993	
	Total						
	Long Wall Glazed	2	3.46	0.23	0.60	0.954	
	Short Wall Glazed	2	2.40	0.23	0.60	0.662	
		Total				1.616 cum	
3.	Plastering Work						
	Long Wall	2	3.46	-	0.60	4.152	
	Short Wall	2	2.40	-	0.60	2.880	
	Top of Long Wall	2	3.46	0.23	-	1.591	
	Top of Short Wall	2	2.40	0.23	-	1.104	
		Total				9.727 m ²	

Estimate of compost by NADEP method

Abstract of work

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

Consumption of materials

S.No.	Particulars	Quantity	Cement	Coarse	Bricks (nos.)
			(Bags)	Sand	
				(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	-
	Total		6.89	1.019	1487
	Say		7 Bags	1.02 cum	1500 nos.

Cost of materials

S.No.	Particulars	Quantity	Rate	Amount
1.	Cement	7 Bags	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
	Tota	Rs. 8,788.20		

Labour charges

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

Total Expenditure

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

DEMONSTRATIONS

A. Demonstration of wheat

Variety recommended for BagpatIrrigated: PBW 550, DBW16 &17Un-irrigated: C 306, Raj 3765, Raj 1555Seed rate -100 -125 Kg/haRequirement of fertilizers/haN-150 Kg, P-75 Kg, K-75 Kg

Estimate of demonstration of wheat in watershed (per ha)

S.No.	Particulars	Quantity	Rate(Rs)	Amount	Remark
1	Tillage operation or preparation of	1.0ha	1000.00/ha	1000.00	Since the project is to
	field for sowing				be operated in a
2	Cost of seed	100kg	25/kg	1800.00	participatory
3	Sowing by seed drill	1.0ha	1000.00/ha	1000.00	Mode, contribution in
4	D.A.P. 18:46	160kg	573.00/ 50 kg	1833.60	form of the tillage,
5	Urea	210kg	270.00/ 50 kg	1134.00	sowing, irrigation and
6	Potash (M.O.P.)	150kg	300.00/50kg	900.00	harvesting done by
7	Irrigation(three irrigation)	1.00ha	650.00/ha	650.00	farmer is not included
8	Harvesting	1.00ha	2000.00/ha	2000.00	in the estimates
	1	1	Total	12217.00	
			Say	12220.00	

Hence demonstration cost of wheat /ha is Rs. 12220.00

B. Demonstration of Arhar

Variety recommended for Bagpat: UPAS 120, Pusa 992, ICPL 151, Pusa 33Seed rate -15 Kg/haRequirement of fertilizers/haN-20 Kg, P-60 Kg, K-40 Kg

Estimate of demonstration of Arhar in watershed (per ha)

S.No.	Particulars	Quantity	Rate(Rs)	Amount	Remark
1	Tillage operation or preparation	1.0ha	1000.00/ha	1000.00	Since the project is to be
	of field for sowing				operated in participatory
2	Cost of seed	15kg	85/kg	1275.00	Mode, contribution by the
3	Sowing by seed drill	1.0ha	1000.00/ha	1000.00	farmer in the form of
4	D.A.P. 18:46	130kg	573.00/ 50 kg	1490.00	tillage, operation, sowing
5	Potash (M.O.P.)	100kg	300.00/50kg	300.00	and harvesting provided by
6	Plant protection	1.0ha	1000/ha	1000.00	participating farmers,
7	Irrigation	1.00ha	650.00/ha	650.00	hence this cost is not
8	Harvesting	1.00ha	2000.00/ha	2000.00	included in the estimates.
			Total	8715.00	
			Say	8720.00	

Hence demonstration cost of wheat /ha is Rs. 8720.00

C. Demonstration of Lentil

Variety recommended for Bagpat: PL 4, PL 306, PL 5etc

Seed rate -15 Kg/ha Requirement of fertilizers/ha N-20 Kg, P-60 Kg, K-40 Kg

Estimate of demonstration of Lentil in watershed (per ha)

S.No.	Particulars	Quantity	Rate(Rs)	Amount	Remark
1	Tillage operation or preparation	1.0ha	1000.00/ha	1000.00	Since the project is to be
	of field for sowing				operated in participatory
2	Cost of seed	60kg	85/kg	6375.00	Mode, contribution by the
3	Sowing by seed drill	1.0ha	1000.00/ha	1000.00	farmer in the form of tillage,
4	D.A.P. 18:46	130kg	573.00/ 50 kg	1490.00	operation, sowing and
5	Potash (M.O.P.)	100kg	300.00/50kg	300.00	harvesting provided by
6	Plant protection	1.0ha	1000/ha	1000.00	participating farmers, hence
7	Irrigation	1.00ha	650.00/ha	650.00	this cost is not included in
8	Harvesting	1.00ha	2000.00/ha	2000.00	the estimates.
	Total			12540.00	
	Say			12550.00	

Hence demonstration cost of wheat /ha is Rs. 12550.00

D. Demonstration of Gram/Pea

Variety recommended for Bagpat: Gram: Avrodhi, WCG 1,2, K8 etc

Pea: Aparna, Azad pea 5, Arkil P 6

Seed rate -15 Kg/ha Requirement of fertilizers/ha N-20 Kg, P-60 Kg, K-40 Kg

Estimate of demonstration of Gram/Pea in watershed (per ha)

S.No.	Particulars	Quantity	Rate(Rs)	Amount	Remark
1	Tillage operation or preparation	1.0ha	1000.00/ha	1000.00	Since the project is to be
	of field for sowing				operated in participatory
2	Cost of seed	75kg	85/kg	6375.00	Mode, contribution by the
3	Sowing by seed drill	1.0ha	1000.00/ha	1000.00	farmer in the form of tillage,
4	D.A.P. 18:46	130kg	573.00/ 50 kg	1490.00	operation, sowing and
5	Potash (M.O.P.)	100kg	300.00/50kg	300.00	harvesting provided by
6	Plant protection	1.0ha	1000/ha	1000.00	participating farmers, hence
7	Irrigation	1.00ha	650.00/ha	650.00	this cost is not included in
8	Harvesting	1.00ha	2000.00/ha	2000.00	the estimates.
	Total			13815.00	
	Say			13820.00	

Hence demonstration cost of wheat /ha is Rs. 13820.00

E. Demonstration of Mustard

Variety recommended for BagpatIrrigated: Pusa Bold, Pusa Gold, Kranti, etcUn-irrigated: Kiran, VarunaSeed rate -5-6 Kg/haRequirement of fertilizers/haN-100 Kg, P-40 Kg, K-20 Kg

Estimate of demonstration of mustard in watershed (per ha)

S.No.	Particulars	Quantity	Rate(Rs)	Amount	Remark
1	Tillage operation or preparation of	1.0ha	1000.00/ha	1000.00	Since the project is to
	field for sowing				be operated in a
2	Cost of seed	6kg	75/kg	450.00	participatory
3	Sowing by seed drill	1.0ha	1000.00/ha	1000.00	Mode, contribution in
4	D.A.P. 18:46	88kg	573.00/ 50 kg	1685.00	form of the tillage,
5	Urea	88kg	270.00/ 50 kg	475.00	sowing, irrigation and
6	Potash (M.O.P.)	50kg	300.00/50kg	300.00	harvesting done by
7	Irrigation &Plant Protection	1.00ha	950.00/ha	950.00	farmer is not included
8	Harvesting	1.00ha	2000.00/ha	1000.00	in the estimates
	Total	5860.00			
	Say			5860.00	

Hence demonstration cost of wheat /ha is Rs. 5860.00

F. Demonstration of Hybrid Bajra

Variety recommended for Bagpat Irrigated:

Seed rate -10 Kg/ha Requirement of fertilizers/ha N-90 Kg, P-30 Kg, K-30 Kg

Estimate of demonstration of Hybrid Bajra in watershed (per ha)

S.No.	Particulars	Quantity	Rate(Rs)	Amount	Remark
1	Tillage operation or preparation of	1.0ha	1000.00/ha	1000.00	Since the project is to
	field for sowing				be operated in a
2	Cost of seed	106kg	150/kg	1500.00	participatory
3	Sowing by seed drill	1.0ha	1000.00/ha	1000.00	Mode, contribution in
4	D.A.P. 18:46	65kg	573.00/ 50 kg	745.00	form of the tillage,
5	Urea	42kg	270.00/ 50 kg	227.00	sowing, irrigation and
6	Potash (M.O.P.)	50kg	300.00/50kg	300.00	harvesting done by
7	Irrigation & Plant Protection	1.00ha	950.00/ha	950.00	farmer is not included
8	Harvesting	1.00ha	2000.00/ha	1000.00	in the estimates
	Total	6722.00			
	Say			6220.00	

Hence demonstration cost of wheat /ha is Rs. 6720.00

Demonstration of agro-horticulture using plastic drum of 200 lit. capacity

District Meerut is situated in U.P WEST region where there is scarcity of water and in summer temperature rises up to 42° c causing upper layer of fields dry and therefore mortality rate of plants is very high. Farmers usually like to grow grain crops only. They are not interested in horticulture because of less holding. The production of crops decreases below the tree.

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

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

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

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

Detail estimate of demonstration of horticulture and mixed cropping for 1.00 ha.

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

CONSUMPTION OF MATERIALS

COST OF MATERIALS

S.No.	Particulars	Quantity	Rate	Amount
1.	Farm yard manure	1560.0 kg	10.00/kg	15600.00
2.	Barbed wire	1200.0 m/120.0 kg	60.50/kg	7260.00
3.	Angle iron	239.40 m/785 kg	40.50/kg	31792.50
4.	Plastic drum	156 nos	690.00 each	107640.00
5.	Cement	6.50 bags	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
	Total			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 cum	492.00/cum	523.88
3.	Fixing of angle iron	10 Man Days	100/Man Day	1000.00
4.	Fixing of barbed wire	15 Man Days	100/Man Day	1500.00
	Rs. 58,527.85			

Total Expenditure				
1. Cost of materials	1,68,292.50			
2. Labour Charges	58,527.85			
Total	Rs. 2,26,819.50.00			
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 BAGPAT 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. IInd Project, efforts will be made to oblise the farmers for Green Manuring A typical estimate is made for Green Manuring is given below:

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 plough the plants of Dhaincha after 40- 45 days of sowing for Green Manuring.	1000/ha Before and after saring	2000.00	participatory mode, contribution in the form of tillage will be done by farmers is not included in the estimate.
	Total		Rs. 625.00	

Estimate for green manuring in the watershed (per ha)

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

PASTURE MANAGEMENT

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

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

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

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

Zone wise crop rotations	Green fodder yield(t / ha)
Central region	
Hybrid Napier +Cowpea-Berseem+Japanrape	286.3
Maize+Cowper-Jowar-Berseem+Japanrape	197.2
Jawar+Cowper-Berseem+Japanrape-Jawer+Cowpea	168.6
Agola of Sugarcane	

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

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

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

Potentials of Semi-arid region for different forage production systems

Region	Forge Production Systems
Semi arid cultivated	Integration of Agro-Silvi-Pasture, dry land agriculture on lands. Forage-cum- arable crop
lands with	Forming on the marginal and sub marginal land and intercropping of 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:

- To condition the soil to make it resistant to determent and transportation and create more absorptive surface layer.
- To cover the soil so that it is protected from the impact of wind and rain drops.
- To decrease the velocity of wind or runoff water.
- 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:

- Strip cropping, rotational cropping or lay farming.
- Stabilization of bunds and terraces.
- Stabilization of gullies, diversion or drainage channels.

- Stabilization of sand dunes.
- Meadows and pasture on steep slopes
- Fertility builder for eroded soi

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

The name of Nakshtra and their tree are as follows:

S.No.	Name of Nakshatras	Name of Tree
1.	Ashwini	Kuchila
2.	Bharini	Aamla
3.	Kritika	Goolar
4.	Rohini	Jaamun
5.	Mrigshira	Khair
6.	Aadra	Agar
7.	Punarvasu	Baans
8.	Pushya	Peepal
9.	Ashalekha	Chameli
10.	Magha	Bar (Banyan)
11.	Purvafalguni	Dhak
12.	Uttarafalguni	Pilkhen
13.	Hasta	Jaai
14.	Chitra	Bel
15.	Swati	Arjun
16.	Vishakha	Babool (Acacia)
17.	Anuradha	Naagkeshwar
18.	Jyeshtha	Shambhal
19.	Mool	Raal Vriksha (Bitumen)
20.	Purvaashadha	Bait (Cane)
21.	Uttaraashadha	Panash
22.	Shrawan	Aak
23.	Ghanishtha	Jaanthi
24.	Shatbhisha	Kandab
25.	Purvaabhadrapad	Aam (mango)
26.	Uttaraabhadrapad	Nimbu (Lemon)

Average cost of Bunding up to field 3 % slope

Average lengths of bunds per ha.	481 m
Cross sectional area of the bunds	0.90 sq m
Total earth for bunding per ha.	432.90cum
a. Average cost of earth work involved in bunding per ha.(@ Rs 40 per cum)	Rs.17320.00
b. Average cost of renovation of existing bunds of the cross section 0.05sq. m	Rs. 962.00
Total Cost	16358.00

Say Rs. 16360.00 per ha. Cost of bunding

Average cost of minor leveling in the bunded fields

Cost of minor leveling in the bunded fields is Rs. 7500.00 per ha and about 250 land require minor land leveling in the watershed. Which will cost about Rs. 18.75 lacks Crop production

Mulching and crop residue management

The sources of mulching material as brought up mulch i.e. litter or pruned material of trees etc are scarce in the watershed. The weeds, *in situ* grown legume and multi purpose trees (as hedge row or on marginal and degraded lands) are some of the options available with growers for mulching the rain-fed crops for moisture conservation, fertility restoration and other purposes. Therefore, weed mulching and hedge row of MPTs will be demonstrated in the watershed for benefit of the rural community.

Green manuring

Intensive cropping with inadequate application of organic manures i.e. FYM, compost etc, has over exploited the existing agricultural production system in the watershed. In order to improve the fertility as well as physico-chemical properties of soils green manuring insitu and ex-situ with suitable crops like *dhaincha*, sun-hemp and neel are proposed to be demonstrated in the watershed areas of IWMP-III BAGPAT

Vermi-composting

In order to provide quality manure with high nutrient content to various field crops, vegetables and cash crops, to save time and proper disposal of on farm organic refuse and cow dung as well as to promote organic farming, vermin-composting will be demonstrated to the farmers so that within a short period they can be able to produce manure from organic waste.

Crop rotation and intercropping

In order to diversify farm produce, minimize the farming risk, mitigate soil erosion, to ensure nutritional security and to optimize farm return, intercropping of legumes (black gram and green gram) in inter row spaces of bajra are proposed to be undertaken in the watershed during *kharif* season. Sustainable and profitable crop- rotations suiting to various needs of the people of the watershed will be demonstrated.

Bio-fertilizers

The various beneficial bio-fertilizers like nitrogen fixers, phosphate solubliser and organic matter decomposers for both legumes and non legumes will be demonstrated in the farmer's field under the watershed villages.

Tillage operations

Deep tillage technology developed at the Agra center holds promising in enhancing post monsoon residual soil moisture conservation and improving the yield of subsequent mustard crop. This technology is proposed to be demonstrated for benefit of farmers in the watershed

Introduction of improved seeds of high yielding varieties (HYV)

Replacement of low yielding traditional varieties of jowar, gram and lentil in the villages in the watershed with improved varieties is necessary for improving the productivity and farm income. These HYVs will be demonstrated in the watershed for the benefit of the farmers.

Balanced fertilizer use

Inadequate and imbalanced fertilizer use in bajra and jowar during *kharif* season and in wheat, mustard, gram and lentil in *rabi* season are one of the major constraints in agricultural production system of the watershed. Therefore, balanced fertilizer use in different crops will be demonstrated in the watershed for the benefits of the farming community.

Control of insect pest and diseases

Aphid in the mustard and pod borer in gram are the major insects in the watershed areas leading to loss in crop productivity. Similarly white blister is also a common disease in the mustard crop. The management strategies of these insect pests and diseases will also be demonstrated in the watershed for benefit of the growers.

Management of the crop

The recommended technology (13.7) of crop management will be demonstrated to the farmers in half plot trial approach so as to enable the farmers to assess the benefits and impact of each technology or package of practice for their ultimate adoption in the watershed. The interventions scheduled on prioritization of problems in the crop production following PRA and surveys target specifically solution of the each and problem related to the crop production as per interventions at 13.7. The specific problems, if any shall be dealt with contingency budget.

Dry land Horticulture

About 20 ha of land are suitable for horticultural development. Species like Bael and Ber will be planted at suitable spacing in the watershed

Agri- Horticulture

Aonla and Sahjan would be a suitable horticultural crop to the locality. Therefore, about 5 ha land in the farmers field shall be selected and brought under Agri-horti system. The cropping system followed will be Bajra and Wheat.

Plantation:

Fuel wood plantation: About 28 ha land will be taken from the waste land falling in the class-VII category in the watershed. These lands will be planted with species like *Prosopis juliflora*, *Acacia nilotica*, *Prosopis cineraria* and *Holoptelia integrifolia*.

Establishment of Farm Implement Center (FIC)

Establishment of six Farm Implement Center is proposed in watershed management plan of IWMP-III Bagpat watershed, that will created the Employment to the rural youths besides improving the soil productivity and agriculture production in the proposed watershed.

S.NO.	Particulars	No./Unit	Unit	Cost Rs.	Subsidy	Total Cost
			Cost	Lakh		Rs. Lakh
а	Cost of Implement					
1	Tractor	1	4.5	4.5	30%	1.35
2	Laser leveler	1	3.5	3.5	50%	1.75
3	Tractor driver mold broad plough	3	0.4	1.2	50%	0.60
4	Sub Soiler	5	0.3	1.5	50%	0.75
5	Mechanical leveler	2	0.4	0.8	50%	0.40
6	Power sprayer	5	0.1	0.5	50%	0.25
7	Ridge maker	2	0.2	0.4	50%	0.20
8	Ferti –seed-drill	2	0.7	1.4	50%	0.70
9	Raised bed planter	5	0.8	4.0	50%	2.00
	Sub Total	-	-	-	-	8.00
b	Establishment cost and other Expenditure (for five years)	-	-	-	-	2.00
	Total					
	G. Total (Six Unit)					60.00

The detail expenditure of Farm Implement Center (FIC) is as follows:

SOCIO-ECONOMIC ANALYSIS OF THE PROJECT

Sustainability and environment security

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

Economic Analysis

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

Agriculture

In rainfed agriculture, the development cost can be recovered within one year as the present rain fed agriculture is being done on well maintained field, therefore, does not require much investment. In irrigated agriculture, investment of Rs. 395.71 lacs is proposed to make. The BC ratio of this sector is 1.8: 1 with in three years pay back period.

Economics of agriculture sector

S.No.	Sector	Area (ha)	NPV (Rs.)	BC ratio
1	Irrigated agriculture	630.80	31143000	1.5:1
2	Rainfed agriculture	4625.00	83960000	1.3:1
3	Total	5255.80	115103000	1.4 :1

Horticulture

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

SN	Common Name	Area (ha)	NPV of Net Benefit (Rs)	B:C Ratio
1	Popular	95	31515000	6.4:1
2	\$agaun	75	86300000	24:1
3	Guava	75	1425500	4-8:1
4	Papaw	45	1280000	24:1
	Total	290	134975500	14.8:1

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

SN	Common Name	Scientific name	Area (ha)	NPV of Net Benefit (Rs)	B:C Ratio
1	Vilayati Babul	Prosopis juliflora	25	384482	2.1:1

Food sufficiency

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

Status of food requirement and availability per annum in IWMP-I Bagpat watershed

Sr.	Items	Require	Before	efore project Proposed		
No.		ment	Availability	Deficit or	Availability (q/yr)	Deficit or surplus (q/yr)
		(q/yr)	(q/yr)	surplus (q/yr)		
1	Cereals	1944	1757	-147	2250	+ 493
2	Pulses	586	248	-187	1030	+ 782
3	Oil seeds	446	4971	+4542	5628	+ 657
4	Vegetable	1464	79	-1385	1550	+ 86

CONSTITUTION OF

PIA, WDT, USER GROUPS, SHG's AND WC

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 Meerut vide letter no-666(10)/54-1-10-1(9)02008 Dated 25-5-2010.

S.No.	Name	Designation	Qualification	Experience
				(Year)
1	Sri S.K.Singh	B.S.A.	intermiate In Ag.Engg.Diploma	31
2	Sri S.P.banshwar	JR.Engr	intermiate In Ag.Engg.Diploma	27
3	Sri Gulab .Singh	JR.Engr	M.A.Econamics, Ag.Engg.Diploma	27
4	Sri Ashok Rastogi	Accountant	M.Com.	7
5	Sri Mon Pal Singh	D/Man	B.A. Diploma in Draft man	33
6	Sri Ram Kishor Mishra	A.S.C.I.	B.Sc.(Ag)	27
7	Sri Ramveer Singh	Work in charge	B.A.	25
8	Sri Bhoopendra Kumar	Work in charge	B.A.	21
9	Sri Hari Ram	Work in charge	intermiate	22
10	Sri Girand Singh	Work in charge	intermiate	21
11	Sri Jiledar Singh	Work in charge	intermiate	22

Detail Staffing Pattern of PIA:

Institutional Arrangement at Project level:

Project management Agency (PIA)

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

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

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

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

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

Roles and Responsibilities of the PIA:

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

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

audit of the work undertaken. It will facilitate the mobilization of additional financial resource from other government programmes, such as NREGA, BRGF, SGRY, National Horticulture Mission, Tribal, Welfare Schemes, Artificial Ground Water Recharging, Greening India, etc.

CONSTITUTION OF W.D.T. BY P.I.A.IWMP-III BAGPAT

One W.D.T. have constituted vide letter No B.S.A/60/I.W.M.P./W.D.T/2010-11 Dated 15-12-1010.

The Detail of W.D.T. is as below

S.No.	Name of the member	Qualification	Experience
			year
1	Dr. R.B.Yadav	Associate Professor, Ph.D. Agronomy	
		Deptt. of Agronomy	27
		S.V.Patel.University of Agric. &Tech., Meerut	
2	Sri Gulab Singh	M.A Economics, Diploma in Ag. Engg	27
3	Sri Kiranpal Singh Pawar	Diploma in Agriculture	35
4	Smt. Kamlesh Rana	B.A. Social Work	15

WATERSHED DEVELOPMENT TEAM:

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

Roles and Responsibilities of WDT:

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

- a. Assist Gram Panchayat /Gram Sabha in constitution of the watershed committee and their functioning.
- b. Organizing and nurturing User Groups and Self-Help Groups.
- c. Mobilizing women to ensure that the perspectives and interests of women are adequately related in the watershed action plan.
- d. Conducting the participatory base -line surveys, training and capacity building.
- e. Preparing detailed resource development plans including water and soil conservation or redemption etc. to promote sustainable livelihood at household level.
- f. Common property resource management and equitable sharing.
- g. Preparing Detailed Project Report (DPR) for the consideration of Gram Sabha.
- h. Undertake engineering surveys, prepare engineering drawing and cost estimates for any structure to be built.
- i. Monitoring, checking, accessing, and undertaking physical verification and measurement of work done.
- j. Facilitating the development of livelihood opportunities for the landless.
- k. Maintaining project accounts.
- 1. 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

DETAIL OF WATERSHED COMMITTEE & SUB WATERSHED COMMITTEE IWMP-III BAGPAT

S. No	Name Of GramPan chyat/Vill age	Date Of Constitut ion	Name Of Precedent	Name Of Secretary	Female Member	Member SC	Member Of SHG	Member Of UG	Member Of UG	Land Less Member	Work Charge	WDT Member
1	Pusar	19-2-11	Shri .Deshpal	Shri Rameswar	Smt.Kusum	Shri Chandarpal	Shri Surendar	Shri Ashokkuma r	Shri Mukesh	Shri Subhash	Girend Singh	Gulab Singh
2	Adampur	19-2-11	Shri Indrapal	Shri Pradeep	Smt Ganga dei	Shri Virendra S/oKhileri	Shri VirendraS/o Trilokcha.	Shri Santrsam	Shri Krasnpal	Shri Tuhiram	Girend Singh	GulabSingh
3	Idarish Pur	19-2-11	Smt. Rekha Devi	Shri Ramkishan	Smt. Vabli	Shri Raju	Shri Rajendar	Shri Brajesh	Shri Babu Ram	Shri Dharmvee r	Gurooba x Singh	GulabSingh
4	Kanhar	20-2-11	Smt.Munes h	Shri Shyam singh	Smt Saroj	Shri Jaipal	Shri Ramchand	Shri Shreepal	Smt. Baburam	Smt. Yograj	Gurooba x Singh	GulabSingh
5	Mojijaba d Nagal	20-2-11	Shri SahaDev	Shri Yashveer Singh	Smt. Mannu	Shri Shreepal	Shri Rajendar	Shri Naubahar	Shri Rampal	Shri Virendar	Gurooba x Singh	GulabSingh
6	Dodhat	20-2-11	Ch.Vayara npawar	Shri Kuldeep	Smt Om Kali	Shri Pritam Singh	Shri Rampal Singh	Shri Manga	Shri Akhatar	Smt. Kailla	Gurooba x Singh	GulabSingh
7	Nipura	20-1-11	Shri Krashanpal	Shri Vikash	Smt Rajbala	Shri Jagpal	Shri Harveer Singh	Shri Gopal	Shri Rajpal	Shri Ompal	Girend Singh	GulabSingh
8	Tikari	20-1-11	Shri Shom Pal	Shri Pradeep Kshayap	Smt Kaushlaya	Shri Ashok	Shri Prem Chand	Shri Ashok Kumar	Shri Jashwant Singh	Shri Om Prakash	Bhoopen dar	GulabSingh
9	Himmat Pur Sujati	19-1-11	Shri Kishanpal	Shri Rakesh Sharma	Smt Sarswati	Smt. Bavita	Shri Naimpal	ShriYashve er Singh	Shri Jaidev Singh	Shri Vinod kumar	Bhoopen dar	GulabSingh
10	Parli *	19-1-11	Shri Kuldeep	Shri Arvind Kumar	Smt Sudha Devi	Shri Rajendra	Shri Gareve	Shri Harpal	Shri Rajpal	Shri Vinod kumar	Bhoopen dar	GulabSingh
11	Gangauli	19-1-11	Shri Dhamendar Rathi	Shri Jitendar	Smt Jagveeri	Shri Suresh	Shri Saudan	Shri Virendar	Shri Devendar	Shri Ompal	Girand Singh	GulabSingh

FORMATION OF SELF HELP GROUP

S.No	Name Of Village	Name of SHG	President	Secretary	Work
1	Pusar	Ramabai, SHG	Chandra Pal s/o Kale Ram	Ravindra s/o Keerat Singh	Stitching & knitting
2	Adampur	Vibha, SHG	Sant Ram s/o Ratan Singh	Virendra Singh s/o	Dairy work/FIC Stitching &
				Khelari	Knitting
3	Idarish Pur	Utthan, SHG	Dharamveer s/o Hari Ram	Raju s/o Gopi	Dairy work/ FIC/Stitching & knitting
4	Kanhar	Gandi, SHG	Ompal s/o Lal Singh	Smt. Saroj w/o Budh	Dairy work/ Stitching &
				Prakash	knitting
5	Mojijabad Nagal	Durga, SHG	Sunil s/o Rajendra	Gang s/o Karma	Goat keeping/ FIC/Stitching & knitting
6	Dodhat	Uday, SHG	Vadpal Singh s/o Bhavar	Krishipal s/o Bhoop	Goat keeping/ FIC/Stitching &
			Singh	Singh	knitting
7	Nipura	Samaj Sudhar,	Nadim s/o Akram	Shaid s/o Habibur	Goat keeping/ FIC/Stitching &
		SHG		Rahman	knitting
8	Tikari	Dr. Bheemrao	Sava Ram s/o Mahar Singh	Budh Prakash s/o Niyadar	Goat keeping/ FIC/Stitching &
		Ambedkar, SHG			knitting
9	Himmat Pur Sujati	Kashyap, SHG	Sube Singh s/o Bhanwar	Ram Fool s/o Braham	Goat keeping/ Stitching &
			Singh	Singh	knitting/FIC
10	Chittamkhaeri	Rojgar, SHG	Rajendra Singh s/o Jai	Pawan Kumar s/o Shiv	Goat keeping/ Stitching &
		_	Singh	Kumar	knitting/FIC
11	Gangauli	Kashi Ram, SHG	Pradeep s/o Shyam Singh	Kishori s/o Dash	Goat keeping/ Stitching & knitting/FIC

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 Watershed	Area Of Micro Watershed ha	Selected Area For Treatment	No. Of User Group Constituted
1	2C6A3a3i	726.56681	413.739	5
2	2C6A3a3d	793.5342	451.8735	5
3	2C6A43a3e	683.69701	389.327	4
4	2C6A3a3h	568.3095	323.6206	4
5	2C6A3a3g	748.1759	426.0447	4
6	2C6A3a3f	830.6675	473.0187	9
7	2C6A3a4a	578.0250	329.153	6
8	2C6A3a4j	356.2245	202.8500	3
9	2C6A3a4i	514.76643	293.1308	6
10	2C6A3a4b	602.9255	343.334	5
11	2C6A3a4c	596.3393	339.58201	8
12	2C6A3a4h	309.650	176.3284	4
	Total	7308.88	4162.00	63

PHASING OF WORKS (Financial and Physical)

Phasing of various works / activities during different years of the project period for treatable area 4162.00 ha out of total area 7308.88 ha is presented in Table

Financial outlay (Year wise financial outlays (lakh Rs.)

S.	Component	Unit	1 st year	2 nd year	3 rd year	4 th year	Total
No							
А	MANAGEMENT COSTS						
	Detail project report		4.99	-	-	-	4.99
	Administrative cost- TA&DA, POL / Hiring of vehicles/office						
	and payment of electricity and phone bill etc. computer,		12.486	12.486	12.486		49.944
	stationary and office consumable and Contingency					12.486	
	Expert for monitoring and evaluation	Nos	1.25	1.25	1.25	1.24	4.994
	Sub Total		18.726	13.736	13.736	13.728	59.933
В	PREPARATORY PHSES						
	Entry Point Activities like improvement in drinking water						
	system, Panchayat Ghar Repair Playing park	Nos	19.98	-	-		19.98
	With recharge water, Drain Repair Street light etc.						
	Institutional and capacity building		8.33	8.32	8.32	-	24.97
	Sub Total		28.31	8.32	8.32	-	44.95
С	WATERSHED WORKS						
a	Watershed development works						
	Construction of bunds (graded, contour and field bunds)	ha	-	250	250	250	650
	Renovation of the existing bunds for <i>in situ</i> soil moisture	ha		220	220	240	800
	conservation	па	-	250	250	540	800
	Minor leveling of bunded fields	ha	-	175	175	175	525
	Dry land horticulture	ha	-	80	80	80	240
	Construction of recharge filter	Nos	-	11	11	11	33
	Generation of soil health card for individual farmers/land	Nos	-	20	20	5	45

	holdings						
	Community pond	Nos	-	12	12	12	36
	Renovation of existing water harvesting structure	Nos	-	3	3	3	9
	Afforestation and development of silvi-pastoral systems	ha	-	121	121	122	364
	Contour trenching	ha	-	122	122	122	366
	Drainage line treatment (Gabion drop, structures, gully plugs and vegetative barriers)	Nos	-	5	3	2	10
	Skill labour		-	80	80	90	250
	Sub Total						
b	LIVILIHOOD PROGRAMME(Community based)						
	Income generating activities through SHG's		25	25	_	_	50
	for landless and marginal farmers		23	25	-	_	50
	a. Establishment of Vermi-compost units	Units	18	18	-	-	36
	b. Mushroom cultivation	Units	6	-	-	-	6
	c. Bee keeping/others(Goat, Pig etc)	Units	6	-	-	-	6
	d. Block plantation of Prosopis juliflora for fire wood	Unit	-	3	3	-	6
	Livestock development activities	Unit	6	-	-	-	6
	Sub Total						
с	PRODUCTION SYATEM AND MICRO ENTERPRISES						
	Crop production, diversification of agriculture and introduction of agro-forestry	ha	6.50	6.50	6.50	6.50	26.00
	Demonstration of improved composting system	ha	7.00	5.14	6.00	6.14	24.28
	Sub Total		13.50	11.64	12.50	12.64	50.28
D	CONSOLIDATION PHASE					24.972	24.972
	GRAND TOTAL						

Note: Unit cost of different activities are given in annexure

Physical plan Phasing of various works / activities during different years of the project period is presented Physical plan phasing

Activities related to	1 st year	2 nd year	3 rd year	4 th year	Total
	(quantity)	(quantity)	(quantity)	(quantity	
ADMINISTRATIVE COSTS					
TA&DA, POL / Hiring of vehicles/office and payment of electricity and phone bill	\checkmark				
etc. computer, stationary and office consumable and Contingency					
Expert for monitoring and evaluation	V		λ		
PREPARATORY PHSES					
Entry Point Activities like improvement in drinking water system, school, temple	\checkmark	-	-	-	
Institutional and capacity building	\checkmark				
WATERSHED WORKS					
Watershed development works		1387	1387	1387	4162
Construction of community pond (Nos)		15	10	10	35
Construction of bunds (graded, contour and field bunds	-	6270	6278	6264	18812
Renovation of the existing bunds and <i>in situ</i> conservation	-	8890	8888	8888	26666
Minor leveling of bunded fields (ha) Lesser Levelling	-	175	175	175	266.66
Dry land Horticulture development	-	80	80	80	240
Steggered / Contour trenching (ha)	-	180	90	40	310
Renovation of existing water harvesting structure (No)	-	20	10	5	35

Afforestation and silvipastoral development (ha)	-	255	125		380
Construction of recharge filter (Nos)	-	15	7	3	25
Generation of soil health card for individual farmers/land holdings	-	15	10	5	30
Drainage line treatment (gabion structure, gully plugs and vegetative barriers) (Nos)	-	5	3	2	10
LIVILIHOOD PROGRAMME(Community based)					
Income generating activities through SHG's for landless and marginal farmers		26	12	-	38
a. Establishment of Vermi-compost units	-	36	-	-	36
b. Mushroom cultivation/Bee keeping	-	3	-	-	3
c. Bee keeping	-	6	-	-	6
d. Block plantation for fire wood	-	-	1000	600	1600
Livestock development activities					
PRODUCTION SYATEM AND MICRO ENTERPRISES					
Demonstration and assessment of improved composting system using alternate	40	20	5	-	65
materials (141ermin compost) and nutrient analysis (Nos.)					
Introduction of improved crop production practices for <i>kharif</i> crops (ha)	10.00	5.00	2.50		17.50
ii) for <i>rabi</i> crops (ha)	10.00	5.00	2.50		17.50
CONSOLIDATION PHASE	=			\checkmark	-

*Indicates that the activity will be carried out as per head in the respective year.

Estimation and costing of the project

Abstract of estimation and costing of the IWMP-III Bagpat watershed

S.No.	Component		Total(Rs in lakes)
А	Detail Project Report (D.P.R.)	1%	4.995
В	MANAGEMENT COSTS		
	Administrative cost -TA&DA, POL / Hiring of vehicles/office and payment of electricity and phone bill etc. computer, stationary and office consumable and Contingency	10%	49.944
	Expert for monitoring and evaluation	2%	9.989
	Sub Total	13%	64.928
В	PREPARATORY PHSES		
	Entry Point Activities like improvement in drinking water system, Panchayat Ghar Repair Playing park With recharge water, Drain Repair Indian hand pump Repair etc.	4%	19.978
	Institutional and capacity building	5%	24.972
	Sub Total	9%	44.949
С	WATERSHED WORKS		
a	Watershed development works		
	Construction of bunds (graded, contour and field bunds)		30.10
	Renovation of the existing bunds for <i>in situ</i> soil moisture conservation		40.00
	Minor leveling of bunded fields		34.12
	Dry land horticulture		12.00
	Construction of recharge filter		15.00

	Generation of soil health card for individual farmers/land holdings		7.00
	Community pond		50.00
	Renovation of existing water harvesting structure		5.50
	Afforestation and development of silvi-pastoral systems		18.20
	Contour trenching		14.30
	Drainage line treatment (Gabion drop, structures, gully plugs and vegetative barriers)		16.00
	Skill labour		7.50
	Sub Total	50%	249.720
b	LIVILIHOOD PROGRAMME(Community based)		
	Income generating activities through SHG' for landless and marginal farmers		5.00
	a. Establishment of Vermi-compost units		18.00
	b. Mushroom cultivation. Sahtoot and fruit plantation		6.20
	c. Bee keeping.Goat.Pig. etc		4.50
	d. Block plantation of <i>Prosopis juliflora</i> for fire wood		6.10
	Livestock development activities and training, Family planning, Poverty elevation,		10.144
	Sub Total	10%	49.944
С	PRODUCTION SYATEM AND MICRO ENTERPRISES		
	Crop production, diversification of agriculture and introduction of agro-forestry	8%	39.955
	Demonstration of improved composting system	5%	24.972
	Sub Total	13%	64.927
D	CONSOLIDATION PHASE	5%	24.972
	GRAND TOTAL		499.440

IWMP-III BAGPAT(2010-11) WORK CALADER YAER 2011-12

District BAGPAT

SL No.	Particulars	Ist.Year		2nd.Year30%		3rd.Year20%		4th.Year30%		TOTAL	
		Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.
1	Administrative Cost 10%	12.49		15.53		15.53		6.39		49.94	
	Monitering-1%										
2	-										
		1.25		1.55		1.55		0.64		4.99	
3	Evaluation 1%	1.07				1.55		0.64		1.00	
4		1.25		1.55		1.55		0.64		4.99	
4	Entry Point activities 4%	19.98								19.98	
5	Institution Capacity Building-5%	9.99		12.42		6.22				24.97	
6	DPR-1%	4.99								4.99	
7		0.00		0.0.01	1562.50	50.50		100.00	1502	0.40.50	11.00
0	WatershedDev.Work 50%	0.00	-	93.81	1563.50	53.73	895.50	102.20	1703	249.72	4162
0	Livelihood Activity 10%	29.96		9,99		9,99				49.94	
9											
	Production System & Micro										
	enterprises 13%	19.98		14.98		14.98		14.99		64.93	
10	Consoildation-5%							24.97		24.97	
	Total	99.89		149.83		99.89		149.83		499.44	
IWMP-III BAGPAT(2010-11) WORK CALADER YAER 2011-12

			Dis	strict	BA	GPA	Γ				Cost=	49	9.44		
SL No.	Particulars		April	May	June	July	August	September	October	November	December	January	February	March	Total
1	Administrative Cost 10%	2.50%			0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.91	12.49
2	Monitering-1%	0.25%												1 55	1 25
3	Evaluation 1%	0.25%												1.55	1.25
4	Entry Point activities														
	4%	4%				4.95	4.95	4.95							19.98
5	Institution Capacity Building-5%	2%							1.85	1.85	1.85	1.88			9.99
6	DPR-1%	1%			0.93	0.93	0.93	0.92							4.99
7	Watershed Dev.Work 50%	0%													0.00
8	Livelihoods Activity 10%	6%						3.71	3.71	3.71	3.71	3.71	3.73		29.97
9	Production System & Micro enterprises 13%	4%							4.95	4.95	4.95				19.98
10	Consoildation-5%	0%													0.00
	Total	20%			1.86	6.81	6.81	10.51	11.44	11.44	11.44	6.52	4.66	4.01	99.89

1	2	3	4	5
S.No.	Item	Unit	Pre-project Status	Post-project Status
1	Status of water table	Meters BGL(M)	13	10
	Ground water structures repaired/			
2	renuvenated /hand pump	NO's	350	45
3	Quality of drinking water	Quality	Normal	Improved
4	Availability of drinking water	No. of days	280	365
5	Increase in irrigated area	Ha.	648.22	1112.05
Change i	n cropping/land use pattern			
6	Area under agricultural crop	Ha.	4162.00	4162.00
	i Area under single crop	Ha.	1818.00	1121.00
	ii Area under double crop	Ha.	1250.00	1847.00
	iii Area under multiple crop	Ha.	1094.00	1194.00
	iv Cropping intensity	%	155.00	175.00
7	Increase in area under vegetation			
	(tree cover)	Ha.	24b	182
8	Increase in area under horticulture	Ha.	150	645
9	Area under fuel & fodder	Ha.	24	112
		Precapita Per-		
10	Increase in milk production	day/Liters	4 to 5	6 to 7
11	No. of SHGs	No's	<u>0</u>	<u>26</u>
12	Increase in Livelihood	Rs./Capita/Annum	Approx.28800	Approx.34200
13	Migration	No's	1341	921
14	SHG Federations formed	No's		2
15	Credit linkage with banks	No's	0	13

Expected/Estimated Outcomes of IWMP-II1(2010-1)BAGPAT



IWMP –III BAGPAT

Name of	Weigh	No. of	Project	Rain fed	Treatable area proposed for treatment	P.I.A.
Project	tage	MWS	Area (ha)	Area (ha)	(excluding reserve forests, etc.) (ha)	
IWMP-III	102.5	11	6999	4625	4162	S.C.Unit of LDWR

MICRO WATERSHED MAP OF BAGHPAT DISTRICT, UTTAR PRADESH PLAN MAP



PROJECT AT A GLANCE

	(Dia alt	BINAULI			
1	Name of Block	18			
2	No. of Grampanchayat	1 Water table below 2.Degrated land			
3	Four reasons for selection of	3. poverty 4. Soil erosion due to rain			
-	Watershed	20.0.2010			
4	Date of Approval of Watershed	29-9-2010			
-	Development By DRD-/DPAC				
F	Area Proposed to be treated	4162(na)			
5	Alea Topocou to an				
	(na.)	29-9-2010			
6	Date of Sanction of PPR	23-10-2010			
	& Date of release 1st Instalment	2011-12 To2014-15 (4year)			
7	Project duration	499.44			
8	Project Cost (in lac.)	244458			
0	Proposed Man days	244450			

भूमि सरंक्षण अधिकारी - अर्ब - अर्ब मुमि विकास एवं जल संसाधन विभाग जनपद - मेस्ठ

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मेरठ मण्डल, मेरठ |

ar क इति क्रियाक (मु०स०) परियोजना निदेशक रामगंगा कमाण्ड परियोजना **रावयांग कमाण्ड परियोगसन्ति**ा ग्राम्य विकास अभिकरण मेरु मण्डल मेरुन।