

**DETAIL PROJECT REPORT OF MICRO
WATERSHED PROJECT
UNDER**



**INTEGRATED WATERSHED MANAGEMENT
PROGRAMME
(IWMP BULANDSHAHAR – III)**

BLOCK – PAHASU, DISTT – BULANDSHAHAR (U.P.)

LAND DEVELOPMENT AND WATER RESOURCES DEPTT. (U.P.)



Prepared by :

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CERTIFICATE

This is to be certified that the proposed all micro-watersheds of IWMP-iii distt. Bulandshahar, Uttar Pradesh has been selected for its sustainable development on watershed basis under Integrated Watershed Management Programme. The land is physically available for proposed interventions and is not overlapping with any other schemes. It will be developed as per Common Guidelines for Watershed Development Project-2008, GOI, New Delhi.

The significant results will be achieved through proposed interventions on soil and water conservation, ground water recharge, availability of drinking and irrigation water, agricultural production systems, live stock, fodder availability, livelihoods of asset less, capacity building, etc. The proposed **Detailed Project Report of all micro-watershed of IWMP-Iii, Khurja, Bulandshahar** is approved for its implementation.

Soil Conservation Officer

Dept. of LDWR, Khurja, Bulandshahar

Deputy Director

LDWR, Meerut, UP

Project Director

DRDA, Bulandshahar, UP

Chief Development Officer

Distt.- Bulandshahar, UP

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PROJECT AT A GLANCE

IWMP-III(Bulandshahar)

1	State	Uttar Pradesh
2	Distt.	Bulandshahar
3	Block	Pahasu
4	M.W.S. Code	2B3E4d3b, 2B3E3c2d, 2B3E3c2c, 2B3E3c2b, 2B3E4d1e, 2B3E3c2a, 2B3E3c1f, 2B3E4d1d
5	Name of M.W.S. Project	Kunwarpur, Kamona, Narau, Barkatpur, Madanpur, Chhatari, Tyore Bujurg, Chodera
6	Involved Village	27
7	Geographical Area of M.W.S.	5574 ha.
8	Rainfed Area	5550
9	Treatable Area	5125
10	Weightage	
11	Cost of Project	615.00
12	For the year	2010-11

Budget Components

S. No.	Components	Area (Ha.)	Cost (in Lacs)
1	2	3	4
1	Management Cost 12%	-	73.80
2	Preparatory Phase 10%	-	61.50
3	Watershed Work Phase	-	
	A- Watershed Development Works 50%	5125	307.50
	B- Livelihood Programme (Community Base) 10%	-	61.50
	C- Production System & Micro Enterprises 13%	-	79.95
4	Consolidation Phase 5%	-	30.75
	Total	5125	615.00

Executive Summary of the Project

Identified selected micro watershed project Kunwarpur, Kamona, Narau, Barkatpur, Madanpur, Chhatari, Tyore Bujurg, Chodera is coded as 2B3E4d3b, 2B3E3c2d, 2B3E3c2c, 2B3E3c2b, 2B3E4d1e, 2B3E3c2a, 2B3E3c1f, 2B3E4d1d has been proposed from cluster of I.W.M.P. Bulandshahar – II project in Pahasu Block district Bulandshahar in the micro watershed which is located in the east of district Bulandshahar on the east bank of River Kali Nadi and upper kali border. It lies between 28⁰ -15' and 15⁰ E Latitudes and 78⁰ -E and 78⁰ -5 N Longitudes Covering area. Its altitudes ranges from 187 meter to 190 meter above the mean sea level. Khurja Railway Station 184.11 m, Bulandshahar Railway station is 201.18 m above mean sea level is displayed. Project area of I.W.M.P. BSR-II is lied in the Pahasu Block of Bulandshahar District which is come in the western plan zone under semi arid area. The annual average rainfall is near to 397 mm which an average of 35 rainy days. Out of which about 85% is received during the mansoon season from July to September and very less rainfall is received in the winter season.

Temperature ranges from as high as 42⁰C in the May-June to as 3⁰-4⁰C during December – January. The Trend of rain fall is highly eratic and maximum water goes as runoff.

Main occupation of the dwellers is agriculture in the watershed. Some part of the lands are shown during the Kharif season. Cane sugar are preferred crops in the project area. The main Crops raised are Wheat, Pea & Mustered and maze.

The topmost portion of the watershed is sloppy flat land. Other than topmost portion of the watershed is under soil erotic portion and depreciative. The soil of the land are sandy loam Soil. The middle agricultural position of watershed relatively smooth sloppy flat land with sandy loam soil texture. These soil is yellow in colour and are inherently good in fertility status.

Natural vegetation of the watershed is very poor. Somewhere forest vegetation is seen which are predominant with Vilayati Babool (*Prosopis Juliflora*), followed by Babool (*Accasia nilotica*), somewhere Neem Plants (*Azadirachta Indica*), Shisham (*Dolbergia Sisson*) and Karanj (*Pongamia Glabra*) are seen in occasional occurrence. There is no grass land in the watershed. Somewhere grass patches are seen only on the bunds, road sides and other such places. Coverage of massive green belt is in poor percentage for environment which is envisaged. That watershed is very poor climate area.

There is normal condition of animal physics and for their fodder arrangement is the watershed and creative possibility would be expected by the implementations of the project.

Due to Aerial soil erosion poor harvesting managements, cropping pattern, non treated watershed etc. are very anti effective causes for the watershed. Problem of the watershed is to be tackled by harvesting structures which have last most of their capacity new water bodies for the prevention of erosion and conservation of soil and moistures various type of earthen bunds in the watershed field, necessity has been observed. Wasteland will be treated with staggered Trenches, afforestation and bunding for the changing of characteristics.

The detail project report has been prepared by the applying of nine process steps for the micro watershed as follows.

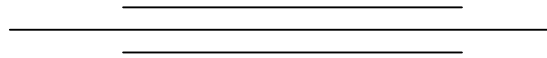
- STEP-1 Secondary data collection:-**During the five days visit programme in the micro watershed project with of all available documents of village label by approaching the Gram panchayat collected secondary data.
- STEP-2 Village meeting & conducting PRA exercise:-**Community meeting conducted on fix days for the consultation with villagers for the PRA Exercise. Participatory mode of the villages was positive indicated for the success of programm. With good in testing participation has been drawn social & resource map on ground & paper & discussed un various topics of problematic thoughts in the micro watershed.
- STEP-3 Socio economic survey:-** The resource organization of village label volunteers identified to conduct house hold socio economic survey/states.
- STEP-4 Probel typology analysis:-**Thoroughly analyzed the data & identified problem type as soil & moisture conservation, crop rotation, crop coverage, productivity, livelihoods, social issues & capacity building gaps etc. Problems discussed with the watershed committee & came up with alternative solution.
- STEP-5 Conduct of net participatory planning (NPP):-** The planning team visited together in the planning blocks on the scheduled date along with the beneficiaries of the villages & data gathered as for the participatory net planning.
- STEP-6 Productivity & livelihood planning exercise:-** For the product livelihood exercise, group discussion on various livelihood as Agriculture, Animal husbandry enterprise development held discussion with the villagers in the micro watershed.
- STEP-7 Institutional & capacity building :-** This plan is prepared based on the data available in the field and auscultations with the watershed committee.
- STEP-8 Data consolidation & documentation of DPR :-** After gathering all required information compiled collected data. Thoroughly discussed and finalized the expected outcomes and benefits specially in the respect of livelihood for different segments. These are the target and performers indicators for the micro watershed.

STEP-9 Conduct of Gram Sabha obtaining approvals submissions of DPR:-After preparation of the draft DPR convened to Gram sabha and activities proposed expected outcomes benefits of implementing the programm are explained in case of any changes are proposed in the Gram sabha approval obtained by the Gram sabha and already singed of Mau paper.

STEP-9A Attachment of detail estimate, cost and design:-Estimating, Costing and design prepared technically According to plan in the micro watershed project. And attached with the DPR.

STEP-9B Various type of mapping :- DPR prepared in the support of micro watershed project using various type of maps is as follows :

- | | |
|--------------------------------------|-----------------------------|
| 1.Index Map of Watershed | 2. Watershed Map |
| 3. Relief/ Drainage Map | 4. Slop Map |
| 5.Soil and Land Capability class map | 6. Land use/ Land Cover Map |
| 7. Cadastral map | 8. Proposed Action Plan map |
| 9. Social Map | |



IWMP- III (2010-11) DISTRICT- BULANDSHAHAR YEAR WISE PHASING OF IWMP WORKS

Area – Ha & Rs.in Lac

Sl. No	Particulars	1 st year (2010-11)		2 nd year (2011-12)		3 rd year (2012-13)		4 th year (2013-14)		5 th year (2014-15)		Total	
		Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.
1	Administrative cost 10%	12.30	-	12.30	-	12.30	-	12.30	-	12.30	-	61.50	-
2	Monitoring 1%	1.845	-	1.845	-	2.46	-	-	-	0	-	6.15	-
3	Evaluation 1%	-	-	3.075	-	-	-	3.075	-	0	-	6.15	-
4	Entry point activity 4%	24.60	-	-	-	-	-	-	-	0	-	24.60	-
5	Institution & capacity building 5%	12.30	-	12.30	-	6.15	-	-	-	0	-	30.75	-
6	DPR 1%	6.15	-	-	-	-	-	-	-	0	-	6.15	-
7	Watershed Dev.Works 50%	23.0625	384	76.875	1281	107.625	1794	99.9375	1166	0	-	307.50	5125
8	Livelihood activities 10%	6.15	-	12.30	-	18.45	-	24.60	-	0	-	61.50	-
9	Production System & micro Enterprises 13%	6.15	-	12.30	-	24.60	-	24.60	-	12.30	-	79.95	-
10	Consolidation phase 5%	-	-	-	-	-	-	-	-	30.75	-	30.75	-
11	TOTAL 100%	92.5575	384	130.995	1281	171.585	1794	164.5125	1166	55.35	-	615.0	

PROJECT AT A GLANCE

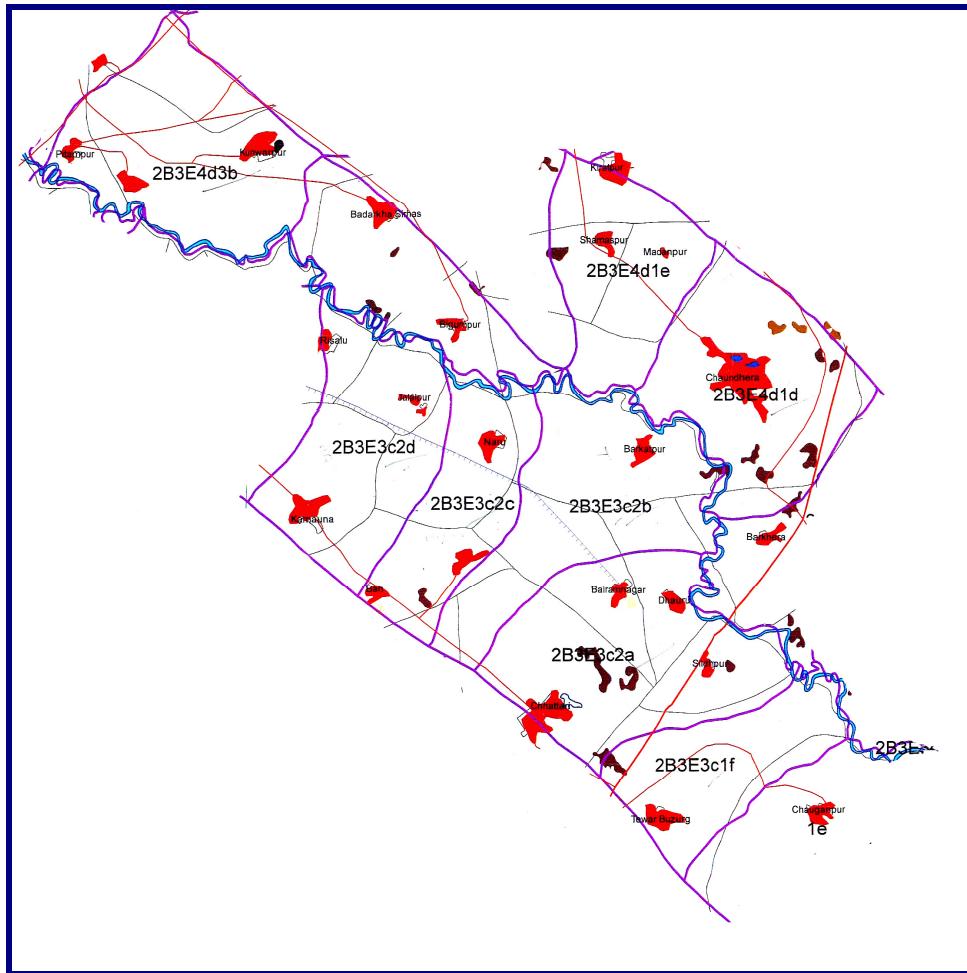
IWMP-III (Bulandshahar)

1	State	Uttar Pradesh
2	Distt.	Bulandshahar
3	Block	Pahasu
4	M.W.S. Code	2B3E34d3b
5	Name of M.W.S. Project	Kunwarpur
6	Involved Village	03
7	Geographical Area of M.W.S.	912Ha.
8	Rainfed Area	559
9	Treatable Area	830
10	Weightage	
11	Cost of Project	99.60
12	For the year	2010-11

Budget Components

S. No.	Components	Area (Ha.)	Cost (in Lacs)
1	2	3	4
1	Management Cost 12%	-	11.95
2	Preparatory Phase 10%	-	8.96
3	Watershed Work Phase	-	
	A- Watershed Development Works 50%	830	49.80
	B- Livelihood Programme (Community Base) 10%	-	9.96
	C- Production System & Micro Enterprises 13%	-	12.94
4	Consolidation Phase 5%	-	4.980
	Total	830	98.59

MICROWATER SHED WISE BASELINE SURVEY & DETAIL PROJECT REPORT



EXECUTIVE SUMMARY OF THE PROJECT

Identified selected micro watershed project Kunwarpur is coded as **2B3E4d3b** has been proposed from cluster of I.W.M.P. Bulandshahar–III project in Pahasu Block district Bulandshahar four villages namely Kunwarpur, Ajijabad, Pitampur and Barola is comprised in the micro watershed which is located in the east of district Bulandshahar on the west bank of River Kali (Upper Kali) and border of district area is known as Khadar. It lies between $28^{\circ} -15'$ and $28^{\circ} -15'$ N Latitudes and $78^{\circ} -0$ and $78^{\circ} -10$ N Longitudes Covering area. Its altitudes ranges from 187 meter to 190 meter above the mean sea level. Khurja Railway Station 184.11 m, Bulandshahar Railway station is 201.18 m above mean sea level is displayed. Project area of I.W.M.P. BSR-II is lied in the Pahasu Block of Bulandshahar District which is come in the western plan zone under semi arid area. The annual average rainfall is near to 397 mm which an average of 35 rainy days. Out of which about 85% is received during the mansoon season from July to September and very less rainfall is received in the winter season.

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The detail project report has been prepared by the applying of nine process steps for the micro watershed code no. **2B3E4d3b** brief is as follows.

- STEP-1 Secondary data collection:-** During the five days visit programme in the micro watershed project with of all available documents of village label by approaching the Gram panchayat collected secondary data.
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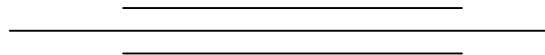
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Project Report

Table – 1 : Micro watershed project brief : -

1	State	U.P.
2	District	Bulandshahar
3	Block	Pahasu
4	Comprised Villages (Nos.)	05
5	Name of Watershed	Kunwarpur
6	Name of MWS Project	Kunwarpur
7	MWS Code No.	2B3E4d3b
8	Geographical Area of MWS	1011
9	Treatable Area	890

1- Project Objectives :- The aim and objectives of the Project are :

- a- Conservation, development and sustainable management of natural resources including their users.
- b- Enhancement of agriculture production and productivity in a sustainable manner.
- c- Restoration of ecological balance in the degraded and fragile rain fed ecosystem.
- d- Reduction in regional disparity between rains fed and irrigated area.
- e- Creation of sustainable employment opportunities for the rural community for livelihood security.
- f- Generation of massive employment.
- g- Reduce migration from rural employment.

2- Major Problem of Project Area :

- a- Actual shortage of drinking water.
- b- Near to nil activated water bodies and water harvesting structures.
- c- Low depth of ground water table.
- d- Undulated and generally sloppy rainfed area.
- e- Large number of Small, Marginal and S.C. farmer land holding.
- f- Lower wages of agriculture labour and also migration of labour due to shortage of employment in the watershed.

3- General Description :

(3.1) Location :-

Farida Watershed has been taken with MWS Code No. **2B3E4d3b** in Pahasu Block of Distt. Bulandshahar is located on Khurja via Shikarpur Syana to Pahasu road about 25 Km. between 28⁰15' and 28⁰10' N Latitudes and 78⁰0' and 78⁰5' N Longitudes. Location and delineation of watershed has been located on watershed map **Fig. 2** and on top sheet **Fig. 3**.

(3.2) Area and Elevation :

Elevation ranges from 181 to 208 mtr. above the mean sea level(MSL) altogether comprised villages and their's area is described as follows.

(Comprises village map Fig. 3)

Table – 2 : Area and Elevation

Sl. No.	MWS Code	Block	Name of Village	Geographical Area	Treatable Area
1	2	3	4	5	6
1	2B3E3c3e	Pahasu	Kunwarpur	531.50	483.71
			Azizabad	245.70	223.60
			Pitampur	59.20	53.87
			Barola	50.40	45.88
			N. Sarangpur	25.30	23.02
				912	830

(3.3) Shape of the Micro Watershed:

The shape of watershed is Elongated and as Rectangular. The maximum length and width of the watershed are 5000 Mtr. and 1814 Mtr. respectively with the Length: Width ratio of 2.76:1.

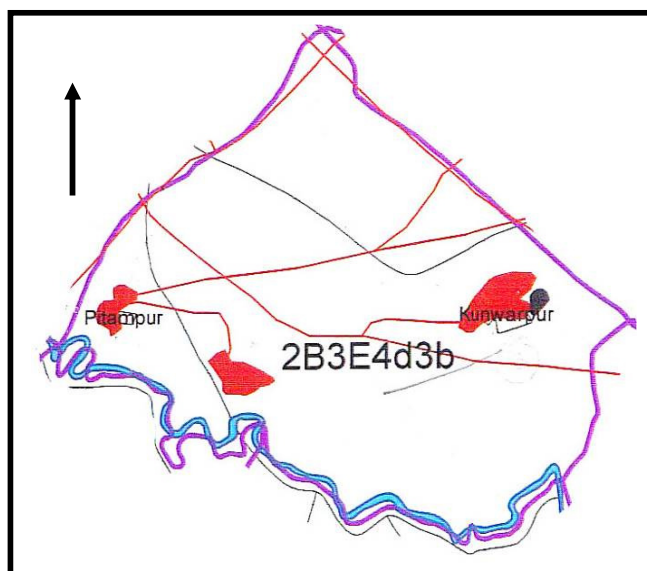


Fig. 1 (Shape of Micro Watershed)

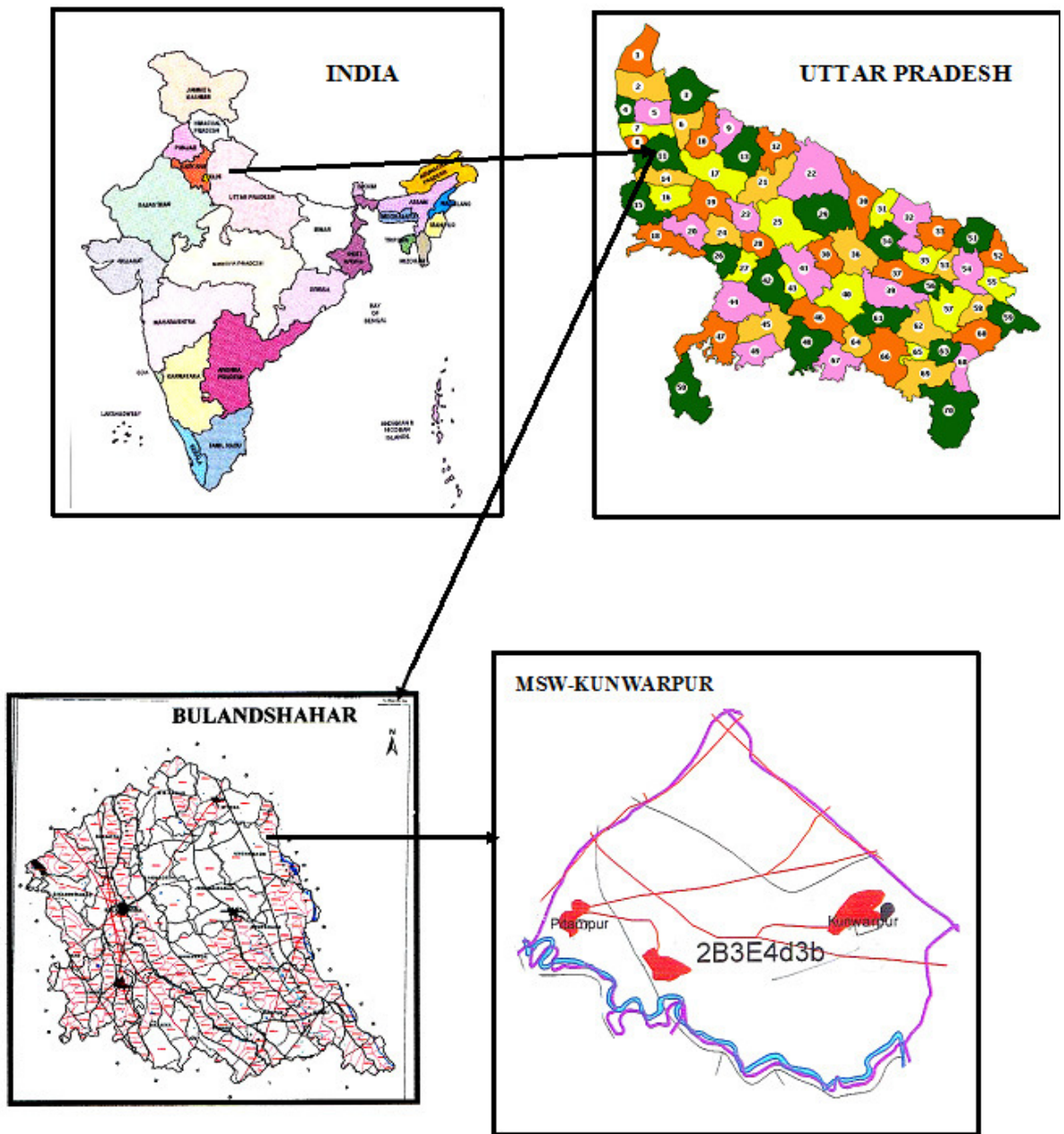
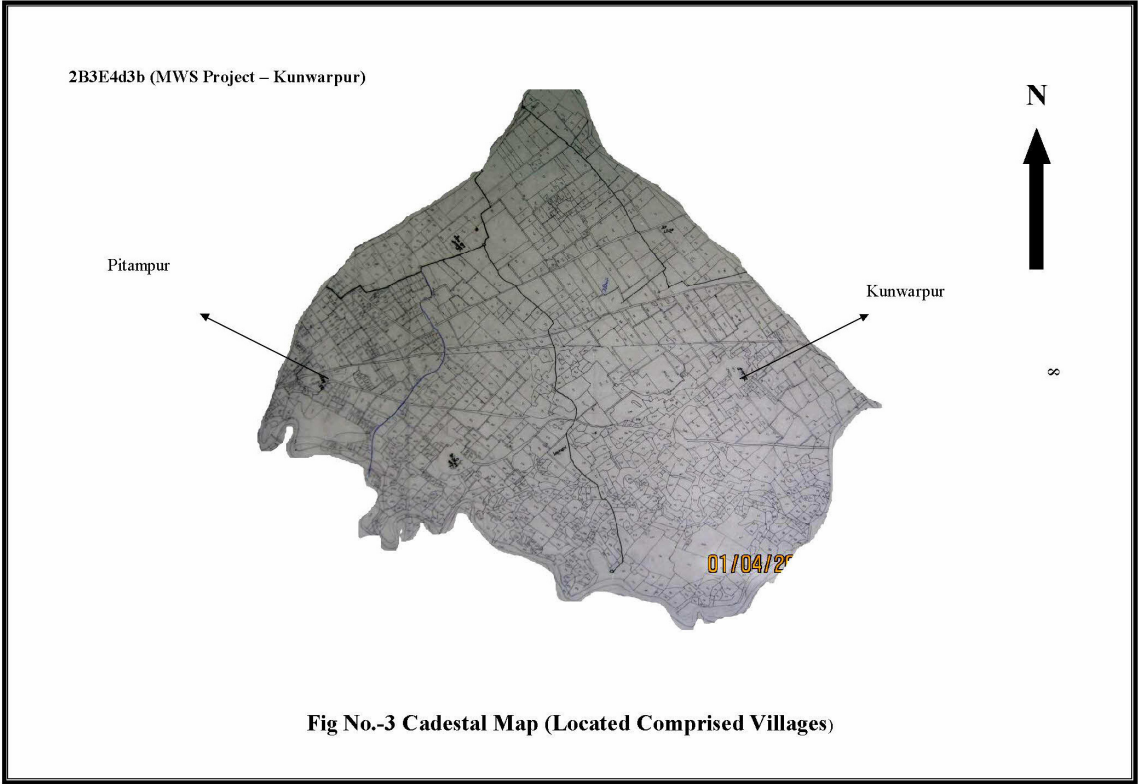


Fig.- 2 Location of the Micro Watershed



Sl. No.	Name of Project	Name of Village	Geographical Area (in ha.)	Raifed Area (in ha.)	Treatable Area	Agri. Land
1	2	3	4	5	6	7
1	Kunwarpur	Kunwarpur	531.50	406.31	483.71	504.92
2		Azizabad	245.7	187.82	223.60	233.41
3		Pitampur	59.20	45.25	53.87	56.24
4		Barola	50.40	38.47	45.80	47.88
5		N. Sarangpur	25.30	21.25	23.02	24.035
Total			912	699.10	830	866.48

(3.4) Climate :

The Watershed falls under semi arid region of tropical climate inclined in Western Plan Zone. The average annual precipitation is about approx. is 397 mm. spreading over 35 rainy days. Most of the rain fall (about 85%) is received during July to September. The rain fall of moderate intensity. Nothing the area receives of scarcity rainfall in the winter season. The temperator variation ranges from as high as 43⁰c in the month of May-June to as low as 4⁰c in December-January.

(3.5) Geomorphology and Soils :

Geomorphology :

The entire watershed is topographically divided into major landforms. Accordingly the soils of watershed can be grouped into various categories such plane land, undulated land, sloppy land and erosic ravenous land.

Soil :

(a) Fine textured soil :

The soil are the most extensive soil group found in the watershed. Some portion of the watershed is relatively sloppy flat land with fine soil texture as sandy loam. The soils are in color and are inherently good high in fertility status. Soil texture is sandy lome loam particularly in depressions and loam in the elevated portion. The soil characteristic texture is dispersive and smooth. Therefore without impeded the downward movement of water productive layer of soil are easily by high runoff.

a- Coarse Textured Soil :

These soil are lying mostly in downward portion, along with erosic gully and drainage line upto end of watershed outlet. These soils are coarser in texture and are relatively poor in fertility status. The soils are lomy sand in texture. Rill and gully formation in same parts particularly near the outlet of watershed can be seen.

(3.6) Drainage and Slope:

Due to prevalence of mild steep slope and presence of a number of drainage lines in the watershed the drainage system is adequate. The watershed from part of Ganga Basin and watershed. Under mild to steep topographical slope of MWS as divided as follow : (Drainage and slope map fig.-4)

Table - 4 : Drainage and Slope

S. No.	Grade	Slope Percent	Area in Ha.	Remark
1	A	0 – 1	249.00	30%
2	B	1 – 2	207.50	25%
3	C	2 – 4	166.00	20%
4	D	4 – 6	124.50	15%
5	E	6 – 8	49.80	6%
6	F	8 – 10	33.20	4%

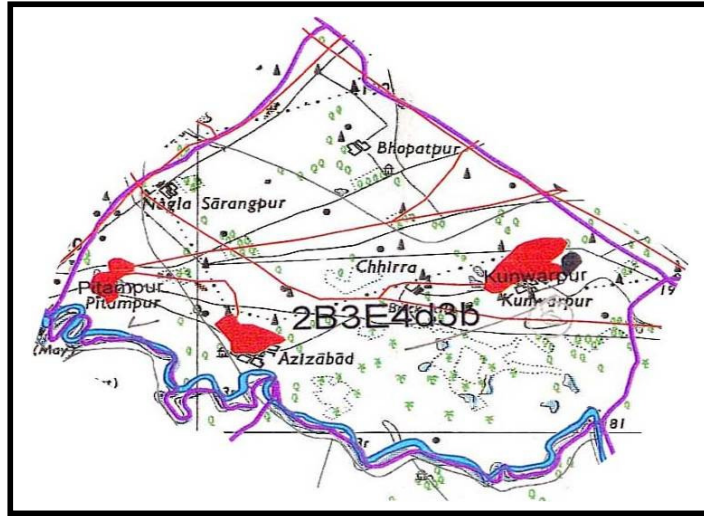


Fig-4 (Drainage & Scrub Map)

(3.7) Vegetation :

a- Natural Vegetation :

Natural vegetation is very poor in the watershed. The forest vegetation is predominant with Vilayti Babool (*Prosopis Juliflora*). There are occasional occurrence of Neem Plants (*Azadirachta Indica*), Shisham (*Dalbergia Sissoo*) and Karanj (*Pongamia Glabra*) and anywhere some scrubs are seen. There are no grass land in the watershed. Somewhere grass patches are seen only on the bunds, roadside and other such places. Poor percentage of massive green trees has been not seen in the watershed except Horticulture backyard.

b- Horticulture :

There is no backyards or commercial horticulture plantation in villages are been in some part of watershed.

c- Agro forestry :

The agriculture fields of the villages have some horticulture plantation at places isolated trees whose frequency is seen as under agroforestry and some where in where in backyards.

(3.8) Human Population:

a- Human Population:

Total Population of involved villages in watershed is 8936 with average family size of six persons as detailed as follows

Table – 5 : Human Population

S. No.	Name of village	Nos. of families	Human Population			Total
			Male	Female	Children	
1	Kunwarpur	458	1832	1374	2100	5764
2	Azizabad	85	155	126	185	466
3	Pitampur	57	124	116	159	399
4	Barola	365	415	376	1600	2391
5	N. Sarangpur	215	300	250	850	1685
		1180				10705

b- Categorization of Human Population :

In the total population of watershed villages, categories are defined as below :

Table – 6 : Population Categories

S. No.	Particulars	Unit	Number of families in population in the villages		
			Population	Family	Remark
1	2	3	4	5	6
1	Agri Farmer	No.	1299	433	
2	Landless	No.	595	101	
3	Agri. Labour	No.	465	78	
4	Land less Labour	No.	165	28	
5	BPL Family	No.	115	20	
6	SC Family	No.	295	49	
7	ST Family	No.	-	-	

(3.9) Land Holding :

All the categories of farmers as small, marginal, medium and large are involved in land holding average of about 1-18 ha. Small land holding farmers 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 as below :

Table – 7 : Distribution of farm families according to their size of land holdings

S. No.	Name of Village	Total Agri. Land in MWS	Land Holding Family (Nos.)					Percentage
			Marginal (< - 1Ha.)	Small (1-2 Ha.)	Medium (2-4 Ha.)	Large (4-7 Ha.)	Total	
1	Kunwarpur	604.92	300	40	10	10	360	
2	Azizabad	233.41	150	20	8	7	185	
3	Pitampur	56.24	28	10	4	3	45	
4	Barola	47.88	25	8	3	2	38	
5	N. Sarangpur	24.035	18	5	2	1	26	
Total		866.48					644	

(3.10) Live Stock Population :

Total live stock population of the watershed is 5377 Nos. Buffalos is preferred as much animal compared to Cow. But milk yield is poor. Goats are also kept for milk as well as for meat purpose. The breakup of livestock population is as follows:

Table – 8 : Live Stock Position

S. No.	Name of Village	Unit	Live Stock Position				Total
			Buffaloes	Cows	Bullocks	Goats	
1	Kunwarpur	No.	725	175	85	55	1040
2	Azizabad	No.	615	135	75	350	1175
3	Pitampur	No.	520	120	18	165	823
4	Barola	No.	721	198	65	85	1069
5	N. Sarangpur	No.	650	145	110	365	1270
Total			3231	773	353	1020	5377

(3.11) Infrastructure Social Feature :

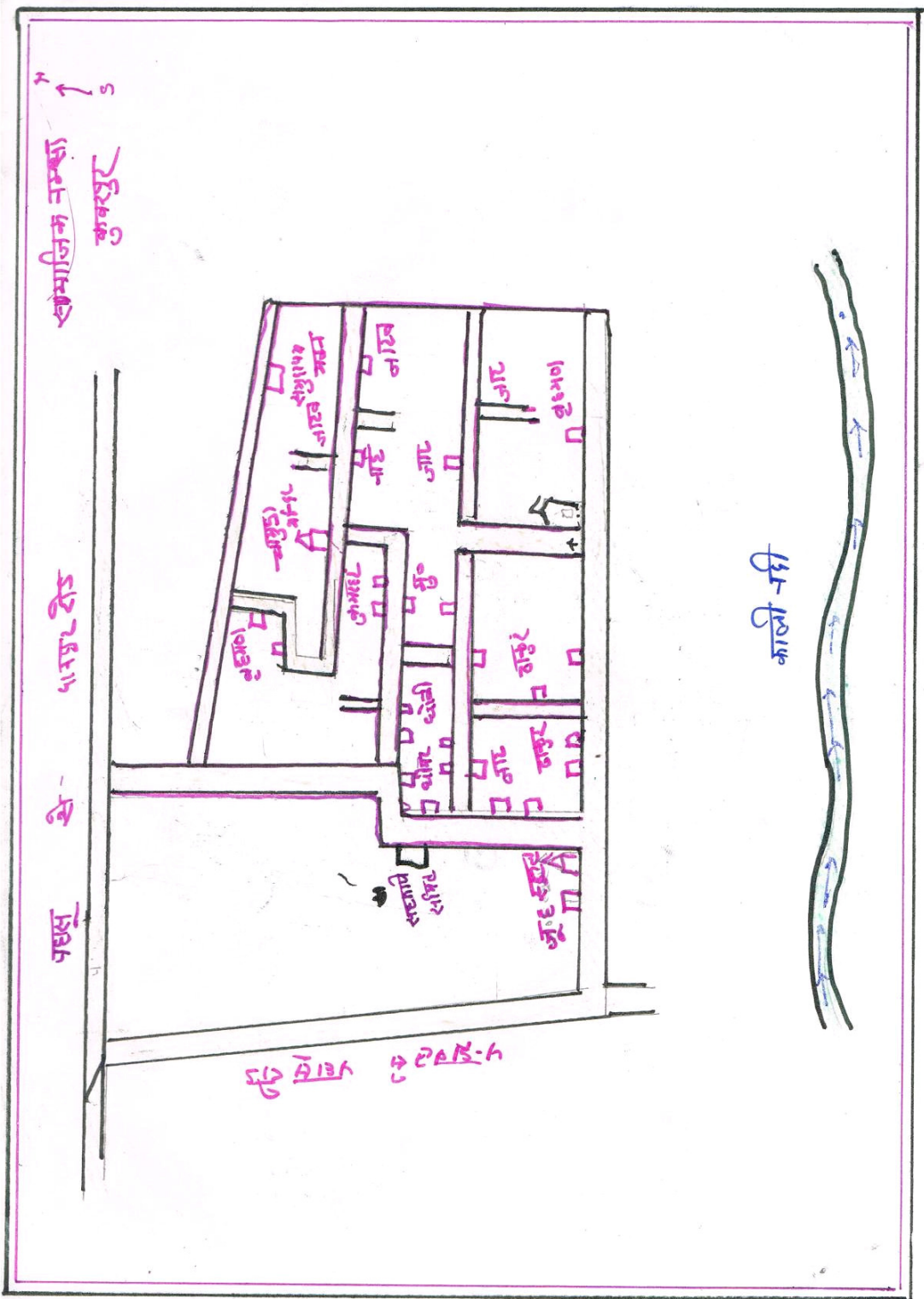
- a- Comprised villages in the micro watershed has moderate communication facilities. Watershed linked with metaled road and approachable through motarable road.
- b- All the villages are electrified and have T.V. and Telephone connection.
- c- Literacy rate in the watershed is very low all villages are having education upto Junior High School.
- d- Nearest small market is at Pahasu 13 Km. Nearest big market Bulandshahar is about 55 Km. from watershed. Religious and ritual features are almost common as in other parts of U.P. small land holding with large family size and more than 25% of the labour force of the total population living below poverty line indicate poor socio economic status of the watershed community.

Participatory Rural Appraisal

Participatory mode of the villagers shows positive indication for the success of the programme. Traditionally the entire village community participate in the individual works. Social map of one of the watershed village drawn by villagers themselves, depicting various village figures is shown in sketched map in Fig.-4 & 5. Infrastructures position of the village recorded as follows :

Table – 9 : MW.S. Project – Kunwarpur

S. No.	Infrastructure	Unit	Qty.
1	2	3	4
1	Primary School	No.	2
2	Junior High School	No.	1
3	Kanya Pathshala	No.	-
4	Public Health Center	No.	-
5	Vet nary Hospital	No.	-
6	Panchayat Ghar	No.	1
7	Post Office	No.	-
8	Agan Bari Center	No.	3
9	Electricity	-	Yes
10	Road	-	Yes
11	Pond	No.	1
12	Hand Pump	No.	20
13	Irrigation Well	No.	1
14	Canal	No.	-
15	Temple	No.	5
16	Well (Drinking Water)	No.	5
17	Pumping Set	No.	35
18	Toilet	No.	38
19	Market	No.	No



Recorded importance of development institution

Farmers perception recorded for importance and role of different development institution in relation to infrastructure. Importance has been depicted with size of circle and role with distance from village circle. (Fig 8)

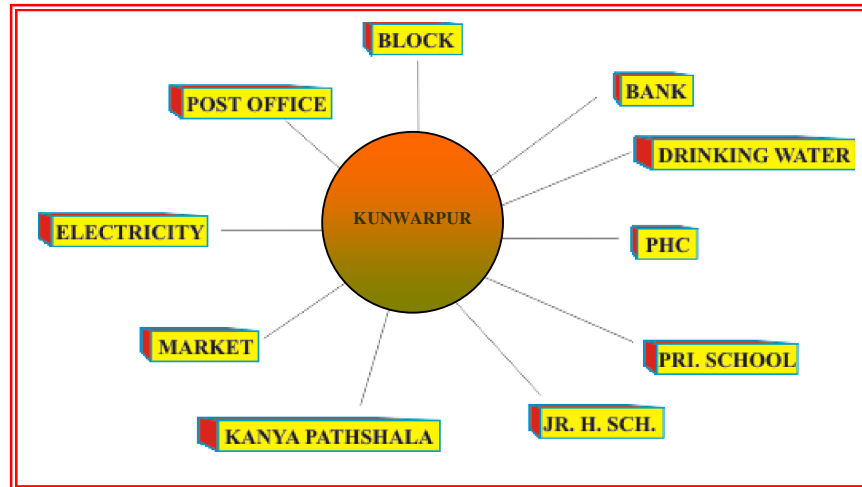


Fig. -8 (Venn diagram of Micro watershed)

(3.12) Communication :

Watershed can be approached from Distt Headquarter Bulandshahar to Project area 35 km. by Road.

(3.13) Natural Resource Base :

Transact of watershed showed typical land use profile consisting of plain agriculture land, erodic area and medium ravenous ridge. Main source of the irrigation are the canal for pre showing irrigation only. The total geographical area of the watershed is 890.00 Ha. classification .

Approach roads for the micro watershed is shown for the communication is shown on topo sheet map Fig 9 as next page.

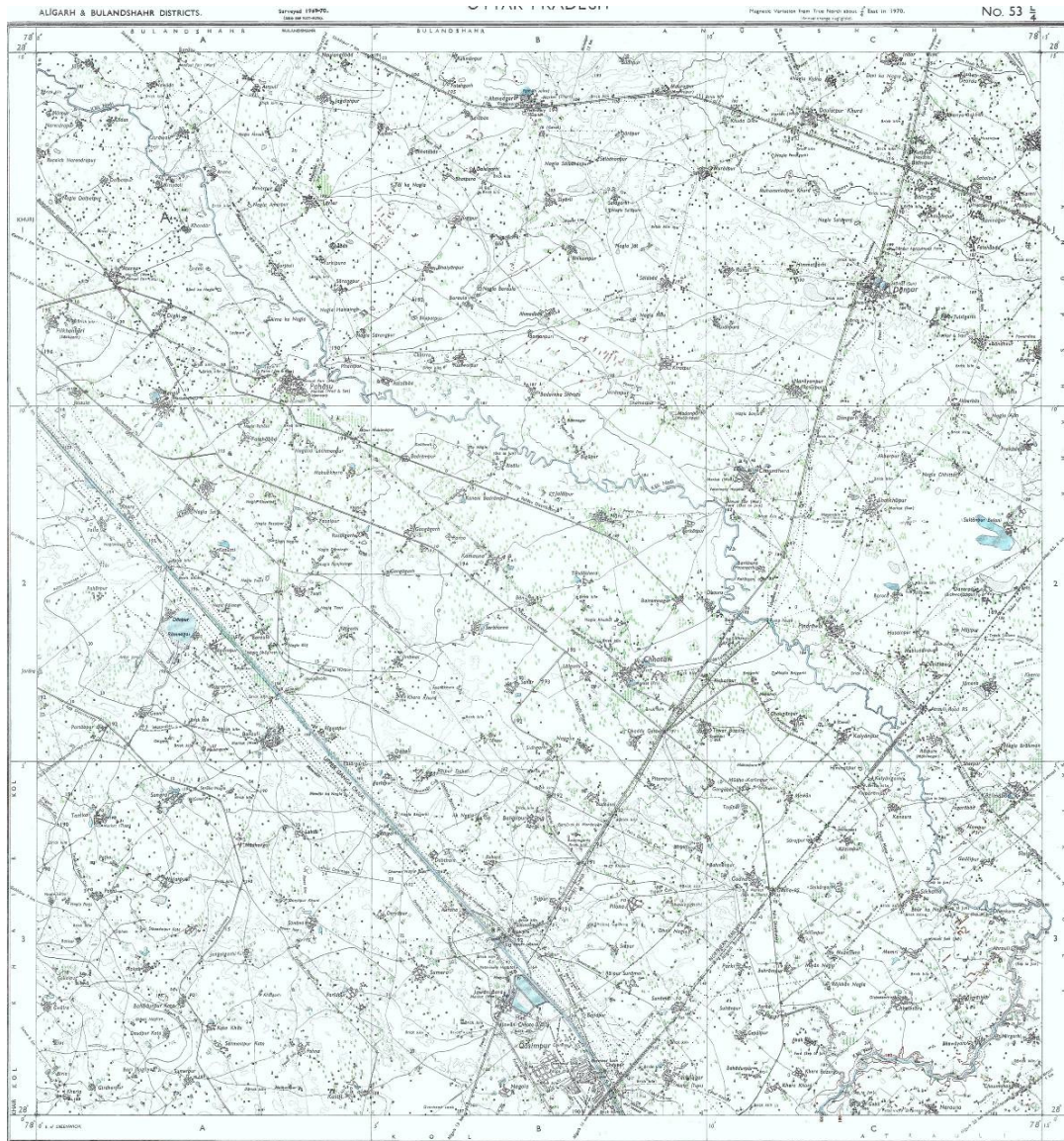


Fig.- 7 Communication Map on Toposheet

Table – 10 : Classification of area(Hect.)

S.N o.	Name of Village	Unit	Total Geographical Area	Rainfed Area	Wasteland	Village Land & Road	Irrigation Resource	
							Water Bodies	Borewell
1	2	3	4	5	6	7	8	9
1	Kunwarpur	Ha.	531.50	406.37	31.89	19.12		12.00
2	Azizabad	Ha.	245.7	187.82	7.25	18.15		8.00
3	Pitampur	Ha.	59.20	45.25	3.55	6.50		5.00
4	Barola	Ha	50.40	38.47	3.02	15.50		3.00
5	N. Sarangpur	Ha	25.30	21.25	1.27	8.16		-
Total			912	699.10	46.98	59.43	-	28.00

(3.14) Livelihood :

Total Population of the watershed is 8936 and out of the total population a majority more than 80% has farming as their major source of livelihood followed by labours, serviceman and small business class. Classified livelihood given in form as follows :

Table – 11 : Livelihood Classification in population :

S. No.	Name of Village	Farmer	Labour	In Service	In Local small business	Others
1	2	3	4	5	6	7
1	Kunwarpur	360	300	15	32	24
2	Azizabad	185	145	12	21	13
3	Pitampur	45	25	3	20	12
4	Barola	38	32	2	8	3
5	N. Sarangpur	26	10	1	1	2
	Total	654	512	33	82	54

(3.15) Dependency of forest fuel wood and fodder :

- a. Fuel wood :-** The main source of fuel is from cow dung cake, woody stem of crops. About 70% of the domestic energy requirement is met from the agriculture by product and cow dung cake. Rest is met out from the forest outside the village and watershed boundary, most preferred fuel wood is Juliflora fuel wood Juliflora obtained from standing along and between watershed.
- b- Fodder :-** Villages have not any sufficient signified dependency on forest based fodder as these resource are nothing availability in the forest.

(3.16) Labour requirement :

Labour requirements was found to be maximum at the time of October, November and December when the sowing of Rabi crops are done. The crucial periods are March and April coinciding harvesting and threshing of Rabi crops and July/August is sowing Kharif Crops take a little place. Other income generating enterprises having potential during the remaining.

(3.17) Crop Rotation :

Present Crop rotation in the watershed comprise of :

Kharif	-	Bajra	-	Rare
		Maize	-	Rare
		Jwar	-	Rare
Rabi	-	Fallow Wheat	-	Major
		Fallow Barly	-	Major
		Fallow Sugarcane	-	Major
		Fallow Mustard	-	Major
Zayad	-	Urad, Moong, Makka		

The above said Rabi Crops is the most prevailing crop rotation on the agriculture lands both in the rainfed and irrigated conditions.

Organized vegetable cultivation fruit plantation and traditional agro forestry systems are lacking as per requirement in the watershed the limited vegetable cultivation in the watershed is confined as kitchen gardens and field to the irrigated condition in a scattered manner. The cultivation of cash crops other than the sugarcane, wheat and mustard also in the watershed.

(3.18) Historical Events :

Chronological record of important events of the watershed village is prepared through participatory rural appraisal (PRA) which is very useful in understanding of its background and chronology is given as follows :

Table – 12 : Historical Events

S. No.	Events/Activities	Year	Rem.
1	2	3	4
1	Established	1651	
2	Opening of Primary School	1962	
3	Opening of Junior School	2004	
4	Opening of Kanya Pathshala	-	
5	Opening of PHC	2003	
6	Opening of Vet. Hospital	-	
7	Panchayat Ghar	2001	
8	Introduction of Tractor	1972	
9	Gobar Gas Plant	-	
10	Thresher	1972	
11	First Tube well/Pumpset	1976	
12	First Motorcycle	1981	
13	T.V. & D.V.D. Players	1994	
14	Electricity in Village	2001	
15	Bituminous Road	2006	
16	First Hand Pump	1952	
17	Templo Renovation	1999	
18	First Land Line Telephone	2003	
19	Planning for Watershed Project	2010-11	

(3.19) Present Land Use in the Watershed :-

The watershed has diversified land uses. The varied present land use under different use in the watershed. The mixed land use followed in the watershed is almost similar in other parts of U.P. During P.R.A. Exercise prepared land has been shown in Table No. 13, 14 & 15.

Table – 13 : (Ownership)

S. No.	Name of Village	Pvt. Agri. Land		Govt. Revenu Land	Forest Land	Other Land
		S.C./S.T.	Others			
1	2	3	4	5	6	7
1	Kunwarpur	48.00	456.00	-	-	45.16
2	Azizabad	32.00	201.40	-	-	201.40
3	Pitampur	15.00	41.24	-	-	41.24
4	Barola	12.00	35.88	-	-	35.88
5	N. Sarangpur	2.00	22.035	-	-	-

Table –14 : (Present Land under different categories)

S. No.	Name of Village	Land Use (Ha.)				Total
		Agricultural	Wasteland (All Types)	Seasonal waterbodies	Village/Road Etc.	
1	2	3	4	5	6	7
1	Kunwarpur	504.92	31.89	-	19.12	555.93
2	Azizabad	233.41	7.25	-	10.15	250.81
3	Pitampur	56.24	3.55	-	6.50	66.29
4	Barola	47.88	3.02	-	15.30	66.20
5	N. Sarangpur	24.035	1.27	-	8.16	33.46
Total		866.48	46.98		59.43	972.69

Table – 15 : (Present land use classified)

S. No.	Land Use Under	Unit (ha.)	Area (Ha.)	Percentage
1	2	3	4	5
1	Under Agriculture			
	A- Rainfed-	Ha.		
	I- Crops		657.85	78%
	II- Agro forestry		12.99	1.5%
	B- Irrigated-		-	
	I- Assured		77.97	9%
	II- Portial		95.31	11%
2	Wasteland			
	A- Aforestation			
	B- Pasture			
	C- Untreatable		21.14	45%
	D- Treatable		25.83	55%

Proposed Post Land Use has been given on Page No. 32

4- Focus on Present Land Use :

(4.1) Agriculture :

The total area under agriculture in the watershed is about 415.02 ha. out of which 906.61 ha. is under rainfed agriculture. Agriculture land uses in the watershed extended to diversified land capabilities starting marginal to good class II land. The irrigated and drinking water is most scarce natural resource in the watershed. The operation of tube well for irrigation of agricultural crops frequently leads to the drinking water. Problem to the farmers of watershed forcing them to carry drinking water from outside of the watershed area. The agricultural field bund are common in the watersheds however they frequently breach on heavy rains.

Various mixed texture of soils are located in patches through out the watershed. The heavy soils are almost kept fallow during rainy season. the agricultural soils also have some as share calcium pan at variable depths. The irrigation water is conveyed by the earthen channels. Surface irrigation methods following mainly border method of flood method by the formers in the watershed. These factors reduce the water use efficiency of limited and valuable irrigation water.

Drought hardy species like Juliflora suitable multi purpose trees is suitable for rehabilitation of the wasteland. Rehabilitation of waste lands promoting agro forestry with appropriate fruit and forest species suitable vegetative barriers on sloppy lands can be high future value and by these adoption would be meet out many demands of fire wood and fodder in the wasteland. Except above but also for soil and water conservation, rehabilitation of wasteland and sustainable income generation for socio-economic upliftment of farmers.

Crop Productivity :

The farmers also do not have suitable cropping system to deal aberrant weather. Weeds impose considerable constraint in productivity of both Karif and Rabi crops under irrigated as well as rainfed production system farmer undertake normally one manual weeding in mustard and other valuable crops however, practices is energy and time consuming. Use of we decide is rare in the watershed.

In the watershed area, limited cropping in the Kharif with mixed cropping practices is not only irrigational but also unscientific and best for low productivity. Subsequent Rabi crops in general. Sugarcane & Mustard crop in particular are raised on residual soil moisture under rainfed production system during post mansoon season.

(4.2) Indigenous Technological Knowledge (ITK) :

Under process of PRA tracked out rural applying technology in various field of local technology and some technology is very popular in village. In which the agriculture is an old traditional practices of farmers who have improved themselves with passage of the time according to their domestic needs and technological reforms in the nearby areas. The villages have their traditional village ponds, practice of field bunding which typically constitute agricultural related ITKs in the watershed. The Mustard & sugarcane being a cash and firewood crop of the watershed and also sugarcane crop is being. Cultivated in self designed manner by the farmers. Its carried out that the area is totally depend on rain and under the rainfed area technology is

applied by the farmers. However limited fertilizer application specifically the DAP came in the practices since about 15-20 years.

(4.3) Forest and Other Vegetation :

Forest :

The watershed have a tract of wasteland area which are under uncultivable position is liesed in the watershed. These wasteland have not any tree vegetation or very less than real requirement for the wasteland use.

Horticulture/Agro forestry :

Horticulture and agro forestry practices were observed in the watershed.

(4.4) Agro forestry :

Agro forestry practices are lacking in the watershed. Though it has good potential under existing disposition and may a role particularly with respect to minimization of cropping risk, built up soil fertility and productivity, protection of soil erosion, soil conservation partly meeting out the fire wood demand of rural community and more over optimizing the economical return from system as whole under typical semi arid climate in the watershed. Bund and boundary plantation also have good potential to care the fire wood and fodder demands of the rural community in the watershed. The existing area under agro forestry is almost negligible. Prosopis Jhliflora may be planted as block or sole plantation specifically on marginal and degraded land in the watershed.

The agro forestry interventions comprising of ber, bail, aonla, guava, papular etc. may be applied for benefit of the farmers under rainfed to irrigation production system on leveled to slopping and marginal agricultural using proper planting techniques and term it control measures.

The multipurpose trees may be also help in supplementing fire wood and fodder demands of the rural community in the watershed and my be planted as hedge rows on rainfed, marginal and degraded lands.

(4.5) Horticulture :

Fruits and vegetables practices are lacking in the watershed area. Its practices may be sustainable very good potential for the formers of watershed. There are a limited lack fruit trees in number like mango, guava, lime, ber, aonla and papaya fruit trees well as vegetables like radish, okra, tomato, cabbage, garlic, onion, chilly, bringer and cucurbits but they are found surviving well in the watershed villages. Organized orchards (vatika) commercial vegetable cultivation horti-agri and other systems of agro forestry etc. are lacking but have good agriculture.

5. Soil and land capability classification :

(5.1) Soil Morphology :

Watershed is located North East corner of Bulandshahr Distt. near about 55 Km. away. The entire terrain of watershed is topographically divided into various land forms. Accordingly the soils of watershed have been grouped major categories is given as follow :

Hill Terrain	Plane Land Sloppy	Undulated Land	Rill Erosic Land	Moderate ravenous
-	35%	30%	18%	17%

Given categories in the blocks is located the soil morphology in the watershed areas. Representation of soil characteristics by soil profile is represented as follows :

Soil Profile

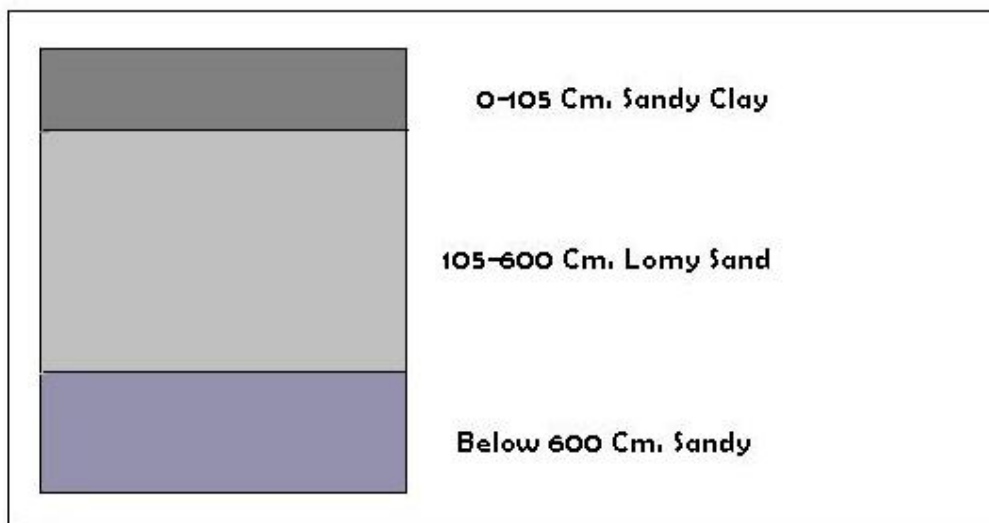


Fig. – 9 (Soil Profile)

Table – 16 : (Morphology of a Typical Soil Profile) :

Horizone	Depth in Cm.	Morphology
1	2	3
A V & H	0-150	Silky when moist, Hard when dry quick soluble, high elasticity, fissures, and cracks, occasional occurrence of free calcium carbonate granules black in colour, clay content 29%, PH- 8 to 8.7
B V & H	150-160	Whitish yellow in colour, very fine mixed with free cacaos and gravels, Hard when dry compact and indurate hard pan restricting development of root and down ward water transmission.
C V & H	7600	Red and white sand stone

(5.2) Soil and Characteristic and Fertility Status :

Soil characteristic pertaining to soil fertility of various classes accruing around villages in the watershed are given as follows :

Table – 17 : Soil Characteristic & Fertility Status :

Sl. No.	Soil Properties	LCC-II	LCC-III & IV
1	2	3	4
1	Sand %	47.04	75.04
2	Silt %	24.60	18.60
3	Clay %	28.36	6.36
4	Texture	Sandy Clay	Lomy Sand
5	PH (1:2)	8.41	8.67
6	Organic Carbon %	0.37	0.12
7	Available N Kg ha ⁻¹	316	173
8	Available P Kg ha ⁻¹	29	15
9	Available K Kg ha ⁻¹	189	325
10	EC (dS m ⁻¹)	0.47	0.12

(5.3) Land Capability Classification (LCC) :

Land capability classification (LCC) was done to classification the soils in different groups based upon the limitations and to emphasize the hazards prevailing in the watershed in order to find out the different topo-sequences, landforms, soil depth and erosion hazards. This was followed by the detailed investigation of selected landforms to bring out the LCC classes of the Watershed. Classes of land capability namely II, III, IV and V are demarcated in the watershed. The areas under different classes are sown as follows :

Table – 18 : Land Capability Classification (LCC) :

S. No.	Land capability class	Area in Ha.	Colour
1	2	3	4
1	I Class	-	-
2	II Class	129.97	15%
3	III Class	606.53	70%
4	IV Class	86.64	10%
5	V Class	43.32	5%
6	VI Class	-	-
7	VII Class	-	-
8	VIII Class	-	-

Land capability classification of various agricultural practices under land use can be classified as groups, class, sub class and units. Utilization of various land class is given as follows :

Table – 19 : Utilization of various land uses

S. N.	LCC	Forestry	Ltd. Grazing	Light Grazing	Dense Grazing	Limited Agriculture	Light Agriculture	Dense Agriculture	More Dense Agriculture
1	I								
2	II								
3	III								
4	IV								
5	V								
6	VI								
7	VII								
8	VIII								

(5.4) Land Capability Class II & III :

This group is one of the most extensive LCC watershed. and also near to class III for the agricultural practices. The soils are sandy & sandy loam in texture. The land under this class is nearly level to mild sloping (1-3%). The soils are deep and erosion hazard is slight. Most of the productive agriculture land comes under class II & III. These lands potentially very productive but due to rainfed a single cropping pattern is in habitation.

(5.5) Land Capability Class IV :

This class is found in lower portion near the outlets of watershed. The soils are coarser in texture, deep, erosion hazard and undulating in topography. Rill and initiation of gully can be seen near the outlet of the watershed.

(5.6) Land Capability Class VII & VIII :

This class of land is not found in watershed. Somewhere lack of soil are found with admixture gravels fragments in these classes of lands.

(5.7) Conclusions :

The majority of land form is coming under class II, which give an insight of good agriculture production potential of the watershed.

The land capability classification provides reasonable good information with regard to capability of soil, that could be used for agriculture, agrihorticulture, silviculture and posture development.

The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like bunding practices.

The reasonable area is under watershed of wasteland and other wasteland including grater potential of this watershed for forestry and pasture development. Rare places namely water body of low portion of land area under seasonally works as water harvesting structures and these harvested water is used or can use for some other beneficial activities during the crop season also.

6. Problems and needs of the watershed indentified during the PRA

(6.1) Problem Identification and prioritization :

- a- The are has undulating topography, steep unstable slopes, gradient of excessive branches of rills and hence highly prone to soil erosion.
- b- Major issues addressed to food sufficiency economic growth and environmental security in the watershed area.

- c- Effective soil depth is limited and highly variable hampering good crop growth.
- d- The watershed have low productive cropping due to tradition single cropping pattern and over all average crop production percentage not sufficient against requirement.
- e- Identified that there is no assured irrigation system has been development capacity of water bodies are reduced due to silt ration which are utilized to store of rainy water and they are renovatable.

(6.2) Transact walk during the PRA :

Problems identified and prioritized during the transact walk and PRA exercises in all comprised villages of watershed. There were pooled and a list of problems representing the whole watershed was prepared. Problems were ranked as per their total weight age in the watershed village.

Table – 20 : Ranking of Problem identification and prioritization of watershed

S.No.	Problem	Rank
1	2	3
1	Lack of irrigation	3
2	Lack of drinking water	6
3	Low production of field crops	4
4	Lack of fodder availability and low productivity	3
5	Lack of availability of fuel wood	5
6	Lack of market facility	5
7	Lack of quality seeds, fertilizer, pesticides etc.	4
8.	Medical and Health care facilities for milching animals and low productivity.	7
9	Lack of medical, educational and transportation facilities	7
10	Lack of water bodies renovation	9
11	Lack of run of earthen check bunds	1
12	Lack of water harvesting structures	1
13	Lack of livelihoods opportunity	2

Prioritized ranking (Upto four Numbers) :-

- 1- Lack of earthen check bunds.
- 2- Lack of livelihood opportunities.
- 3- Lack of irrigation water was the greatest problem. Lack of irrigation water problem experienced by the people followed by low crop production.

(6.3) Analysis of SWOT of the watershed :

Strength (S), Weakness (W), Opportunity (O) and Threat (T) analysis is a useful decision support tool. A SWOT analysis of watershed is presented as follows :

SWOT analysis of the watershed

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

7. Proposed land use for the watershed :

Watershed management plan preparation due importance is given to topographic, land suitability, irrigation potentially, prevailing farming systems, micro farming situation, farming, farmers preferences and priorities along with economic and environment securities.

Crop and tree selection and area distribution was done as per farmers priorities revealed through PRA exercise.

The watershed management plan for watershed is prepared with specific objectives of food sufficiency, income and employment generation with environment security.

Technical options were with the ITK based on the latest available experiment findings. Due attention was given to the resource of the farmers and adjustments were made in capital intensive resource demanding technological outputs while making them adoptable to the resource poor farmers. Emphasis was given on maximum use of farm yard manure. The proposed land use plan of the watershed is shown as follow as in table

Table – 21 : Present and proposed land use plan of the watershed

S.No.	Land use	Present (ha)	Proposed area (ha)
1	2	3	4
1	Agriculture		
a	Rainfed		
	I Crops	657.85	680
	II Agro-forestry	12.99	14
b	Irrigated		
	I Assured	77.97	77.97
	II Partial	95.31	98.00
2	Waste land		
a	Aforestation		
b	Pasture		
c	Untreatable	21.14	16.00
d	Treatable	25.83	20.00
3	Village land	59.43	-

(7.1) Status of Present Water Resources Utilization :

Watershed is having some canal system. Management and maintenance of these canal are required. Before sowing of Rabi crops, water from these canal is issued as supplementary irrigation for Rabi sowing are allowed to go as waste. After releasing water from canal, submergence area also put under cultivation.

Some where bore well irrigation applied by the farmers in the watershed.

(7.2) Proposed Plan for Irrigation Development :

- a- Present system of irrigation and wastage of water during October–November need to be made more efficient from water management point of view by minimizing conveyance losses in the existing water courses.
- b- Present irrigation canal capacity have to build up by the reform. Which are lack capacity of water.
- c- Construction of new water harvesting earthen structures, Pucca Check Dem, Series Gully Plugging, etc. has been sloppy portion to increase irrigation potential and for recharging of ground water, soil and moisture conservation maximum field irrigation, best production and expected change of crop rotation.
- d- The up gradation of the exciting system of irrigation will result in :
 - i- Minimization of conveyance losses.
 - ii- Increase in frequency of irrigation.
 - iii- Adoption of high yielding varieties of crops.
 - iv- Assured cultivation of cash crops.
 - v- Capacity buildup by the planning of new water harvesting structures.

(7.3) Ground Water Recharge :

For the purpose of ground water recharge, the area of the upper side of watershed is recommended for Field Bunds, Contour Bunds, Peripheral Bunds and Submergence Bunds and in the lower portion Contour Staggered Trenches, Gully Plugs, Earthen Check Dem and Pacca Outlets. In the undulated sloppy portion of the watershed recommended water harvesting structure for dual purpose as ground water storage and under ground water recharge.

(7.4) Crop Production :

Practices proposed in the watershed is given as follows :-

- a- Mulching and crop residue management.
- b- Application of green manuring.
- c- Vermi Composting.
- d- Crop rotation and inter cropping.
- e- Biofertilizers.

(7.5) Tillage Operation :

Deep tillage technology is proposed to apply to be demonstrated for benefit of farmers in the watershed.

(7.6) Improved Seeds of High Yielding Verities (H.Y.V.) :

Recommendation of improved varieties is necessary for improving the productivity and farm income. Through replacement of low yielding traditional verities of seeds in villages of watershed.

(7.7) Balanced Fertilizer Use :-

Demonstration of use of fertilizer in various crops of watershed recommended balance fertilizer use in different crops will be benefited of forming community.

(7.8) Control of insects and diseases :

Aphid in the mustard 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 pest and diseased will also be demonstrated in the watershed for benefit of the growers.

(7.9) Dry Land Horticulture :

Such portion of dry land in which proposed horticulture development planning recommended species like Ber, Bel and Aonla will be planted at suitable spacing in the watershed.

(7.10) Agri Horticulture :

Aonla and Sahjan would be suitable horticultural crops to the locality. Therefore, a part of land in the farmer field shall be selected and brought under Agri-horticulture system. The cropping system followed will be Jwar and Wheat.

(7.11) Plantation (Fuel wood) :

Such a portion which are under wasteland will be taken falling in the class-IV category in the watershed. These lands will be planted with species like Vilayati Babool (Prosopis Juliflora), Babool (Acacia Nilotica), Karanj (Pangamia Glabra).

9. Socio Economic Analysis of the of the Project :

(9.1) Sustainability and environment security :

The proposed land use plan will improve the land utilization index and crop diversification index significantly as compared to the existing one. in the proposed watershed management plan proper blending of the bio engineering measures will be applied on above 80% of the total area of watershed. It is estimated that more than above 70% of the watershed area will be treated and consequently the soil loss and runoff from the area is expected to be reduced by 70% respectively.

It will help in maintaining ecosystem integrity on sustained basis along with improving the livelihood security of the farming community.

(9.2) Economic Analysis :

Economic analysis of the project was carried by taking direct benefits and costs considering 10 years for project life at 10% discount rate. Whole watershed development plan was divided into three sector as agriculture, horticulture and forest/Fuel wood plantation. Net Present Value (NPV) and Benefit Cost ratio criteria were applied judge the economic efficiency of each enterprises and sector. Net present value (NPV) of the project life is considered to be 10 years and discount rate for NPV estimation is 10% is given NPV and benefits as follows :-

Table – 22 : Present productivity income analysis :

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	3.00	4300.00	12900.00	6450.00	6450.00	1:1
		Moong	3.00	4500.00	13500.00	6075.00	7425.00	1.22:1
		Jwar	4.80	600.00	2880.00	1584.00	1296.00	0.82:1
		Wheat	18.50	850.00	15275.00	8650.00	7075.00	0.82:1
		Pea	7.50	2250.00	16875.00	10970.00	5905.00	0.54:1
		Mustard	3.50	18.500	6475.00	3235.00	3240.00	1:1
Total		-			105105.00	54105.00	51000.00	0.94:1
Average		-			13138.00	6763.00	6375.00	0.94:1
B	Forestry	Vilayati				15000.00	-	Nil
		Babool						
C	Horticulture	Ber				20000.00	-	Nil
		Aonla				20000.00	-	Nil
		Bel				20000.00	-	Nil
Total		-				60000.00	-	Nil
Average		-				20000.00	-	Nil
Grand Total								

Table –23 : Post productivity and income analysis for Post Productivity**Value and B.C.:**

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	4.00	5000.00	20000.00	8325.00	11615.00	1.39:1
		Moong	4.00	5000.00	20000.00	8200.00	11800.00	1.44:1
		Jwar	5.50	800.00	4400.00	1900.00	2500.00	1.32:1
		Wheat	25.00	1000.00	25000.00	16680.00	13320.00	1.14:1
		Pea	9.50	3500.00	33250.00	14810.00	18540.00	1.12:1
		Mustard	5.00	3000.00	15000.00	4370.00	8130.00	1.86:1
Total		-	-	-	172250.00	72845.00	99765.00	1.38:1
Average		-	-	-	21531.00	9061.00	12471.00	1.38:1
B	Forestry	Vilayati Babool	80.00	500.00	40000.00	15000.00	25000.00	1.67:1
C	Horticulture	Ber	35.00	2000.00	52500.00	20000.00	32500.00	1.63:1
		Aonla	35.00	2000.00	70000.00	20000.00	50000.00	2.50:1
		Bel	40.00	1500.00	80000.00	20000.00	40000.00	2:1
Total		-	-	-	182500.00	60000.00	122500.00	2.04:1
Average		-	-	-	60833.00	20000.00	40833.00	2.04:1
Grand Total		-	-	-	1394750.00	147485.00	247265.00	1.68:1

Table –24 : Summary of NPV, PPV and B.C. Ratio (Sector wise) :

S. No.	Name of Sector	NPV		PPV		B.C. Ratio
		Expend.	Net Income	Expend.	Net Income	
1	2	3	4	5	6	7
1	Rain fed Agriculture	54105.00	51000.00	72485.00	99765.00	1.38:1
2	Forest/Fuel wood Plantation	15000.00	-	15000.00	25000.00	1.67 : 1
3	Horticulture	60000.00	-	60000.00	122500.00	2.04:1
Total		129105.00	51000.00	147485.00	247265.00	1.68:1

(9.3) Economics of Agriculture Sector :

The development cost can be recovered by the adoption of plan in present rain fed agriculture is being done on well maintained field, therefore does not require much investment. In rain fed agriculture, investment of Rs. 44.50 lacs is proposed to made is given as follows :

Table – 25 : Economics of Agriculture Sector :

S. No.	Name of sector	Name of Activities / Plan	Treatble Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Rainfed	Soil, moisture and water cons works	830	473.64	1126.97	653.61	1.38:1

(9.4) Economics of forest fuel wood plantation :

Economic analysis of fuel wood plantation in the watershed. Project life is considered to be 20 years and discount rate for NPV estimation is 10 % is followed and as is given follows :

Table –26 : Economics of forest fuel wood Plantation :

S. No.	Name of sector	Common Name of Plant	Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Forest Fuel wood sector	Vilayati Babool (Prasopis Juliflora)	25.00	2.50	6.675	4.175	1.67 : 1

(9.5) Economics of Horticulture Sector :

Economic analysis of Horticulture Plantation in agri-horti system and on wasteland patches of watershed project, life is considered about 15-20 years and discount factor rate for NPV estimation is 10% is follows :

Table – 27 : Economics of Horticulture system :

S. No.	Name of Sector	Common name of Plants	Area (Ha.)	NPV (Lacs)	Post Productive Value (Lacs)	Benefit Lacs	B.C. Ratio
1	2	3	4	5	6	7	8
1	Horticulture	Ber (zyziphus mouritana)	4.00	0.80	2.104	1.304	1.63: 1
		Amla (Embelica officianalis)	3.80	0.76	2.660	1.40	2.5 : 1
		Bel (Aegle marmelos)	2.20	0.44	1.320	0.88	2 : 1
Total			10.00	2.00	6.084	4.084	2.04 : 1

(9.6) Food requirement and sufficiency :

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

Table – 28 : Status of food requirement and availability of per annual :

S. No.	Name of Foods	Requirement Q./Yr.	Present Status		Expected Post Status	
			Availability Q./Yr.	Deficit or surplus Q./Yr.	Availability Q./Yr.	Deficit or surplus Q./Yr.
1	2	3	4	5	6	7
1	Cereals 110 Kg.	11775	10010	1765	20017	8242
2	Pulses 36.50	3907	2149	1758	7032	3125
3	Oil Seeds 29.20	3125	1250	1875	5000	1875
4	Vegetable 71 kg	9742	1948	7794	17535	7793

(9.7) Employment generation :

One of the major problem of the labour migration in watershed project. By the implementation of the project activities employment opportunities will be generated. However the changes in land use pattern and adoption of other subsidiary enterprise will generate employment opportunities in the watershed as given in table follows :

Table – 29 : Employment generation under proposed works :

S. No.	Employment activities/works	Area under work	Cost	Mandays generation (Nos.)			
				Unskilled	Skill	Total	Person
1	2	3	4	5	6	7	8
2	Graded Contour Bund	95	2.85	2850	-	2850	95
3	Gully Plug, C.D.	159	11.925	8347	612	8959	298
4	Submergence Bund	135	5.40	5400	-	5400	180
1	Peripheral Bund	135	4.725	4725	-	4725	157
5	W.H.B.	167	15.03	9018	510	9528	317
6	Renovation of Bund	104	3.12	3120	-	3120	104
7	Reno. of W.H.B.	-	-	-	-	-	-
8	Community Pond	-	-	-	-	-	-
9	Afforestation	25	4.75	950	-	950	32
10	Horticulture	10	2.00	400	-	400	13
Total		830	49.80	34810	1122	35932	1196

10. Formation of watershed committee :

Under compliance of common guideline Para (6.3) is followed and by the help of watershed development team, watershed committee is organized in the micro watershed village Ghuraiya with 10 members as prescribed in common guide line. List for organization of W.C. village details given as follows :

Table – 30 : Details of comprised village W.C. organization in M.W.S. :

S. No.	Particulars	Details	Block	Geographical Area
1	2	3	4	5
1	Micro watershed code	2B3E4d3b	Pahasu	912 531.50
2	Name of Gram Panchayat in M.W.S.	Kunwarpur, Barola, N. Sarangpur		

Table – 31 : List of organized W.C. for the Gram Panchyat Kunwarpur in watershed.

S. No.	Name of selected members	Age	Representation Members from	Post	Qualification	Village
1	2	3	4	5	6	7
1	Virendra Singh	42	Gram Sabha	President	12	Kunwarpur
2	Pramod Kumar	43	Gram Sabha	Secretary	12	Kunwarpur
3	Grees Chand	45	From – U.G	Member	10	Kunwarpur
4	Mangal Sen	48	From – U.G	Member	-	Kunwarpur
5	Gajendra Singh	45	From – U.G	Member	12	Kunwarpur
6	Dharmendra Sing	26	From – S.H.G.	Member	12	Kunwarpur
7	Gokul	35	From – S.H.G.	Member	Nil	Kunwarpur
8	Anita Devi	30	From – S.H.G.	Member	8	Kunwarpur
9	Sunita Devi	28	From – S.C.	Member	8	Kunwarpur
10	Pamman Singh	25	From – S.C.	Member	Ph.D.	Khurja
11	Sunil Kumar	55	From – PIA	Work out	Agri Engg.	Khurja

(10.1) Formation of Self Help Groups in M.W.S.

By the help of watershed committee and watershed development team self help group are formatted / organized. Families and persons are selected from poor, small and marginal farmers families, landless poor families, agriculture labour families, women, herdsman and shepherd and S.C. families in the formatted self help groups are given as follow :

Table – 32 : Vikas Self help group – Kunwarpur (Livelihood) .

S. No.	Name of member in formatted SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Kandhi Singh	50	L.R.	Live Stock	New
2	Gajendra Singh	45	L.R.	Live Stock	New
3	Mangal Sen	48	L.R.	Live Stock	New
4	Harveer	38	L.R.	Live Stock	New
5	Yogesh	40	L.R.	Live Stock	New
6	Dharmendra	32	L.R.	Live Stock	New
7	Brajesh	26	L.R.	Live Stock	New
8	Jagdish	42	L.R.	Live Stock	New
9	Om Prakash	35	L.R.	Live Stock	New
10	Dharmendra	26	L.R.	Live Stock	New

Table – 33 : Jagarti Self help group Kunwarpur

S. No.	Name of member in formed SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Dhaniram	52	BG	Livestock	New
2	Rajendra	56	Gen	Livestock	New
3	Prempal Singh	50	Gen	Livestock	New
4	Gayatri Devi	40	Gen	Livestock	New
5	Hukum Singh	32	SC	Livestock	New
6	Megh Singh	50	Gen	Livestock	New
7	Om Prakash	50	BC	Livestock	New
8	Om Pal	48	BC	Livestock	New
9	Mahipal	35	BC	Livestock	New
10	Jagpal Singh	35	SC	Livestock	New

Table – 34 : Self help group in Kunwarpur village of Watershed

S. No.	Name of member in formed SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Rajendra	35	Gen	Livestock	New
2	Amichand	65	Gen	Livestock	New
3	Rakesh	40	Gen	Livestock	New
4	Dharpal	50	Gen	Livestock	New
5	Jagpal	35	Gen	Livestock	New
6	Rajendra Singh	35	Gen	Livestock	New
7	Mahavir	55	Gen	Livestock	New
8	Udaiveer	45	Gen	Livestock	New
9	Arvind	35	Gen	Livestock	New
10	Jagdish	40	Gen	Livestock	New

Formation of User's Groups :

User's groups are formed by the help of watershed committee and watershed development team in the micro watershed comprised villages. Farmers which have land village are involved in the User's groups and they will be directly benefited as expected by the implementation of watershed project. Easy and convenient conditions are made to resource use between user's groups and they will be responsible to operate and maintenance for the created assets in the watershed. Nos. of formed user's groups details are given as follows :

Table – 35 : Village wise user's groups

S. No.	Name of village	No. of groups	No. of farmers	Total Agri. Land	Area under treatment	Cost of assets
1	2	3	4	5	6	7
1	Kunwarpur	24	360	531.50	483.71	
2	Azizabad	13	185	245.70	223.60	
3	Pitampur	4	45	59.20	53.87	
4	Barola	4	38	40.40	45.80	
5	N. Sarangpur	2	26	25.30	23.02	

10. Estimation and Costing of Proposed activities of the watershed Project Year 2010-11.

Proposed works / activities for the Project Period (Year 2010-11) under proposed treatable area 830.00 Ha. Out of total Geographical area 912.00Ha.

(10.1) Financial and Physical Outlets :**Table – 36 : Financial and Physical Outlets for the Year 2010-11 :**

Sl. No.	Components	Unit cost per ha.	Physical ha.	Financial (Lacs)			Man-days Generation
				Labour Component	Material Component	Total	
1	2	3	4	5	6	7	8
A	Management Cost 10%						
1	Administrative Cost – TA & DA Hiring of Vehicles, Official Expenditure Electricity & Phone bill Computer, Stationery and office consumable materials & contingency	1200	-	-	9.960	9.960	-
2	Monitoring	120	-	-	.996	.996	
3	Evaluation	120	-	-	.996	.996	
	Sub Total	1440		-	11.95	11.952	
B	Preparatory Phase 10%						
1	Entry Point Activities 4%	480	-	1.1168	2.8672	3.984	1117
2	Institutional & Capacity Building 5%	600	-	-	4.980	4.980	
3	Detailed Project Report 1%	120	-	-	0.996	.996	
	Sub Total	1200	-	1.1168	8.8432	9.960	1117
C	Watershed Work Phase						
a	Watershed Development Works						
1	Graded, Contour & Field Bunds	3000	95	2.85	-	2.85	2850
2	Gully Plug, Earthen Checkdam /WHS	7500	159	8.3475	3.5775	11.925	8959
3	Submergence bunds	4000	135	5.40	-	5.40	5400
4	Peripheral Bund	3500	135	4.725	-	4.725	4725
5	Earthen Water Harvesting Bund	9000	167	9.018	6.012	15.03	9528
6	Renovation of existing Bunds	3000	104	3.12	-	3.12	3120
7	Renovation of existing W.H.B	-	-	-	-	-	-
8	Aforestation and Development of silvi postural system	-	25	0.95	3.80	4.75	950
9	Dry Land Horticulture	20000	10	0.40	1.60	2.00	400
10	Community Pound (Renovation)	-	-	-	-	-	-
	Sub Total		830	34.8105	14.9895	49.80	35932
B	Livelihood Programme (Community Based) 7.620						
	Income generating activities through SHG's for landless and marginal farmers 10%						
1	Live stock development activities	200	-	-	1.6603	1.6603	-
2	Bee Keeping	100	-	-	0.8297	0.8297	-
3	Poultry Farming	200	-	-	1.6603	1.6603	-
4	Nursery Development	300	-	-	2.4900	2.4900	-
5	Vegetable Production	100	-	-	0.8297	0.8297	-
6	Milk Dairy Promotion Unit	200	-	-	1.6603	1.6603	-
7	Establishment of Vermi compost Unit	100	-	-	0.8297	0.8297	-
8	Sub Total	1200	-	-	9.9600	9.9600	-
C	Production System and micro Enterprises						
1	Crop production, diversification of agriculture and introduction of agro forestry	1170	-	-	9.711	9.711	-
2	Demonstration of improved composting system	390	-	-	3.237	3.237	-
	Sub Total	1560	-	-	12.948	12.948	
D	Consolidation Phase 5% Sub Total	600	-	-	4.980	4.980	-
Grand Total		12000	830	35.9273	63.6227	99.60	37049

संकल्प पत्र

ग्राम पंचायत – कुवैरपुर कोड सं० 2B3E4d3b विकास खण्ड –पहासू जिला – बुलन्दशहर

यह कि आई०डब्लू०एम०पी० परियोजना में तैयार की गयी निर्माण की नयी सृजित परिसम्पत्तियों को ग्राम पंचायत कुवैरपुर एवं माइक्रो वाटरशेड के अन्तर्गत सम्मिलित ग्रामों में योजना क्रियान्वयन कराने एवं योजना उपरान्त चालू रखने तथा सृजित परिसम्पत्तियों के अनुरक्षण हेतु कृत संकल्प एवं इच्छुक है।

कुवैरपुर ग्राम पंचायत के सभी स्रोत स्थल जैसे तालाब, ग्रामसभा गोचर (चारागाह), जल संसाधन, जंगल आदि में भूमि विकास परियोजना के अन्तर्गत किये जायेंगे। उन कार्यों को समाज के कमजोर वर्ग जैसे अनुसूचित जाति/जनजाति, महिला वर्ग एवं अल्प भूमिहीन गरीबी रेखा के नीचे के लाभार्थियों को लाभ पहुँचाने हेतु इच्छुक होंगे।

हम योजना संचालन हेतु प्रस्तावित करते हैं एवं सहमति देते हैं कि भारत सरकार के समस्त मार्गदर्शी सिद्धान्तों के अनुपालन में कार्य सम्पन्न करायेगें यह भी घोषित करते हैं कि चयनित क्षेत्र जिसको मेरे द्वारा भलीभाँति देखा गया है, और प्रस्तावित योजना में प्रस्तावित समस्त कार्य 15 सालों से नहीं कराया गया है जिसकी मुझे पूर्ण रूप से जानकारी है और अनुमोदन करते हैं।

उमोद कुमार
ग्रामोद्या सचिव
कान्हे सिंह
गजेन्द्र सिंह

Vsin
[Stamp]

PROJECT AT A GLANCE

IWMP-III (Bulandshahar)

1	State	Uttar Pradesh
2	Distt.	Bulandshahar
3	Block	Pahasu
4	M.W.S. Code	2B3E3c2d
5	Name of M.W.S. Project	Kamona
6	Involved Village	07
7	Geographical Area of M.W.S.	663Ha.
8	Rainfed Area	506.49
9	Treatable Area	603
10	Weightage	-
11	Cost of Project	72.36
12	For the year	2010-11

Budget Components

S. No.	Components	Area (Ha.)	Cost (in Lacs)
1	2	3	4
1	Management Cost 12%	-	8.6832
2	Preparatory Phase 10%	-	7.2360
3	Watershed Work Phase	-	
	A- Watershed Development Works 50%	603	36.1800
	B- Livelihood Programme (Community Base) 10%	-	7.2360
	C- Production System & Micro Enterprises 13%	-	9.4068
4	Consolidation Phase 5%	-	3.6180
	Total	603	72.3600

Executive Summary of the Project

Identified selected micro watershed project Kamona is coded as **2B3E3c2d** has been proposed from cluster of I.W.M.P. Bulandshahar–III project in Pahasu Block district Bulandshahar four villages namely Kamona, Ban, Narau, Jalalpur and Risalu is comprised in the micro watershed which is located in the east of district Bulandshahar on the west bank of River Kali (Upper Kali) and border of district area is known as Khadar. It lies between 28° -15' and 28° -15' N Latitudes and 78° -0 and 78° -10 W Longitudes Covering area. Its altitudes ranges from 187 meter to 190 meter above the mean sea level. Khurja Railway Station 184.11 m, Bulandshahar Railway station is 201.18 m above mean sea level is displayed. Project area of I.W.M.P. BSR-III is lied in the Pahasu Block of Bulandshahar District which is come in the western plan zone under semi arid area. The annual average rainfall is near to 397 mm which an average of 35 rainy days. Out of which about 85% is received during the mansoon season from July to September and very less rainfall is received in the winter season.

Temperature ranges from as high as 43°C in the May-June to as 3° - 4°C during December – January. The Trend of rain fall is highly erotic and maximum water goes as runoff.

Main occupation of the dwellers is agriculture in the watershed. Some part of the lands are shown during the Kharif season. Cane sugar are preferred crops in the project area. The main Crops raised are Wheat, Pea & Mustered & Maize

The topmost portion of the watershed is sloppy flat land. Other than topmost portion of the watershed is under soil erotic portion and depreciative. The soil of the land are sandy loam Soil. The middle agricultural position of watershed relatively smooth sloppy flat land with sandy loam soil texture. These soil is yellow in colour and are inherently good in fertility status.

Natural vegetation of the watershed is very poor. Somewhere forest vegetation is seen which are predominant with Vilayati Babool (*Prosopis Juliflora*), followed by Babool (*Accasia nilotica*), somewhere Neem Plants (*Azadirachta Indica*), Shisham (*Dolbergia Sisson*) and Karanj (*Pongamia Glabra*) are seen in occasional occurrence. There is no grass land in the watershed. Somewhere grass patches are seen only on the bunds, road sides and other such places. Coverage of massive green belt is in poor percentage for environment which is envisaged. That watershed is very poor climate area.

There is normal condition of animal physics and for their fodder arrangement is the watershed and creative possibility would be expected by the implementations of the project.

Due to Aerial soil erosion poor harvesting managements, cropping pattern, non treated watershed etc. are very anti effective causes for the watershed. Problem of the watershed is to be tackled by harvesting structures which have last most of their capacity new water bodies for the prevention of erosion and conservation of soil and moistures various type of earthen bunds in the watershed field, necessity has been observed. Wasteland will be treated with staggered Trenches, afforestation and bunding for the changing of characteristics.

The detail project report has been prepared by the applying of nine process steps for the micro watershed code no. **2B3E3c2d** brief is as follows.

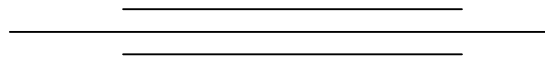
- STEP-1 Secondary data collection:-** During the five days visit programme in the micro watershed project with of all available documents of village label by approaching the Gram panchayat collected secondary data.
- STEP-2 Village meeting & conducting PRA exercise:-** Community meeting conducted on fix days for the consultation with villagers for the PRA Exercise. Participatory mode of the villages was positive indicated for the success of programm. With good in testing participation has been drawn social & resource map on ground & paper & discussed un various topics of problematic thoughts in the micro watershed.
- STEP-3 Socio economic survey:-** The resource organization of village label volunteers identified to conduct house hold socio economic survey/states.
- STEP-4 Probel typology analysis:-** Thoroughly analyzed the data & identified problem type as soil & moisture conservation, crop rotation, crop coverage, productivity, livelihoods, social issues & capacity building gaps etc. Probelms discussed with the watershed committee & came up with alternative solution.
- STEP-5 Conduct of net participatory planning (NPP):-** The planning team visited together in the planning blocks on the scheduled date along with the beneficiaries of the villages & data gathered as for the participatory net planning.
- STEP-6 Productivity & livelihood planning exercise:-** For the product livelihood exercise, group discussion on various livelihood as Agriculture, Animal husbandry enterprise development held discussion with the villagers in the micro watershed.
- STEP-7 Institutional & capacity building :-** This plan is prepared based on the data available in the field and auscultations with the watershed committee.
- STEP-8 Data consolidation & documentation of DPR :-** After gathering all required information compiled collected data. Thoroughly discussed and finalized the expected outcomes and benefits specially in the respect of livelihood for different segments. These are the target and performers indicators for the micro watershed.

STEP-9 Conduct of Gram Sabha obtaining approvals submissions of DPR:-After preparation of the draft DPR convened to Gram sabha and activities proposed expected outcomes benefits of implementing the programm are explained in case of any changes are proposed in the Gram sabha approval obtained by the Gram sabha and already singed of Mau paper.

STEP-9A Attachment of detail estimate, cost and design:-Estimating, Costing and design prepared technically According to plan in the micro watershed project. And attached with the DPR.

STEP-9B Various type of mapping :- DPR prepared in the support of micro watershed project using various type of maps is as follows :

- | | |
|---------------------------------------|-----------------------------|
| 1. Index Map of Watershed | 2. Watershed Map |
| 3. Relief/ Drainage Map | 4. Slop Map |
| 5. Soil and Land Capability class map | 6. Land use/ Land Cover Map |
| 7. Cadastral map | 8. Proposed Action Plan map |
| 9. Social Map | |



Project Report

Table – 1 : Micro watershed project brief : -

1	State	U.P.
2	District	Bulandshahar
3	Block	Pahasu
4	Comprised Villages (Nos.)	05
5	Name of Watershed	Kamona
6	Name of MWS Project	Kamona
7	MWS Code No.	2B3E3c2d
8	Geographical Area of MWS	1011
9	Treatable Area	890

1- Project Objectives :- The aim and objectives of the Project are :

- h- Conservation, development and sustainable management of natural resources including their users.
- i- Enhancement of agriculture production and productivity in a sustainable manner.
- j- Restoration of ecological balance in the degraded and fragile rain fed ecosystem.
- k- Reduction in regional disparity between rains fed and irrigated area.
- l- Creation of sustainable employment opportunities for the rural community for livelihood security.
- m- Generation of massive employment.
- n- Reduce migration from rural employment.

2- Major Problem of Project Area :

- g- Actual shortage of drinking water.
- h- Near to nil activated water bodies and water harvesting structures.
- i- Low depth of ground water table.
- j- Undulated and generally sloppy rainfed area.
- k- Large number of Small, Marginal and S.C. farmer land holding.
- l- Lower wages of agriculture labour and also migration of labour due to shortage of employment in the watershed.

3- General Description :

(3.1) Location :-

Farida Watershed has been taken with MWS Code No. **2B3E4d3b** in Pahasu Block of Distt. Bulandshahar is located on Khurja via Shikarpur Syana to Pahasu road about 25 Km. between 28⁰15' and 28⁰10' N Latitudes and 78⁰0' and 78⁰5' N Longitudes. Location and delineation of watershed has been located on watershed map **Fig. 2** and on top sheet **Fig. 3**.

(3.2) Area and Elevation :

Elevation ranges from 181 to 208 mtr. above the mean sea level(MSL) altogether comprised villages and their's area is described as follows.

(Comprises village map Fig. 3)

Table – 2 : Area and Elevation

Sl. No.	MWS Code	Block	Name of Village	Geographical Area	Treatable Area
1	2	3	4	5	6
1	2B3E3c2d	Pahasu	Kamona	290.20	263.93
			Ban	80.64	73.34
			Narau	95.20	86.58
			Jalalpur	116.50	106.02
			Risalu	80.40	73.12
				663.00	603.00

(3.3) Shape of the Micro Watershed:

The shape of watershed is Elongated and as Rectangular. The maximum length and width of the watershed are 5000 Mtr. and 1814 Mtr. respectively with the Length: Width ratio of 2.76:1.

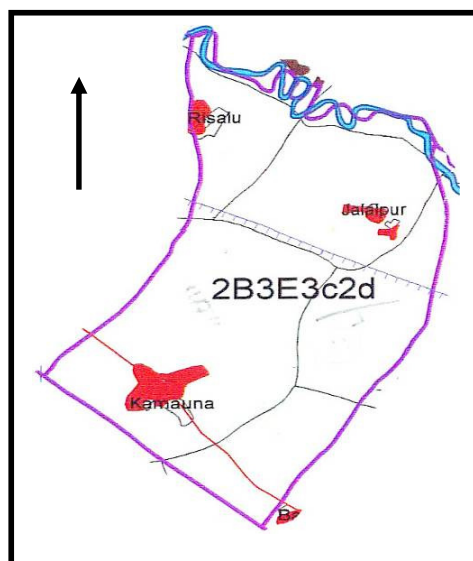


Fig. 1 (Shape of Micro Watershed)

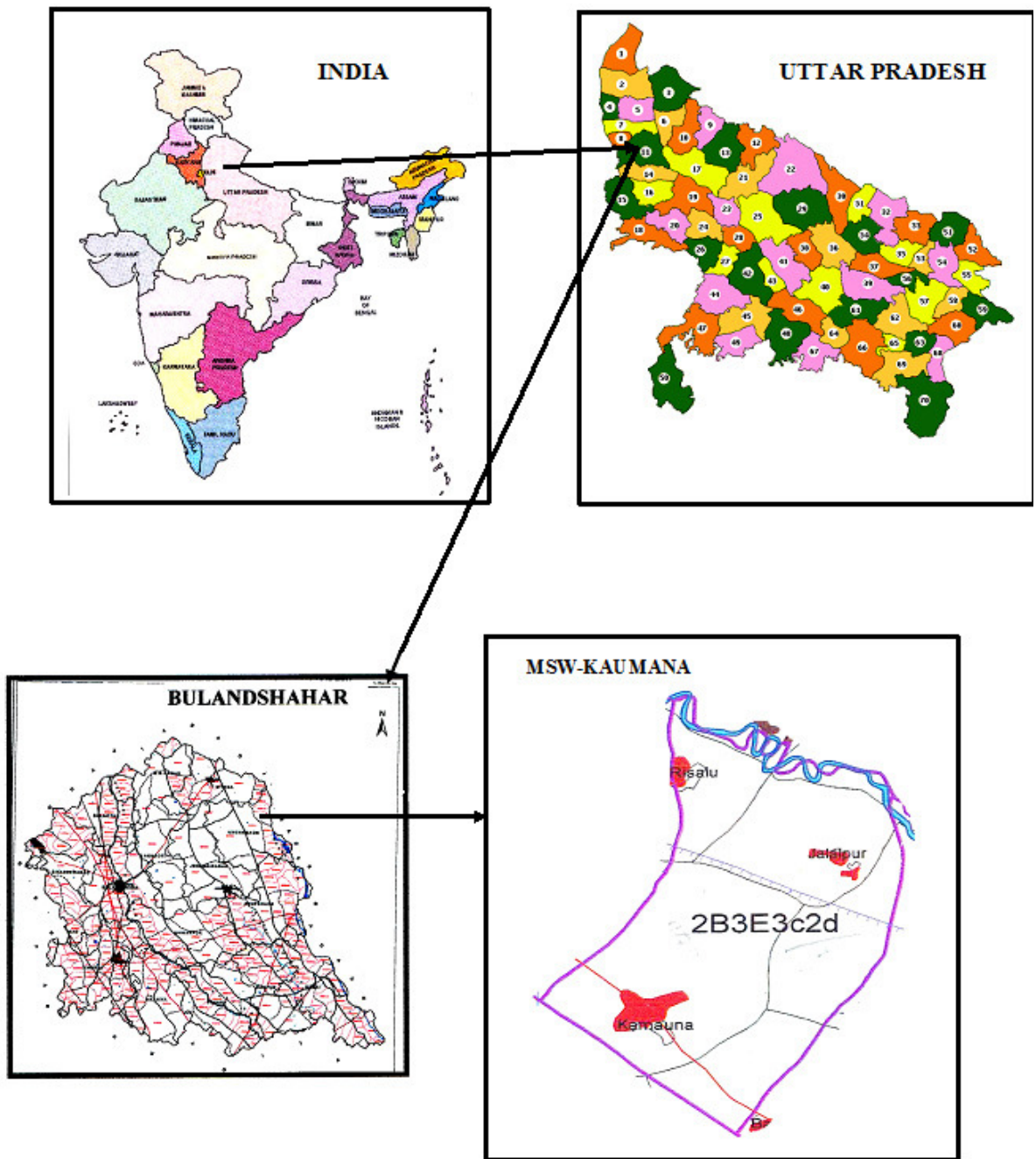
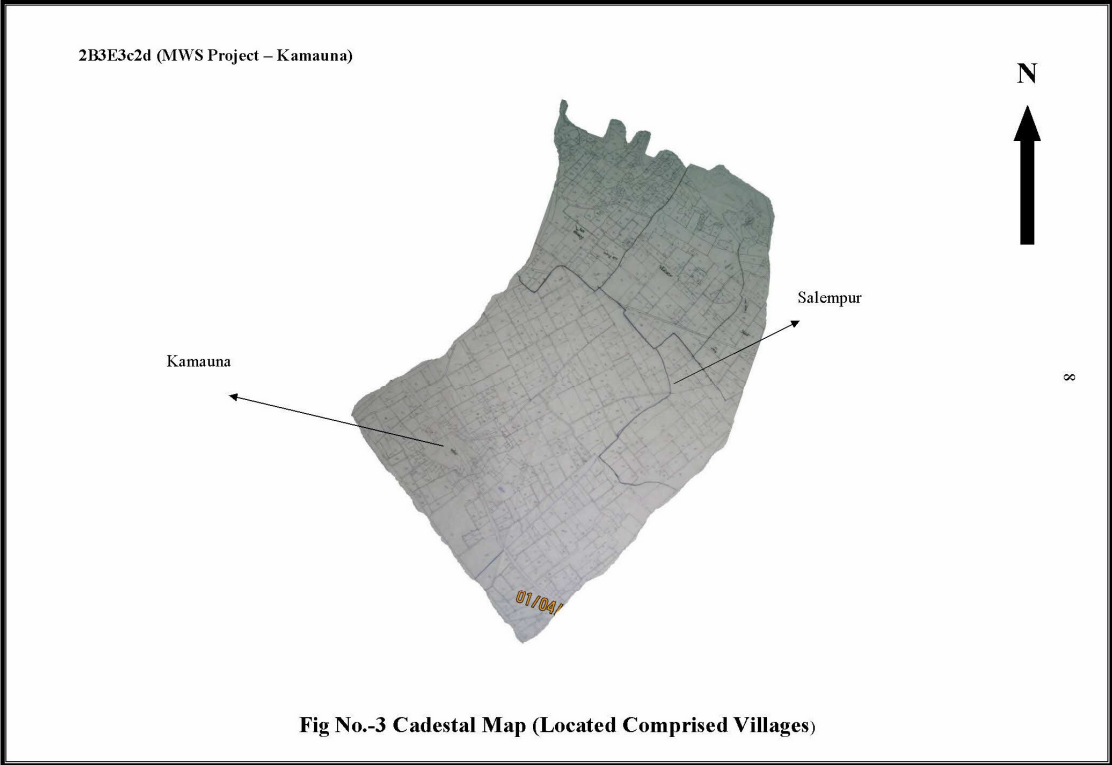


Fig.- 2 Location of the Micro Watershed



Sl. No.	Name of Project	Name of Village	Geographical Area (in ha.)	Raifed Area (in ha.)	Treatable Area	Agri. Land
1	2	3	4	5	6	7
1	Kamona	Kamona	290.20	221.70	263.93	275.69
2		Ban	80.64	61.60	73.34	76.60
3		Narau	95.30	72.72	86.58	90.44
4		Jalalpur	116.40	89.05	106.02	110.58
5		Risalu	80.40	61.42	73.12	73.12
Total			663.00	506.49	603	626.43

(3.4) Climate :

The Watershed falls under semi arid region of tropical climate inclined in Western Plan Zone. The average annual precipitation is about approx. is 397 mm. spreading over 35 rainy days. Most of the rain fall (about 85%) is received during July to September. The rain fall of moderate intensity. Nothing the area receives of scarcity rainfall in the winter season. The temperator variation ranges from as high as 43⁰c in the month of May-June to as low as 4⁰c in December-January.

(3.5) Geomorphology and Soils :

Geomorphology :

The entire watershed is topographically divided into major landforms. Accordingly the soils of watershed can be grouped into various categories such plane land, undulated land, sloppy land and erosic ravenous land.

Soil :

(a) Fine textured soil :

The soil are the most extensive soil group found in the watershed. Some portion of the watershed is relatively sloppy flat land with fine soil texture as sandy loam. The soils are in color and are inherently good high in fertility status. Soil texture is sandy lome loam particularly in depressions and loam in the elevated portion. The soil characteristic texture is dispersive and smooth. Therefore without impeded the downward movement of water productive layer of soil are easily by high runoff.

a- Coarse Textured Soil :

These soil are lying mostly in downward portion, along with erosic gully and drainage line upto end of watershed outlet. These soils are coarser in texture and are relatively poor in fertility status. The soils are lomy sand in texture. Rill and gully formation in same parts particularly near the outlet of watershed can be seen.

(3.6) Drainage and Slope:

Due to prevalence of mild steep slope and presence of a number of drainage lines in the watershed the drainage system is adequate. The watershed from part of Ganga Basin and watershed. Under mild to steep topographical slope of MWS as divided as follow : (Drainage and slope map fig.-4)

Table - 4 : Drainage and Slope

S. No.	Grade	Slope Percent	Area in Ha.	Remark
1	A	0.5 - 1	180.9	30%
2	B	1-2	150.75	25%
3	C	2-3	120.6	20%
4	D	3-4	90.45	15%
5	E	4-5	36.18	6%
6	F	5-6	24.12	4%

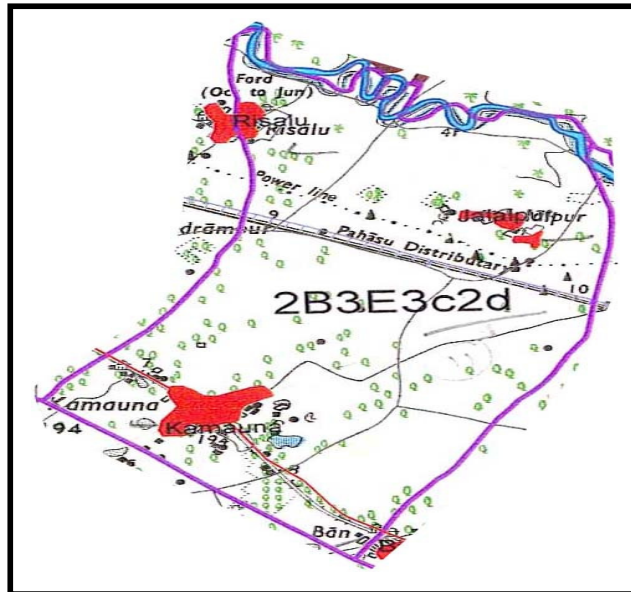


Fig-4 (Drainage & Scrub Map)

(3.7) Vegetation :

a- Natural Vegetation :

Natural vegetation is very poor in the watershed. The forest vegetation is predominant with Vilayti Babool (*Prosopis Juliflora*). There are occasional occurrence of Neem Plants (*Azadirochta Indica*), Shisham (*Dalbergia Sissoo*) and Karanj (*Pangamia Glabra*) and anywhere some scrubs are seen. There are no grass land in the watershed. Somewhere grass patches are seen only on the bunds, roadside and other such places. Poor percentage of massive green trees has been not seen in the watershed except Horticulture backyard.

b- Horticulture :

There is no backyards or commercial horticulture plantation in villages are been in some part of watershed.

c- Agro forestry :

The agriculture fields of the villages have some horticulture plantation at places isolated trees whose frequency is seen as under agroforestry and some where in where in backyards.

(3.8) Human Population:

a- Human Population:

Total Population of involved villages in watershed is 8936 with average family size of six persons as detailed as follows

Table – 5 : Human Population

S. No.	Name of village	Nos. of families	Human Population			Total
			Male	Female	Children	
1	Kamona	465	565	525	1100	2190
2	Ban	435	525	480	1062	2067
3	Narau	300	330	305	600	1235
4	Jalalpur	265	305	285	595	1185
5	Risalu	295	378	310	650	1338
						8015

c- Categorization of Human Population :

In the total population of watershed villages, categories are defined as below :

Table – 6 : Population Categories

S. No.	Particulars	Unit	Number of families in population in the villages		
			Population	Family	Remark
1	2	3	4	5	6
1	Agri Farmer	No.	2450	597	
2	Landless	No.	528	132	
3	Agri. Labour	No.	1530	510	
4	Land less Labour	No.	460	115	
5	BPL Family	No.	1285	257	
6	SC Family	No.	1470	245	
7	ST Family	No.	-	-	

(3.9) Land Holding :

All the categories of farmers as small, marginal, medium and large are involved in land holding average of about 1-18 ha. Small land holding farmers 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 as below :

Table – 7 : Distribution of farm families according to their size of land holdings

S. No.	Name of Village	Total Agri. Land in MWS	Land Holding Family (Nos.)					Percentage
			Marginal (< - 1Ha.)	Small (1-2 Ha.)	Medium (2-4 Ha.)	Large (4-7 Ha.)	Total	
1	Kamona	275.69	200	40	30	2	272	
2	Ban	76.60	50	10	5	3	68	
3	Narau	90.44	60	20	7	9	91	
4	Jalalpur	110.58	65	18	11	5	99	
5	Risalu	73.12	48	10	5	4	67	
Total		626.43	423	98	58	18	597	

(3.10) Live Stock Population :

Total live stock population of the watershed is 5377 Nos. Buffalos is preferred as much animal compared to Cow. But milk yield is poor. Goats are also kept for milk as well as for meat purpose. The breakup of livestock population is as follows:

Table – 8 : Live Stock Position

S. No.	Name of Village	Unit	Live Stock Position				Total
			Buffaloes	Cows	Bullocks	Goats	
1	Kamona	No.	675	135	91	175	1076
2	Ban	No.	400	175	14	35	624
3	Narau	No.	1371	305	48	185	1829
4	Jalalpur	No.	595	145	75	155	970
5	Risalu	No.	1387	301	95	85	1068
		Total					

(3.11) Infrastructure Social Feature :

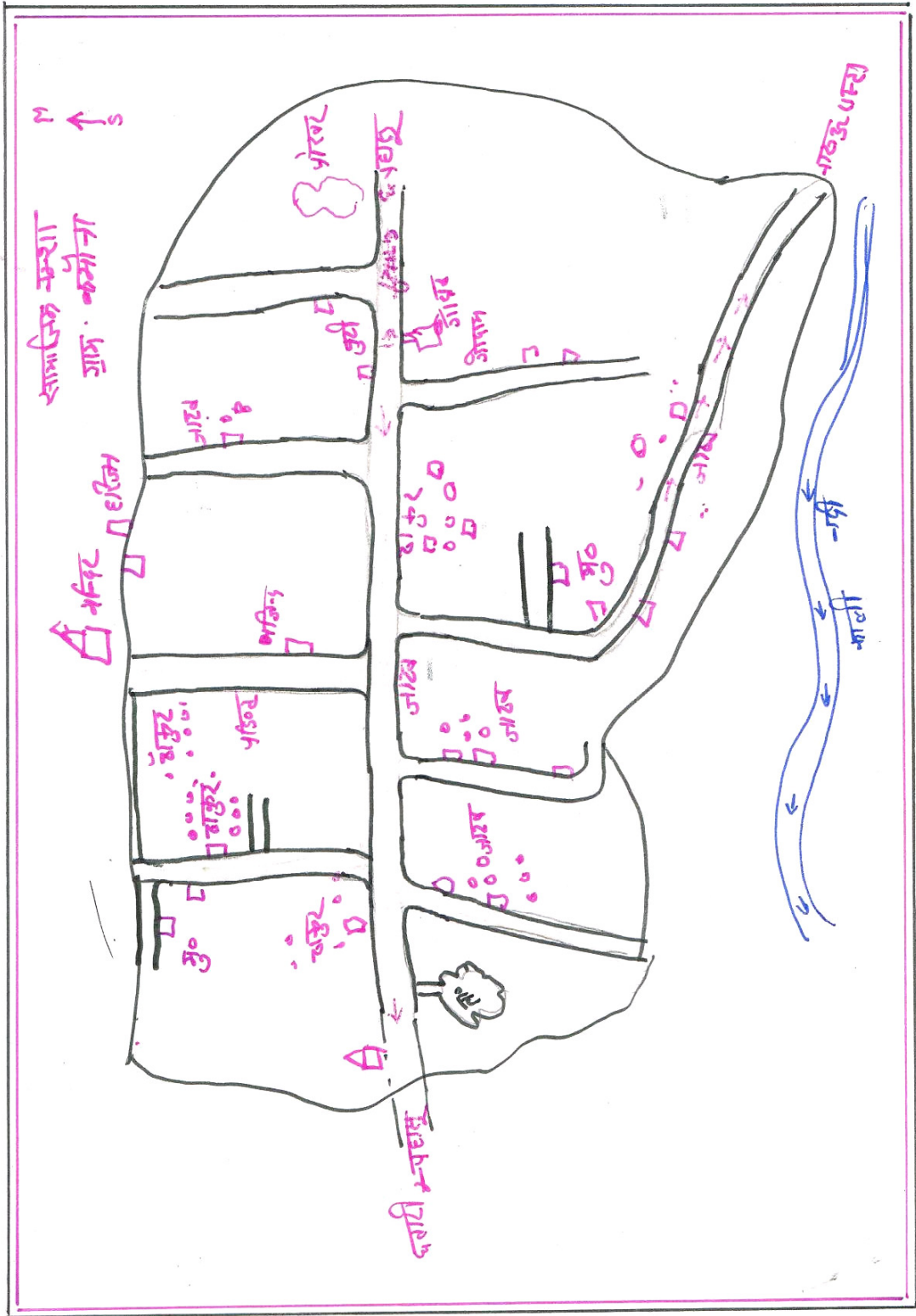
- a- Comprised villages in the micro watershed has moderate communication facilities. Watershed linked with metaled road and approachable through motarable road.
- e- All the villages are electrified and have T.V. and Telephone connection.
- f- Literacy rate in the watershed is very low all villages are having education upto Junior High School.
- g- Nearest small market is at Pahasu 13 Km. Nearest big market Bulandshahar is about 40 Km. from watershed. Religious and ritual features are almost common as in other parts af U.P. small land holding with large family size and more than 25% of the labour force of the total population living below poverty line indicate poor socio economic status of the watershed community.

Participatory Rural Appraisal

Participatory mode of the villagers shows positive indication for the success of the programme. Traditionally the entire village community participate in the individual works. Social map of one of the watershed village drawn by villagers themselves, depicting various village figures is shown in sketched map in Fig.-4 & 5. Infrastructures position of the village recorded as follows :

Table – 9 : MW.S. Project – Kunwarpur

S. No.	Infrastructure	Unit	Qty.
1	2	3	4
1	Primary School	No.	1
2	Junior High School	No.	1
3	Kanya Pathshala	No.	-
4	Public Health Center	No.	Yes
5	Vet nary Hospital	No.	-
6	Panchayat Ghar	No.	1
7	Post Office	No.	-
8	Agan Bari Center	No.	5
9	Electricity	-	Yes
10	Road	-	Yes
11	Pond	No.	1
12	Hand Pump	No.	45
13	Irrigation Well	No.	4
14	Canal	No.	Yes
15	Temple	No.	4
16	Well (Drinking Water)	No.	5
17	Pumping Set	No.	35
18	Toilet	No.	25
19	Market	No.	No



Recorded importance of development institution

Farmers perception recorded for importance and role of different development institution in relation to infrastructure. Importance has been depicted with size of circle and role with distance from village circle. (Fig 8)

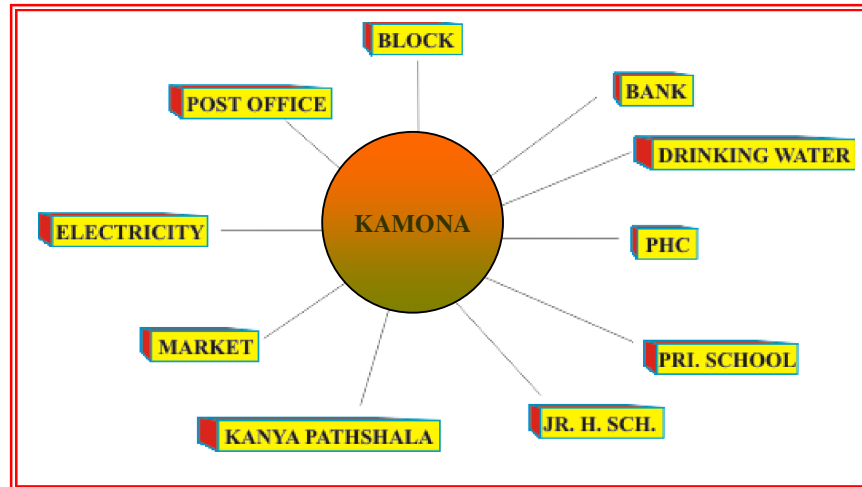


Fig. -8 (Venn diagram of Micro watershed)

(3.12) Communication :

Watershed can be approached from District Headquarter Bulandshahar to Project area 35 km. by Road.

(3.13) Natural Resource Base :

Transact of watershed showed typical land use profile consisting of plain agriculture land, erodic area and medium ravenous ridge. Main source of the irrigation are the canal for pre showing irrigation only. The total geographical area of the watershed is 603.00 Ha. classification .

Approach roads for the micro watershed is shown for the communication is shown on topo sheet map Fig 9 as next page.

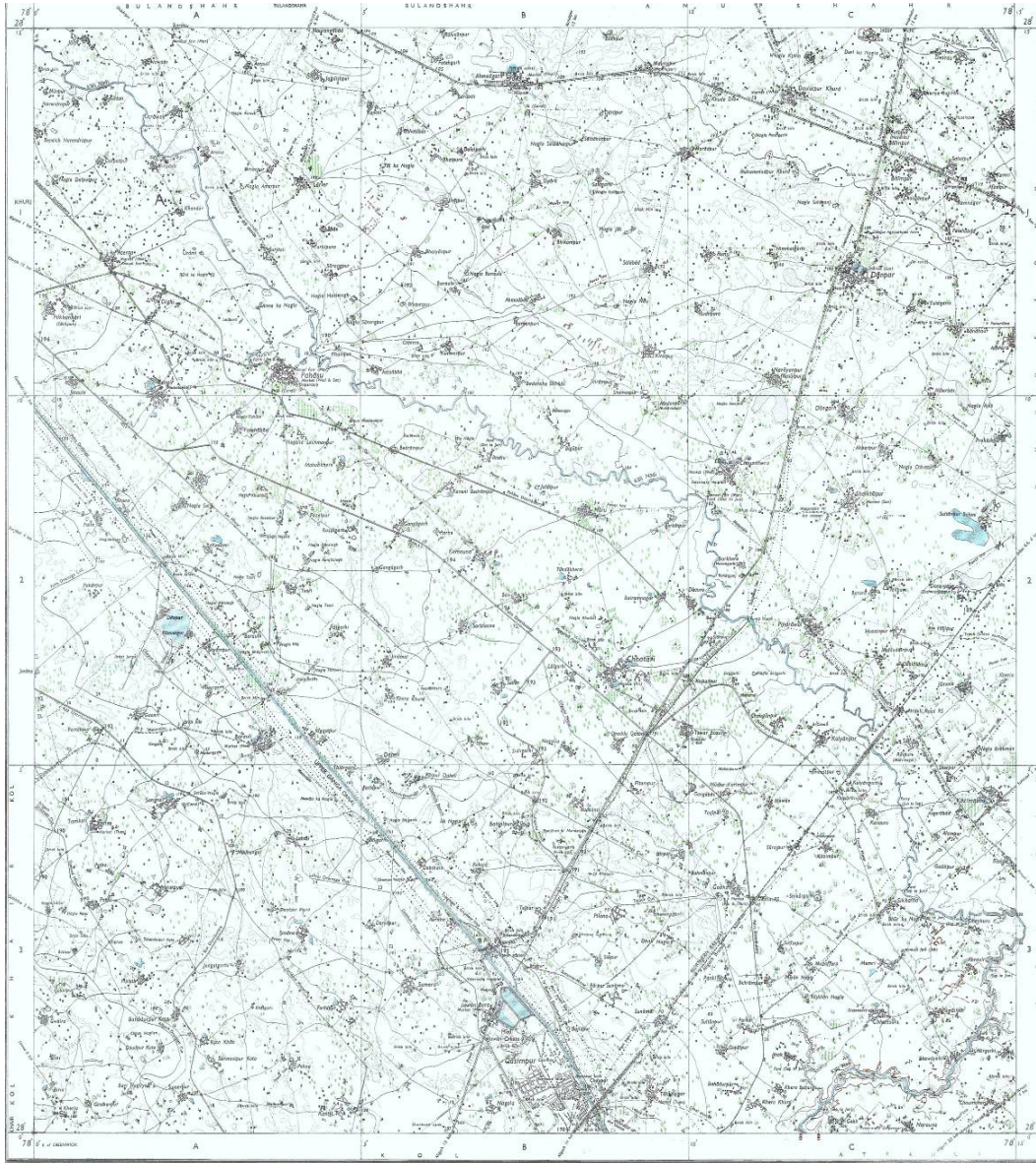


Fig.- 7 Communication Map on Toposheet

Table – 10 : Classification of area(Hect.)

S.N o.	Name of Village	Unit	Total Geographical Area	Rainfed Area	Wasteland	Village Land & Road	Irrigation Resource	
							Water Bodies	Borewell
1	2	3	4	5	6	7	8	9
1	Kamona	Ha.	290.20	221.70	17.41	18.00	-	21.00
2	Ban	Ha.	80.64	61.60	4.83	4.00	-	6.00
3	Narau	Ha.	95.36	72.72	5.72	6.38	-	8.00
4	Jalalpur	Ha	116.40	89.05	6.98	9.00	-	12.00
5	Risalu	Ha	80.40	61.42	4.82	5.25	-	7.00
Total			663.00	506.49	39.76	42.63		54.00

(3.14) Livelihood :

Total Population of the watershed is 8936 and out of the total population a majority more than 80% has farming as their major source of livelihood followed by labours, serviceman and small business class. Classified livelihood given in form as follows :

Table – 11 : Livelihood Classification in population :

S. No.	Name of Village	Farmer	Labour	In Service	In Local small business	Others
1	2	3	4	5	6	7
1	Kamona	272	219	15	35	3
2	Ban	68	55	3	8	2
3	Narau	91	80	5	5	1
4	Jalalpur	99	79	6	5	9
5	Risalu	67	54	3	7	3
	Total					

(3.15) Dependency of forest fuel wood and fodder :

- a. Fuel wood :-** The main source of fuel is from cow dung cake, woody stem of crops. About 70% of the domestic energy requirement is met from the agriculture by product and cow dung cake. Rest is met out from the forest outside the village and watershed boundary, most preferred fuel wood is Juliflora fuel wood Juliflora obtained from standing along and between watershed.
- c- Fodder :-** Villages have not any sufficient signified dependency on forest based fodder as these resource are nothing availability in the forest.

(3.16) Labour requirement :

Labour requirements was found to be maximum at the time of October, November and December when the sowing of Rabi crops are done. The crucial periods are March and April coinciding harvesting and threshing of Rabi crops and July/August is sowing Kharif Crops take a little place. Other income generating enterprises having potential during the remaining.

(3.17) Crop Rotation :

Present Crop rotation in the watershed comprise of :

Kharif	-	Bajra	-	Rare
		Maize	-	Rare
		Jwar	-	Rare
Rabi	-	Fallow Wheat	-	Major
		Fallow Barly	-	Major
		Fallow Sugarcane	-	Major
		Fallow Mustard	-	Major
Zayad	-	Urad, Moong, Makka		

The above said Rabi Crops is the most prevailing crop rotation on the agriculture lands both in the rainfed and irrigated conditions.

Organized vegetable cultivation fruit plantation and traditional agro forestry systems are lacking as per requirement in the watershed the limited vegetable cultivation in the watershed is confined as kitchen gardens and field to the irrigated condition in a scattered manner. The cultivation of cash crops other than the sugarcane, wheat and mustard also in the watershed.

(3.18) Historical Events :

Chronological record of important events of the watershed village is prepared through participatory rural appraisal (PRA) which is very useful in understanding of its background and chronology is given as follows :

Table – 12 : Historical Events

S. No.	Events/Activities	Year	Rem.
1	2	3	4
1	Established	1650	
2	Opening of Primary School	1958	
3	Opening of Junior School	2005	
4	Opening of Kanya Pathshala	-	
5	Opening of PHC	-	
6	Opening of Vet. Hospital	-	
7	Panchayat Ghar	1996	
8	Introduction of Tractor	1960	
9	Gobar Gas Plant	-	
10	Thresher	1970	
11	First Tube well/Pumpset	1925	
12	First Motorcycle	1978	
13	T.V. & D.V.D. Players	2001	
14	Electricity in Village	2000	
15	Bituminous Road	1995	
16	First Hand Pump	1950	
17	Templo Renovation	1999	
18	First Land Line Telephone	2004	
19	Planning for Watershed Project	2010-11	

(3.19) Present Land Use in the Watershed :-

The watershed has diversified land uses. The varied present land use under different use in the watershed. The mixed land use followed in the watershed is almost similar in other parts of U.P. During P.R.A. Exercise prepared land has been shown in Table No. 13, 14 & 15.

Table – 13 : (Ownership)

S. No.	Name of Village	Pvt. Agri. Land		Govt. Revenu Land	Forest Land	Other Land
		S.C./S.T.	Others			
1	2	3	4	5	6	7
1	Kamona	25.00	250.69	-	-	-
2	Ban	20.00	56.60	-	-	-
3	Narau	21.00	69.44	-	-	-
4	Jalalpur	28.00	82.58	-	-	-
5	Risalu	19.00	54.12	-	-	-

Table –14 : (Present Land under different categories)

S. No.	Name of Village	Land Use (Ha.)				Total
		Agricultural	Wasteland (All Types)	Seasonal waterbodies	Village/Road Etc.	
1	2	3	4	5	6	7
1	Kamona	275.69	17.41	-	18.00	311.1
2	Ban	76.60	4.83	-	4.00	85.43
3	Narau	90.44	5.72	-	6.38	102.54
4	Jalalpur	110.58	6.98	-	9.00	126.56
5	Risalu	73.12	4.82	-	5.25	83.19
Total		626.13	39.76		42.63	708.82

Table – 15 : (Present land use classified)

S. No.	Land Use Under	Unit (ha.)	Area (Ha.)	Percentage
1	2	3	4	5
1	Under Agriculture		627.43	
	A- Rainfed-	Ha.	-	
	I- Crops		489.39	78%
	II- Agro forestry		9.41	1.5%
	B- Irrigated-			
	I- Assured		56.46	9%
	II- Portial		69.01	11%
2	Wasteland			
	A- Aforestation			
	B- Pasture			
	C- Untreatable		17.89	45%
	D- Treatable		21.86	55%

Proposed Post Land Use has been given on Page

No. 32

4- Focus on Present Land Use :

(4.1) Agriculture :

The total area under agriculture in the watershed is about 415.02 ha. out of which 906.61 ha. is under rainfed agriculture. Agriculture land uses in the watershed extended to diversified land capabilities starting marginal to good class II land. The irrigated and drinking water is most scarce natural resource in the watershed. The operation of tube well for irrigation of agricultural crops frequently leads to the drinking water. Problem to the farmers of watershed forcing them to carry drinking water from outside of the watershed area. The agricultural field bund are common in the watersheds however they frequently breach on heavy rains.

Various mixed texture of soils are located in patches through out the watershed. The heavy soils are almost kept fallow during rainy season. the agricultural soils also have some as share calcium pan at variable depths. The irrigation water is conveyed by the earthen channels. Surface irrigation methods following mainly border method of flood method by the formers in the watershed. These factors reduce the water use efficiency of limited and valuable irrigation water.

Drought hardy species like Juliflora suitable multi purpose trees is suitable for rehabilitation of the wasteland. Rehabilitation of waste lands promoting agro forestry with appropriate fruit and forest species suitable vegetative barriers on sloppy lands can be high future value and by these adoption would be meet out many demands of fire wood and fodder in the wasteland. Except above but also for soil and water conservation, rehabilitation of wasteland and sustainable income generation for socio-economic upliftment of farmers.

Crop Productivity :

The farmers also do not have suitable cropping system to deal aberrant weather. Weeds impose considerable constraint in productivity of both Karif and Rabi crops under irrigated as well as rainfed production system farmer undertake normally one manual weeding in mustard and other valuable crops however, practices is energy and time consuming. Use of we decide is rare in the watershed.

In the watershed area, limited cropping in the Kharif with mixed cropping practices is not only irrigational but also unscientific and best for low productivity. Subsequent Rabi crops in general. Sugarcane & Mustard crop in particular are raised on residual soil moisture under rainfed production system during post mansoon season.

(4.2) Indigenous Technological Knowledge (ITK) :

Under process of PRA tracked out rural applying technology in various field of local technology and some technology is very popular in village. In which the agriculture is an old traditional practices of farmers who have improved themselves with passage of the time according to their domestic needs and technological reforms in the nearby areas. The villages have their traditional village ponds, practice of field bunding which typically constitute agricultural related ITKs in the watershed. The Mustard & sugarcane being a cash and firewood crop of the watershed and also sugarcane crop is being. Cultivated in self designed manner by the farmers. Its carried out that the area is totally depend on rain and under the rainfed area technology is

applied by the farmers. However limited fertilizer application specifically the DAP came in the practices since about 15-20 years.

(4.3) Forest and Other Vegetation :

Forest :

The watershed have a tract of wasteland area which are under uncultivable position is liesed in the watershed. These wasteland have not any tree vegetation or very less than real requirement for the wasteland use.

Horticulture/Agro forestry :

Horticulture and agro forestry practices were observed in the watershed.

(4.4) Agro forestry :

Agro forestry practices are lacking in the watershed. Though it has good potential under existing disposition and may a role particularly with respect to minimization of cropping risk, built up soil fertility and productivity, protection of soil erosion, soil conservation partly meeting out the fire wood demand of rural community and more over optimizing the economical return from system as whole under typical semi arid climate in the watershed. Bund and boundary plantation also have good potential to care the fire wood and fodder demands of the rural community in the watershed. The existing area under agro forestry is almost negligible. Prosopis Jhliflora may be planted as block or sole plantation specifically on marginal and degraded land in the watershed.

The agro forestry interventions comprising of ber, bail, aonla, guava, papular etc. may be applied for benefit of the farmers under rainfed to irrigation production system on leveled to slopping and marginal agricultural using proper planting techniques and term it control measures.

The multipurpose trees may be also help in supplementing fire wood and fodder demands of the rural community in the watershed and my be planted as hedge rows on rainfed, marginal and degraded lands.

(4.5) Horticulture :

Fruits and vegetables practices are lacking in the watershed area. Its practices may be sustainable very good potential for the formers of watershed. There are a limited lack fruit trees in number like mango, guava, lime, ber, aonla and papaya fruit trees well as vegetables like radish, okra, tomato, cabbage, garlic, onion, chilly, bringer and cucurbits but they are found surviving well in the watershed villages. Organized orchards (vatika) commercial vegetable cultivation horti-agri and other systems of agro forestry etc. are lacking but have good agriculture.

5. Soil and land capability classification :

(5.1) Soil Morphology :

Watershed is located North East corner of Bulandshahr Distt. near about 55 Km. away. The entire terrain of watershed is topographically divided into various land forms. Accordingly the soils of watershed have been grouped major categories is given as follow :

Hill Terrain	Plane Land Sloppy	Undulated Land	Rill Erosic Land	Moderate ravenous
-	25%	20%	15%	7%

Given categories in the blocks is located the soil morphology in the watershed areas. Representation of soil characteristics by soil profile is represented as follows :

Soil Profile :

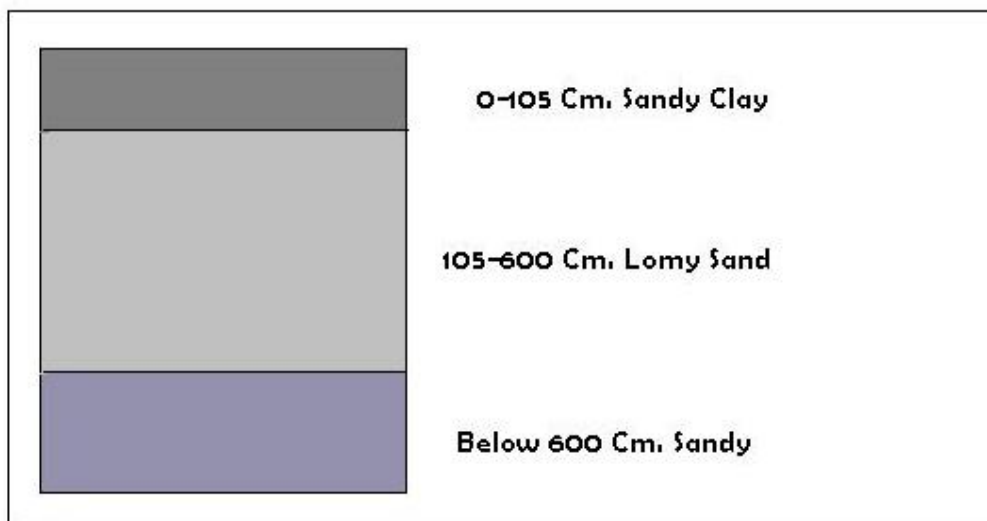


Fig. – 9 (Soil Profile)

Table – 16 : (Morphology of a Typical Soil Profile) :

Horizone	Depth in Cm.	Morphology
1	2	3
A V & H	0-150	Silky when moist, Hard when dry quick soluble, high elasticity, fissures, and cracks, occasional occurrence of free calcium carbonate granules black in colour, clay content 29%, PH- 8 to 8.7
B V & H	150-160	Whitish yellow in colour, very fine mixed with free cacaos and gravels, Hard when dry compact and indurate hard pan restricting development of root and down ward water transmission.
C V & H	7600	Red and white sand stone

(5.2) Soil and Characteristic and Fertility Status :

Soil characteristic pertaining to soil fertility of various classes accruing around villages in the watershed are given as follows :

Table – 17 : Soil Characteristic & Fertility Status :

Sl. No.	Soil Properties	LCC-II	LCC-III & IV
1	2	3	4
1	Sand %	47.04	75.04
2	Silt %	24.60	18.60
3	Clay %	28.36	6.36
4	Texture	Sandy Clay	Lomy Sand
5	PH (1:2)	6.41	6.67
6	Organic Carbon %	0.37	0.12
7	Available N Kg ha ⁻¹	316	173
8	Available P Kg ha ⁻¹	29	15
9	Available K Kg ha ⁻¹	95.00	265
10	EC (dS m ⁻¹)	0.47	0.12

(5.3) Land Capability Classification (LCC) :

Land capability classification (LCC) was done to classification the soils in different groups based upon the limitations and to emphasize the hazards prevailing in the watershed in order to find out the different topo-sequences, landforms, soil depth and erosion hazards. This was followed by the detailed investigation of selected landforms to bring out the LCC classes of the Watershed. Classes of land capability namely II, III, IV and V are demarcated in the watershed. The areas under different classes are shown as follows :

Table – 18 : Land Capability Classification (LCC) :

S. No.	Land capability class	Area in Ha.	Colour
1	2	3	4
1	I Class	-	-
2	II Class	129.97	15%
3	III Class	606.53	70%
4	IV Class	86.64	10%
5	V Class	43.32	5%
6	VI Class	-	-
7	VII Class	-	-
8	VIII Class	-	-

Land capability classification of various agricultural practices under land use can be classified as groups, class, sub class and units. Utilization of various land class is given as follows :

Table – 19 : Utilization of various land uses

S. N.	LCC	Forestry	Ltd. Grazing	Light Grazing	Dense Grazing	Limited Agriculture	Light Agriculture	Dense Agriculture	More Dense Agriculture
1	I								
2	II								
3	III								
4	IV								
5	V								
6	VI								
7	VII								
8	VIII								

(5.4) Land Capability Class II & III :

This group is one of the most extensive LCC watershed. and also near to class III for the agricultural practices. The soils are sandy & sandy loam in texture. The land under this class is nearly level to mild sloping (1-3%). The soils are deep and erosion hazard is slight. Most of the productive agriculture land comes under class II & III. These lands potentially very productive but due to rainfed a single cropping pattern is in habitation.

(5.5) Land Capability Class IV :

This class is found in lower portion near the outlets of watershed. The soils are coarser in texture, deep, erosion hazard and undulating in topography. Rill and initiation of gully can be seen near the outlet of the watershed.

(5.6) Land Capability Class VII & VIII :

This class of land is not found in watershed. Somewhere lack of soil are found with admixture gravels fragments in these classes of lands.

(5.7) Conclusions :

The majority of land form is coming under class II, which give an insight of good agriculture production potential of the watershed.

The land capability classification provides reasonable good information with regard to capability of soil, that could be used for agriculture, agrihorticulture, silviculture and posture development.

The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like bunding practices.

The reasonable area is under watershed of wasteland and other wasteland including grater potential of this watershed for forestry and pasture development. Rare places namely water body of low portion of land area under seasonally works as water harvesting structures and these harvested water is used or can use for some other beneficial activities during the crop season also.

6. Problems and needs of the watershed indentified during the PRA

(6.1) Problem Identification and prioritization :

- f- The are has undulating topography, steep unstable slopes, gradient of excessive branches of rills and hence highly prone to soil erosion.
- g- Major issues addressed to food sufficiency economic growth and environmental security in the watershed area.

- h- Effective soil depth is limited and highly variable hampering good crop growth.
- i- The watershed have low productive cropping due to tradition single cropping pattern and over all average crop production percentage not sufficient against requirement.
- j- Identified that there is no assured irrigation system has been development capacity of water bodies are reduced due to silt ration which are utilized to store of rainy water and they are renovatable.

(6.3) Transact walk during the PRA :

Problems identified and prioritized during the transact walk and PRA exercises in all comprised villages of watershed. There were pooled and a list of problems representing the whole watershed was prepared. Problems were ranked as per their total weight age in the watershed village.

Table – 20 : Ranking of Problem identification and prioritization of watershed

S.No.	Problem	Rank
1	2	3
1	Lack of irrigation	5
2	Lack of drinking water	6
3	Low production of field crops	8
4	Lack of fodder availability and low productivity	4
5	Lack of availability of fuel wood	6
6	Lack of market facility	8
7	Lack of quality seeds, fertilizer, pesticides etc.	7
8.	Medical and Health care facilities for milching animals and low productivity.	8
9	Lack of medical, educational and transportation facilities	9
10	Lack of water bodies renovation	9
11	Lack of run of earthen check bunds	3
12	Lack of water harvesting structures	2
13	Lack of livelihoods opportunity	6

Prioritized ranking (Upto four Numbers) :-

- 4- Lack of earthen check bunds.
- 5- Lack of livelihood opportunities.
- 6- Lack of irrigation water was the greatest problem. Lack of irrigation water problem experienced by the people followed by low crop production.

(6.3) Analysis of SWOT of the watershed :

Strength (S), Weakness (W), Opportunity (O) and Threat (T) analysis is a useful decision support tool. A SWOT analysis of watershed is presented as follows :

SWOT analysis of the watershed

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

7. Proposed land use for the watershed :

Watershed management plan preparation due importance is given to topographic, land suitability, irrigation potentially, prevailing farming systems, micro farming situation, farming, farmers preferences and priorities along with economic and environment securities.

Crop and tree selection and area distribution was done as per farmers priorities revealed through PRA exercise.

The watershed management plan for watershed is prepared with specific objectives of food sufficiency, income and employment generation with environment security.

Technical options were with the ITK based on the latest available experiment findings. Due attention was given to the resource of the farmers and adjustments were made in capital intensive resource demanding technological outputs while making them adoptable to the resource poor farmers. Emphasis was given on maximum use of farm yard manure. The proposed land use plan of the watershed is shown as follow as in table

Table – 21 : Present and proposed land use plan of the watershed

S.No.	Land use	Present (ha)	Proposed area (ha)
1	2	3	4
1	Agriculture		
a	Rainfed		
	I Crops	489.39	627.43
	II Agro-forestry	9.41	30.00
b	Irrigated		
	I Assured	56.46	56.46
	II Partial	69.01	78.00
2	Waste land		
a	Aforestation		25.00
b	Pasture		
c	Untreatable	17.89	9.00
d	Treatable	21.86	11.00
3	Village land	42.63	-

(7.1) Status of Present Water Resources Utilization :

Watershed is having some canal system. Management and maintenance of these canal are required. Before sowing of Rabi crops, water from these canal is issued as supplementary irrigation for Rabi sowing are allowed to go as waste. After releasing water from canal, submergence area also put under cultivation.

Some where bore well irrigation applied by the farmers in the watershed.

(7.2) Proposed Plan for Irrigation Development :

- a- Present system of irrigation and wastage of water during October–November need to be made more efficient from water management point of view by minimizing conveyance losses in the existing water courses.
- b- Present irrigation canal capacity have to build up by the reform. Which are lack capacity of water.
- c- Construction of new water harvesting earthen structures, Pucca Check Dem, Series Gully Plugging, etc. has been sloppy portion to increase irrigation potential and for recharging of ground water, soil and moisture conservation maximum field irrigation, best production and expected change of crop rotation.
- d- The up gradation of the exciting system of irrigation will result in :
 - i- Minimization of conveyance losses.
 - ii- Increase in frequency of irrigation.
 - iii- Adoption of high yielding varieties of crops.
 - iv- Assured cultivation of cash crops.
 - v- Capacity buildup by the planning of new water harvesting structures.

(7.3) Ground Water Recharge :

For the purpose of ground water recharge, the area of the upper side of watershed is recommended for Field Bunds, Contour Bunds, Peripheral Bunds and Submergence Bunds and in the lower portion Contour Staggered Trenches, Gully Plugs, Earthen Check Dem and Pacca Outlets. In the undulated sloppy portion of the watershed recommended water harvesting structure for dual purpose as ground water storage and under ground water recharge.

(7.4) Crop Production :

Practices proposed in the watershed is given as follows :-

- a- Mulching and crop residue management.
- b- Application of green manuring.
- c- Vermi Composting.
- d- Crop rotation and inter cropping.
- e- Biofertilizers.

(7.5) Tillage Operation :

Deep tillage technology is proposed to apply to be demonstrated for benefit of farmers in the watershed.

(7.6) Improved Seeds of High Yielding Varieties (H.Y.V.) :

Recommendation of improved varieties is necessary for improving the productivity and farm income. Through replacement of low yielding traditional varieties of seeds in villages of watershed.

(7.7) Balanced Fertilizer Use :-

Demonstration of use of fertilizer in various crops of watershed recommended balance fertilizer use in different crops will be benefited of farming community.

(7.8) Control of insects and diseases :

Aphid in the mustard 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 pest and diseased will also be demonstrated in the watershed for benefit of the growers.

(7.9) Dry Land Horticulture :

Such portion of dry land in which proposed horticulture development planning recommended species like Ber, Bel and Aonla will be planted at suitable spacing in the watershed.

(7.10) Agri Horticulture :

Aonla and Sahjan would be suitable horticultural crops to the locality. Therefore, a part of land in the farmer field shall be selected and brought under Agri-horticulture system. The cropping system followed will be Jwar and Wheat.

(7.11) Plantation (Fuel wood) :

Such a portion which are under wasteland will be taken falling in the class-IV category in the watershed. These lands will be planted with species like Vilayati Babool (Prosopis Juliflora), Babool (Acacia Nilotica), Karanj (Pangamia Glabra).

9. Socio Economic Analysis of the of the Project :

(9.1) Sustainability and environment security :

The proposed land use plan will improve the land utilization index and crop diversification index significantly as compared to the existing one. in the proposed watershed management plan proper blending of the bio engineering measures will be applied on above 80% of the total area of watershed. It is estimated that more than above 70% of the watershed area will be treated and consequently the soil loss and runoff from the area is expected to be reduced by 70% respectively.

It will help in maintaining ecosystem integrity on sustained basis along with improving the livelihood security of the farming community.

(9.2) Economic Analysis :

Economic analysis of the project was carried by taking direct benefits and costs considering 10 years for project life at 10% discount rate. Whole watershed development plan was divided into three sector as agriculture, horticulture and forest/Fuel wood plantation. Net Present Value (NPV) and Benefit Cost ratio criteria were applied judge the economic efficiency of each enterprises and sector. Net present value (NPV) of the project life is considered to be 10 years and discount rate for NPV estimation is 10% is given NPV and benefits as follows :-

Table – 22 : Present productivity income analysis :

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	3.00	4300.00	12900.00	6450.00	6450.00	1:1
		Moong	3.00	4500.00	13500.00	6075.00	7425.00	1.22:1
		Jwar	4.80	600.00	2880.00	1584.00	1296.00	0.82:1
		Wheat	18.50	850.00	15275.00	8650.00	7075.00	0.82:1
		Pea	7.50	2250.00	16875.00	10970.00	5905.00	0.54:1
		Mustard	3.50	18.500	6475.00	3235.00	3240.00	1:1
Total		-			105105.00	54105.00	51000.00	0.94:1
Average		-			13138.00	6763.00	6375.00	0.94:1
B	Forestry	Vilayati				15000.00	-	Nil
		Babool						
C	Horticulture	Ber				20000.00	-	Nil
		Aonla				20000.00	-	Nil
		Bel				20000.00	-	Nil
Total		-				60000.00	-	Nil
Average		-				20000.00	-	Nil
Grand Total								

Table –23 : Post productivity and income analysis for Post Productivity**Value and B.C.:**

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	4.00	5000.00	20000.00	8325.00	11615.00	1.39:1
		Moong	4.00	5000.00	20000.00	8200.00	11800.00	1.44:1
		Jwar	5.50	800.00	4400.00	1900.00	2500.00	1.32:1
		Wheat	25.00	1000.00	25000.00	16680.00	13320.00	1.14:1
		Pea	9.50	3500.00	33250.00	14810.00	18540.00	1.12:1
		Mustard	5.00	3000.00	15000.00	4370.00	8130.00	1.86:1
Total		-	-	-	172250.00	72845.00	99765.00	1.38:1
Average		-	-	-	21531.00	9061.00	12471.00	1.38:1
B	Forestry	Vilayati Babool	80.00	500.00	40000.00	15000.00	25000.00	1.67:1
C	Horticulture	Ber	35.00	2000.00	52500.00	20000.00	32500.00	1.63:1
		Aonla	35.00	2000.00	70000.00	20000.00	50000.00	2.50:1
		Bel	40.00	1500.00	80000.00	20000.00	40000.00	2:1
Total		-	-	-	182500.00	60000.00	122500.00	2.04:1
Average		-	-	-	60833.00	20000.00	40833.00	2.04:1
Grand Total		-	-	-	1394750.00	147485.00	247265.00	1.68:1

Table –24 : Summary of NPV, PPV and B.C. Ratio (Sector wise) :

S. No.	Name of Sector	NPV		PPV		B.C. Ratio
		Expend.	Net Income	Expend.	Net Income	
1	2	3	4	5	6	7
1	Rain fed Agriculture	54105.00	51000.00	72485.00	99765.00	1.38:1
2	Forest/Fuel wood Plantation	15000.00	-	15000.00	25000.00	1.67 : 1
3	Horticulture	60000.00	-	60000.00	122500.00	2.04:1
Total		129105.00	51000.00	147485.00	247265.00	1.68:1

(9.3) Economics of Agriculture Sector :

The development cost can be recovered by the adoption of plan in present rain fed agriculture is being done on well maintained field, therefore does not require much investment. In rain fed agriculture, investment of Rs. 44.50 lacs is proposed to made is given as follows :

Table – 25 : Economics of Agriculture Sector :

S. No.	Name of sector	Name of Activities / Plan	Treatble Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Rainfed	Soil, moisture and water cons works	603	344.10	818.75	474.85	1.38:1

(9.4) Economics of forest fuel wood plantation :

Economic analysis of fuel wood plantation in the watershed. Project life is considered to be 20 years and discount rate for NPV estimation is 10 % is followed and as is given follows :

Table –26 : Economics of forest fuel wood Plantation :

S. No.	Name of sector	Common Name of Plant	Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Forest Fuel wood sector	Vilayati Babool (Prasopis Juliflora)	25.0	2.50	6.675	4.175	1.67 :1

(9.5) Economics of Horticulture Sector :

Economic analysis of Horticulture Plantation in agri-horti system and on wasteland patches of watershed project, life is considered about 15-20 years and discount factor rate for NPV estimation is 10% is follows :

Table – 27 : Economics of Horticulture system :

S. No.	Name of Sector	Common name of Plants	Area (Ha.)	NPV (Lacs)	Post Productive Value (Lacs)	Benefit Lacs	B.C. Ratio
1	2	3	4	5	6	7	8
1	Horticulture	Ber (zyziphus mouritana)	4.00	0.80	2.104	1.304	1.63: 1
		Amla (Embelica officianalis)	3.80	0.76	2.660	1.40	2.5 : 1
		Bel (Aegle marmelos)	2.20	0.44	1.320	0.88	2 : 1
Total			10.00	2.00	6.084	4.084	2.04 : 1

(9.6) Food requirement and sufficiency :

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

Table – 28 : Status of food requirement and availability of per annual :

S. No.	Name of Foods	Requirement Q./Yr.	Present Status		Expected Post Status	
			Availability Q./Yr.	Deficit or surplus Q./Yr.	Availability Q./Yr.	Deficit or surplus Q./Yr.
1	2	3	4	5	6	7
1	Cereals 110 Kg.	8816	7493	1323	14987	6171
2	Pulses 36.50	2925	1608	1317	5265	2340
3	Oil Seeds 29.20	2340	936	1404	3744	1404
4	Vegetable 71 kg	7293	1458	5835	13127	5834

(9.7) Employment generation :

One of the major problem of the labour migration in watershed project. By the implementation of the project activities employment opportunities will be generated. However the changes in land use pattern and adoption of other subsidiary enterprise will generate employment opportunities in the watershed as given in table follows :

Table – 29 : Employment generation under proposed works :

S. No.	Employment activities/works	Area under work	Cost	Mandays generation (Nos.)			
				Unskilled	Skill	Total	Person
1	2	3	4	5	6	7	8
2	Graded Contour Bund	68	2.04	2040	-	2040	68
3	Gully Plug, C.D.	114	8.55	5985	439	6424	214
4	Submergence Bund	97	3.88	3880	-	3880	129
1	Peripheral Bund	96	3.360	3360	-	3360	112
5	W.H.B.	119	10.71	6426	364	6790	226
6	Renovation of Bund	74	2.22	2220	-	2220	74
7	Reno. of W.H.B.	-	-	-	-	-	-
8	Community Pond	-	-	-	-	-	-
9	Afforestation	25	3.42	684	-	684	23
10	Horticulture	10	2.00	400	-	400	13
Total		603	36.18	24995	803	25798	859

10. Formation of watershed committee :

Under compliance of common guideline Para (6.3) is followed and by the help of watershed development team, watershed committee is organized in the micro watershed village Ghuraiya with 10 members as prescribed in common guide line. List for organization of W.C. village details given as follows :

Table – 30 : Details of comprised village W.C. organization in M.W.S. :

S. No.	Particulars	Details	Block	Geographical Area
1	2	3	4	5
1	Micro watershed code	2B3E3c2d	Pahasu	663.00
2	Name of Gram Panchayat in M.W.S.	Kamona, Ban, Narau, Risalu		

Table – 31 : List of organized W.C. for the Gram Panchyat Kamona in watershed.

S. No.	Name of selected members	Age	Representation Members from	Post	Qualification	Village
1	2	3	4	5	6	7
1	Dimpal Devi	24	Gram Sabha	President	12	Kamona
2	Satyapal Singh	40	Gram Sabha	Secretary	12	Kamona
3	Sunil Kumar	55	From – U.G	Member	10	Kamona
4	Heera	36	From – U.G	Member	-	Kamona
5	Ramswaroop	70	From – U.G	Member	12	Kamona
6	Ram Singh	55	From – S.H.G.	Member	12	Kamona
7	Niranjan	40	From – S.H.G.	Member	Nil	Kamona
8	Vilapi	40	From – S.H.G.	Member	8	Kamona
9	Guddi	45	From – S.C.	Member	8	Kamona
10	Sanjay	24	From – S.C.	Member	Ph.D.	Kamona
11	Thamman Singh	38	From – PIA	Work out	Agri Engg.	Kamona

(10.1) Formation of Self Help Groups in M.W.S.

By the help of watershed committee and watershed development team self help group are formatted / organized. Families and persons are selected from poor, small and marginal farmers families, landless poor families, agriculture labour families, women, herdsman and shepherd and S.C. families in the formatted self help groups are given as follow :

Table – 32 : Vikas Self help group – Kamona (Livelihood) .

S. No.	Name of member in formatted SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Ram Singh	55	L.R.	Live Stock	New
2	Dharm Singh	50	L.R.	Live Stock	New
3	Satyapal Singh	45	L.R.	Live Stock	New
4	Manohar	36	L.R.	Live Stock	New
5	Basudevi	55	L.R.	Live Stock	New
6	Bharchand	42	L.R.	Live Stock	New
7	Shamshad Khan	36	L.R.	Live Stock	New
8	Jartarang	45	L.R.	Live Stock	New
9	Khajan	36	L.R.	Live Stock	New
10	Anil	35	L.R.	Live Stock	New

Table – 33 : Jagarti Self help group Kamona

S. No.	Name of member in formed SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Lalaram	40	BG	Livestock	New
2	Ashok	40	Gen	Livestock	New
3	Nannu Singh	55	Gen	Livestock	New
4	Brahampal	40	Gen	Livestock	New
5	Meena	40	SC	Livestock	New
6	Suresh	35	Gen	Livestock	New
7	Benami	55	BC	Livestock	New
8	Yogesh	35	BC	Livestock	New
9	Pappu	33	BC	Livestock	New
10	Ravendra Singh	38	SC	Livestock	New

Table – 34 : Self help group in Kamona village of Watershed

S. No.	Name of member in formed SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Sanjay Kumar	24	Gen	Livestock	New
2	Heera Lal	30	Gen	Livestock	New
3	Smt. Triveni	42	Gen	Livestock	New
4	Imarti Devi	40	Gen	Livestock	New
5	Khajan	45	Gen	Livestock	New
6	Manchand	42	Gen	Livestock	New
7	Dharmendra	40	Gen	Livestock	New
8	Deepesh Kumar	35	Gen	Livestock	New
9	Heera Lal	36	Gen	Livestock	New
10	Jafruddin	36	Gen	Livestock	New

Formation of User's Groups :

User's groups are formed by the help of watershed committee and watershed development team in the micro watershed comprised villages. Farmers which have land village are involved in the User's groups and they will be directly benefited as expected by the implementation of watershed project. Easy and convenient conditions are made to resource use between user's groups and they will be responsible to operate and maintenance for the created assets in the watershed. Nos. of formed user's groups details are given as follows :

Table – 35 : Village wise user's groups

S. No.	Name of village	No. of groups	No. of farmers	Total Agri. Land	Area under treatment	Cost of assets
1	2	3	4	5	6	7
1	Kamona	18	272	275.69	263.93	
2	Ban	4	68	76.60	73.34	
3	Narau	6	91	90.44	86.58	
4	Jalalpur	6	99	110.58	106.02	
5	Risalu	4	67	73.12	73.12	
	Total	38	597	626.43	603.00	

10. Estimation and Costing of Proposed activities of the watershed Project Year 2010-

11.

Proposed works / activities for the Project Period (Year 2010-11) under proposed treatable area 603.00 Ha. Out of total Geographical area 663.00Ha.

(10.1) Financial and Physical Outlets :**Table – 36 : Financial and Physical Outlets for the Year 2010-11 :**

Sl. No.	Components	Unit cost per ha.	Physical ha.	Financial (Lacs)			Man-days Generation
				Labour Component	Material Component	Total	
1	2	3	4	5	6	7	8
A	Management Cost 10%						
1	Administrative Cost – TA & DA Hiring of Vehicles, Official Expenditure Electricity & Phone bill Computer, Stationery and office consumable materials & contingency	1200	-	-	7.236	7.236	-
2	Monitoring	120	-	-	.7236	.7236	
3	Evaluation	120	-	-	.7236	.7236	
	Sub Total	1440		-	8.6832	8.6832	
B	Preparatory Phase 10%						
1	Entry Point Activities 4%	480	-	0.5789	2.3155	2.8944	578
2	Institutional & Capacity Building 5%	600	-	-	3.618	3.618	
3	Detailed Project Report 1%	120	-	-	0.7236	.7236	
	Sub Total	1200	-	0.5789	6.6571	7.236	578
C	Watershed Work Phase						
a	Watershed Development Works						
1	Graded, Contour & Field Bunds	3000	68	2.040	-	2.04	2040
2	Gully Plug, Earthen Checkdam /WHS	7500	114	5.985	2.565	8.55	6424
3	Submergence bunds	4000	97	3.880	-	3.88	3880
4	Peripheral Bund	3500	96	3.360	-	3.360	3360
5	Earthen Water Harvesting Bund	9000	119	6.426	4.284	10.71	6790
6	Renovation of existing Bunds	3000	74	2.22	-	2.22	2220
7	Renovation of existing W.H.B	-	-	-	-	-	-
8	Aforestation and Development of silvi postural system	-	25	0.684	2.736	3.42	684
9	Dry Land Horticulture	20000	10	0.40	1.60	2.00	400
10	Community Pound (Renovation)	-	-	-	-	-	-
	Sub Total		603	24.995	11.185	36.18	25798
B	Livelihood Programme (Community Based) 7.620						
	Income generating activities through SHG's for landless and marginal farmers 10%						
1	Live stock development activities	200	-	-	1.2062	1.6603	-
2	Bee Keeping	100	-	-	0.6027	0.8297	-
3	Poultry Farming	200	-	-	1.2062	1.6603	-
4	Nursery Development	300	-	-	1.8093	2.4900	-
5	Vegetable Production	100	-	-	0.6027	0.8297	-
6	Milk Dairy Promotion Unit	200	-	-	1.2062	1.6603	-
7	Establishment of Vermi compost Unit	100	-	-	0.6027	0.8297	-
8	Sub Total	1200	-	-	7.236	9.9600	-
C	Production System and micro Enterprises						
1	Crop production, diversification of agriculture and introduction of agro forestry	1170	-	-	7.0551	7.0551	-
2	Demonstration of improved composting system	390	-	-	2.3517	2.3517	-
	Sub Total	1560	-	-	9.4068	9.4068	
D	Consolidation Phase 5% Sub Total	600	-	-	3.618	3.618	-
Grand Total		12000	830	25.5739	46.7861	72.36	26376

संकल्प पत्र

ग्राम पंचायत – कमौना कोड सं० 2B3E3c2d विकास खण्ड –पहासू जिला – बुलन्दशहर

यह कि आई०डब्लू०एम०पी० परियोजना में तैयार की गयी निर्माण की नयी सृजित परिसम्पत्तियों को ग्राम पंचायत कमौना एवं माइक्रो वाटरशेड के अन्तर्गत सम्मिलित ग्रामों में योजना क्रियान्वयन कराने एवं योजना उपरान्त चालू रखने तथा सृजित परिसम्पत्तियों के अनुरक्षण हेतु कृत संकल्प एवं इच्छुक है।

कमौना ग्राम पंचायत के सभी स्रोत स्थल जैसे तालाब, ग्रामसभा गोचर (चारागाह), जल संसाधन, जंगल आदि में भूमि विकास परियोजना के अन्तर्गत किये जायेंगे। उन कार्यों को समाज के कमजोर वर्ग जैसे अनुसूचित जाति/जनजाति, महिला वर्ग एवं अल्प भूमिहीन गरीबी रेखा के नीचे के लाभाथियों को लाभ पहुँचाने हेतु इच्छुक होंगे।

हम योजना संचालन हेतु प्रस्तावित करते हैं एवं सहमति देते हैं कि भारत सरकार के समस्त मार्गदर्शी सिद्धान्तों के अनुपालन में कार्य सम्पन्न करायेगें यह भी घोषित करते हैं कि चयनित क्षेत्र जिसको मेरे द्वारा भलीभाँति देखा गया है, और प्रस्तावित योजना में प्रस्तावित समस्त कार्य 15 सालों से नहीं कराया गया है जिसकी मुझे पूर्ण रूप से जानकारी है और अनुमोदन करते हैं।

डिम्पल देवी
डिम्पल देवी (प्रधान)
ग्राम पंचायत-कमौना
वि० खण्ड-पहासू (बुलन्दशहर)
डिम्पल देवी

शंकर
संजयकुमार
रामसूर्यसिंह
अनिलकुमार

PROJECT AT A GLANCE

IWMP-III (Bulandshahar)

1	State	Uttar Pradesh
2	Distt.	Bulandshahar
3	Block	Pahasu
4	M.W.S. Code	2B3E3c2c
5	Name of M.W.S. Project	Narau
6	Involved Village	06
7	Geographical Area of M.W.S.	480
8	Rainfed Area	381.00
9	Treatable Area	457
10	Weightage	
11	Cost of Project	54.84
12	For the year	2010-11

Budget Components

S. No.	Components	Area (Ha.)	Cost (in Lacs)
1	2	3	4
1	Management Cost 12%	-	6.5808
2	Preparatory Phase 10%	-	5.484
3	Watershed Work Phase	-	-
	A- Watershed Development Works 50%	480	27.42
	B- Livelihood Programme (Community Base) 10%	-	5.484
	C- Production System & Micro Enterprises 13%	-	7.129
4	Consolidation Phase 5%	-	2.742
	Total	480	54.84

Executive Summary of the Project

Identified selected micro watershed project Narau is coded as 2B3E3c2c has been proposed from cluster of I.W.M.P. Bulandshahar – III project in Pahasu Block district Bulandshahar four villages namely Narau, Tundakheda, Ban, Lalgarhi is comprised in the micro watershed which is located in the east of district Bulandshahar on the east bank of River Kali Nadi and upper kali border. It lies between $28^{\circ}-15'$ and $28^{\circ}-15'$ N Latitudes and $78^{\circ}-0'$ and $78^{\circ}-10'$ W Longitudes Covering area. Its altitudes ranges from 187 meter to 190 meter above the mean sea level. Khurja Railway Station 184.11 m, Bulandshahar Railway station is 201.18 m above mean sea level is displayed. Project area of I.W.M.P. BSR-II is lied in the Pahasu Block of Bulandshahar District which is come in the western plan zone under semi arid area. The annual average rainfall is near to 397 mm which an average of 35 rainy days. Out of which about 85% is received during the mansoon season from July to September and very less rainfall is received in the winter season.

Temperature ranges from as high as 43°C in the May-June to as $3^{\circ}-4^{\circ}\text{C}$ during December – January. The Trend of rain fall is highly eratic and maximum water goes as runoff.

Main occupation of the dwellers is agriculture in the watershed. Some part of the lands are shown during the Kharif season. Cane sugar are preferred crops in the project area. The main Crops raised are Wheat, Pea & Mustered and maze.

The topmost portion of the watershed is sloppy flat land. Other than topmost portion of the watershed is under soil erotic portion and depreciative. The soil of the land are sandy loam Soil. The middle agricultural position of watershed relatively smooth sloppy flat land with sandy loam soil texture. These soil is yellow in colour and are inherently good in fertility status.

Natural vegetation of the watershed is very poor. Somewhere forest vegetation is seen which are predominant with Vilayati Babool (*Prosopis Juliflora*), followed by Babool (*Accasia nilotica*), somewhere Neem Plants (*Azadirachta Indica*), Shisham (*Dolbergia Sisson*) and Karanj (*Pongamia Glabra*) are seen in occasional occurrence. There is no grass land in the watershed. Somewhere grass patches are seen only on the bunds, road sides and other such places. Coverage of massive green belt is in poor percentage for environment which is envisaged. That watershed is very poor climate area.

There is normal condition of animal physics and for their fodder arrangement is the watershed and creative possibility would be expected by the implementations of the project.

Due to Aerial soil erosion poor harvesting managements, cropping pattern, non treated watershed etc. are very anti effective causes for the watershed. Problem of the watershed is to be tackled by harvesting structures which have last most of their capacity new water bodies for the prevention of erosion and conservation of soil and moistures various type of earthen bunds in the watershed field, necessity has been observed. Wasteland will be treated with staggered Trenches, afforestation and bunding for the changing of characteristics.

The detail project report has been prepared by the applying of nine process steps for the micro watershed code no. 2B3E3c2c brief is as follows.

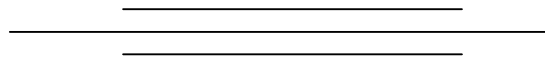
- STEP-1 Secondary data collection:-** During the five days visit programme in the micro watershed project with of all available documents of village label by approaching the Gram panchayat collected secondary data.
- STEP-2 Village meeting & conducting PRA exercise:-** Community meeting conducted on fix days for the consultation with villagers for the PRA Exercise. Participatory mode of the villages was positive indicated for the success of programm. With good in testing participation has been drawn social & resource map on ground & paper & discussed un various topics of problematic thoughts in the micro watershed.
- STEP-3 Socio economic survey:-** The resource organization of village label volunteers identified to conduct house hold socio economic survey/states.
- STEP-4 Probel typology analysis:-** Thoroughly analyzed the data & identified problem type as soil & moisture conservation, crop rotation, crop coverage, productivity, livelihoods, social issues & capacity building gaps etc. Problems discussed with the watershed committee & came up with alternative solution.
- STEP-5 Conduct of net participatory planning (NPP):-** The planning team visited together in the planning blocks on the scheduled date along with the beneficiaries of the villages & data gathered as for the participatory net planning.
- STEP-6 Productivity & livelihood planning exercise:-** For the product livelihood exercise, group discussion on various livelihood as Agriculture, Animal husbandry enterprise development held discussion with the villagers in the micro watershed.
- STEP-7 Institutional & capacity building :-** This plan is prepared based on the data available in the field and auscultations with the watershed committee.
- STEP-8 Data consolidation & documentation of DPR :-** After gathering all required information compiled collected data. Thoroughly discussed and finalized the expected outcomes and benefits specially in the respect of livelihood for different segments. These are the target and performers indicators for the micro watershed.

STEP-9 Conduct of Gram Sabha obtaining approvals submissions of DPR:-After preparation of the draft DPR convened to Gram sabha and activities proposed expected outcomes benefits of implementing the programm are explained in case of any changes are proposed in the Gram sabha approval obtained by the Gram sabha and already singed of Mau paper.

STEP-9A Attachment of detail estimate, cost and design:-Estimating, Costing and design prepared technically According to plan in the micro watershed project. And attached with the DPR.

STEP-9B Various type of mapping :- DPR prepared in the support of micro watershed project using various type of maps is as follows :

- | | |
|---------------------------------------|-----------------------------|
| 1. Index Map of Watershed | 2. Watershed Map |
| 3. Relief/ Drainage Map | 4. Slop Map |
| 5. Soil and Land Capability class map | 6. Land use/ Land Cover Map |
| 7. Cadastral map | 8. Proposed Action Plan map |
| 9. Social Map | |



Project Report

Table – 1 : Micro watershed project brief : -

1	State	U.P.
2	District	Bulandshahar
3	Block	Pahasu
4	Comprised Villages (Nos.)	04
5	Name of Watershed	Narau
6	Name of MWS Project	Narau
7	MWS Code No.	2B3E3c2c
8	Geographical Area of MWS	480
9	Treatable Area	457

1- Project Objectives :- The aim and objectives of the Project are :

- o- Conservation, development and sustainable management of natural resources including their users.
- p- Enhancement of agriculture production and productivity in a sustainable manner.
- q- Restoration of ecological balance in the degraded and fragile rain fed ecosystem.
- r- Reduction in regional disparity between rains fed and irrigated area.
- s- Creation of sustainable employment opportunities for the rural community for livelihood security.
- t- Generation of massive employment.
- u- Reduce migration from rural employment.

2- Major Problem of Project Area :

- m- Actual shortage of drinking water.
- n- Near to nil activated water bodies and water harvesting structures.
- o- Low depth of ground water table.
- p- Undulated and generally sloppy rainfed area.
- q- Large number of Small, Marginal and S.C. farmer land holding.
- r- Lower wages of agriculture labour and also migration of labour due to shortage of employment in the watershed.

3- General Description :

(3.1) Location :-

Narau Watershed has been taken with MWS Code No. 2B3E3c2c in Pahasu Block of Distt. Bulandshahar is located on Bulandshahar via Diwai to Narau Via Pahasu road about 30 Km. between 28⁰15' and 28⁰ 15' N Latitudes and 78⁰0' and 78⁰ 10' w Longitudes. Location and delineation of watershed has been located on watershed map **Fig. 2** and on top sheet **Fig. 3**.

(3.2) Area and Elevation :

Elevation ranges from 181 to 208 mtr. above the mean sea level(MSL) altogether comprised villages and their's area is described as follows.
(Comprises village map Fig. 3)

Table – 2 : Area and Elevation

Sl. No.	MWS Code	Block	Name of Village	Geographical Area	Treatable Area
1	2	3	4	5	6
1	2B3E3c2c	Pahasu	Narau	253.08	240.95
			Tundakheda	183.32	174.55
			Ban	38.48	36.63
			Lalgarhi	5.12	4.87
			480.00	457	

(3.3) Shape of the Micro Watershed:

The shape of watershed is Elongated and as Rectangular. The maximum length and width of the watershed are 5000 Mtr. and 1814 Mtr. respectively with the Length: Width ratio of 2.76:1.

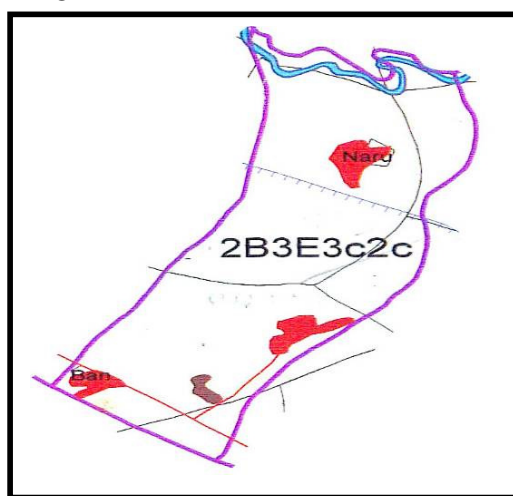


Fig. 1 (Shape of Micro Watershed)

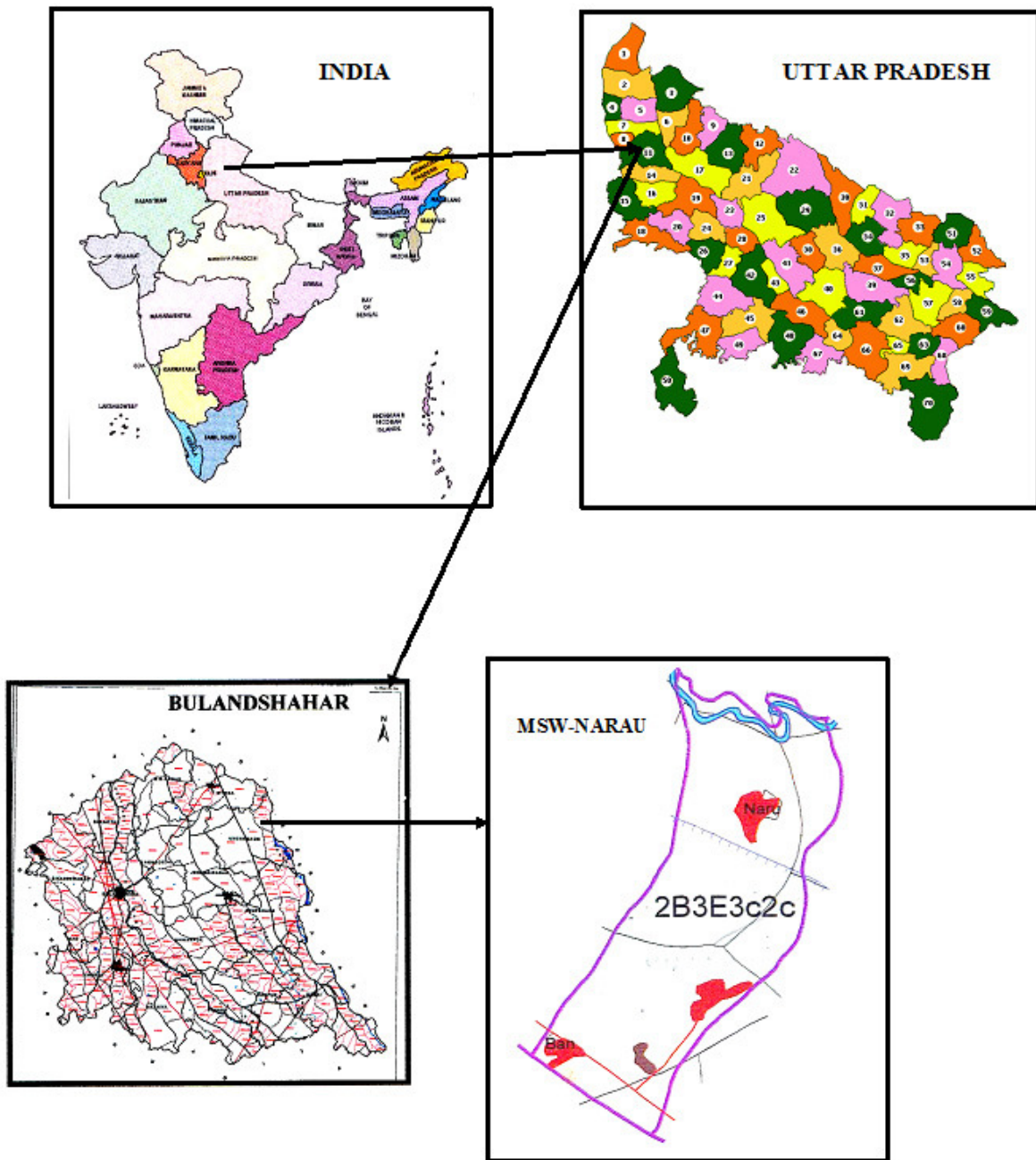
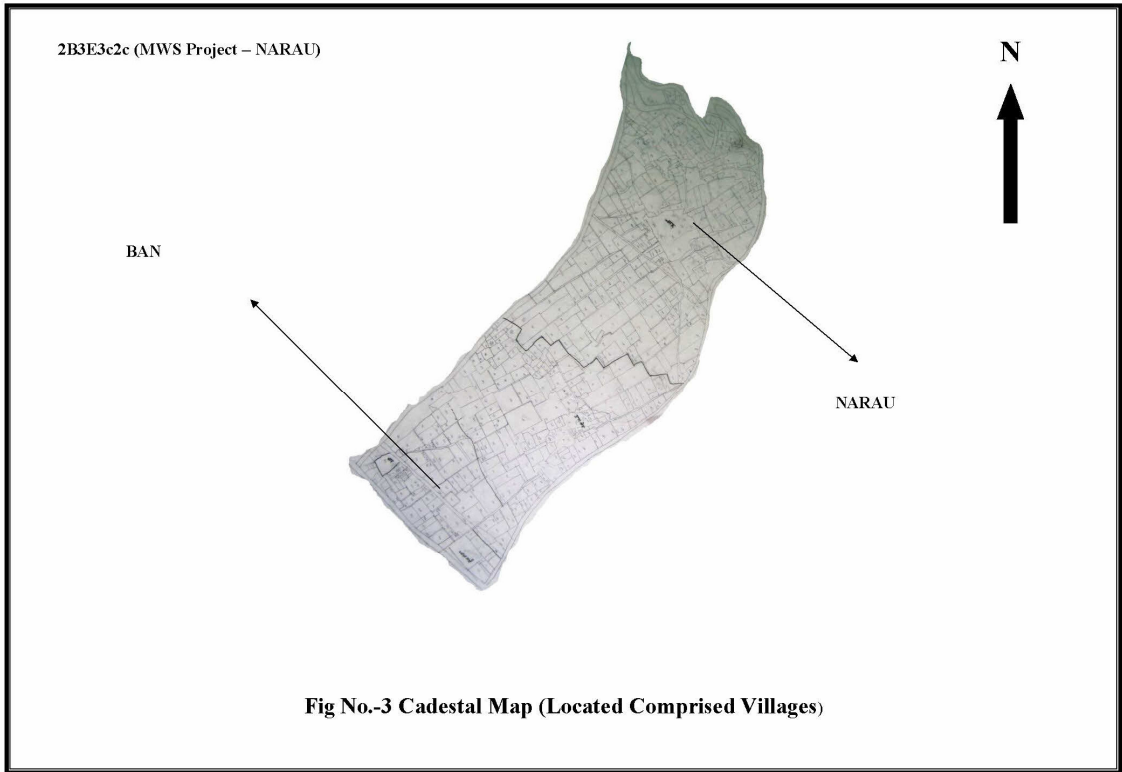


Fig.- 2 Location of the Micro Watershed



(3.4)	Sl. C No. i	Name of Project	Name of Village	Geograph ical Area (in ha.)	Raifed Area (in ha.)	Treatable Area	Agri. Land
	1 m	2	3	4	5	6	7
	1 a	Narau	Narau	253.08	202.39	240.95	245.00
	2 t		Tundakhena	183.32	146.62	174.55	182.00
	3 e		Ban	38.48	30.76	36.63	38.63
	4		Lalgarhi	5.12	4.09	4.87	5.00
	:	Total		480.00	383.86	437	470.63

The Watershed falls under semi arid region of tropical climate inclined in Western Plan Zone. The average annual precipitation is about approx. is 397 mm. spreading over 35 rainy days. Most of the rain fall (about 85%) is received during July to September. The rain fall of moderate intensity. Nothing the area receives of scarcity rainfall in the winter season. The temperator variation ranges from as high as 43⁰c in the month of May-June to as low as 4⁰c in December-January.

(3.5) Geomorphology and Soils :

Geomorphology :

The entire watershed is topographically divided into major landforms. Accordingly the soils of watershed can be grouped into various categories such plane land, undulated land, sloppy land and erosic ravenous land.

Soil :

(a) Fine textured soil :

The soil are the most extensive soil group found in the watershed. Some portion of the watershed is relatively sloppy flat land with fine soil texture as sandy sandy loam. The soils are in color and are inherently good high in fertility status. Soil texture is sandy lome loam particularly in depressions and loam in the elevated portion. The soil characteristic texture is dispersive and smooth. Therefore without impede the downward movement of water productive layer of soil are easily by high runoff.

a- Coarse Textured Soil :

These soil are lying mostly in downward portion, along with erosic gully and drainage line upto end of watershed outlet. These soils are coarser in texture and are relatively poor in fertility status. The soils are lomy sand in texture. Rill and gully formation in same parts particularly near the outlet of watershed can be seen.

(3.6) Drainage and Slope:

Due to prevalence of mild steep slope and presence of a number of drainage lines in the watershed the drainage system is adequate. The watershed from part of Ganga Basin and watershed. Under mild to steep topographical slope of MWS as divided as follow : (Drainage and slope map fig.-4)

Table - 4 : Drainage and Slope

S. No.	Grade	Slope Percent	Area in Ha.	Remark
1	A	05-1	137.10	30%
2	B	1-2	114.25	25%
3	C	2-3	91.40	20%
4	D	3-4	68.55	15%
5	E	4-5	27.42	6%
6	F	5-6	18.28	4%
	Total		457	

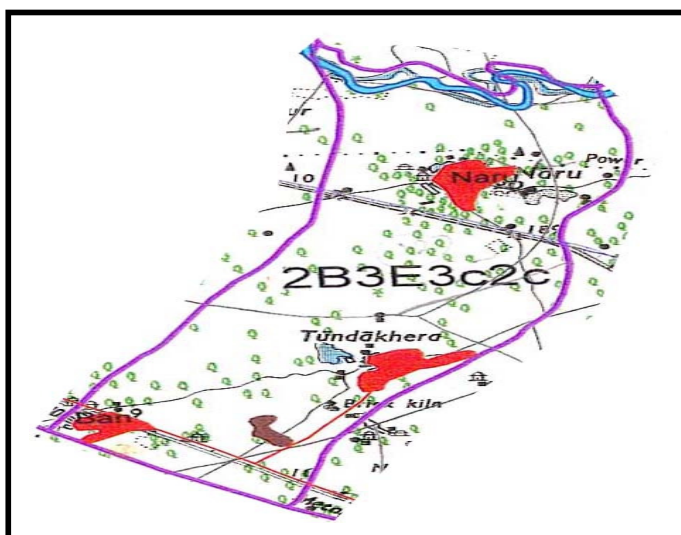


Fig-4 (Drainage & Scrub Map)

(3.7) Vegetation :

a- Natural Vegetation :

Natural vegetation is very poor in the watershed. The forest vegetation is predominant with Vilayti Babool (*Prosopis Juliflora*). There are occasional occurrence of Neem Plants (*Azadirachta Indica*), Shisham (*Dalbergia Sissoo*) and Karanj (*Pongamia Glabra*) and anywhere some scrubs are seen. There are no grass land in the watershed. Somewhere grass patches are seen only on the bunds, roadside and other such places. Poor percentage of massive green trees has been not seen in the watershed except Horticulture backyard.

b- Horticulture :

There is no backyards or commercial horticulture plantation in villages are been in some part of watershed.

c- Agroforestry :

The agriculture fields of the villages have some horticulture plantation at places isolated trees whose frequency is seen as under agroforestry and some where in where in backyards.

(3.8) Human Population:

a- Human Population:

Total Population of involved villages in watershed is 8936 with average family size of six persons as detailed as follows

Table – 5 : Human Population

S. No.	Name of village	Nos. of families	Human Population			Total
			Male	Female	Children	
1	Narau	378	575	469	1180	2224
2	Tundakheda	395	615	535	1120	2273
3	Ban	435	525	480	1062	2067
4	Lalgarhi	320	340	210	400	1050
Total		1528	2055	1694	3762	7614

d- Categorization of Human Population :

In the total population of watershed villages, categories are defined as below :

Table – 6 : Population Categories

S. No.	Particulars	Unit	Number of families in population in the villages		
			Population	Family	Remark
1	2	3	4	5	6
1	Agri Farmer	No.	3640	910	
2	Landless	No.	480	160	
3	Agri. Labour	No.	1750	350	
4	Land less Labour	No.	400	100	
5	BPL Family	No.	1400	350	
6	SC Family	No.	4500	900	
7	ST Family	No.	-	-	

(3.9) Land Holding :

All the categories of farmers as small, marginal, medium and large are involved in land holding average of about 1-18 ha. Small land holding farmers 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 as below :

Table – 7 : Distribution of farm families according to their size of land holdings

S. No.	Name of Village	Total Agri. Land in MWS	Land Holding Family (Nos.)					Percentage
			Marginal (< - 1Ha.)	Small (1-2 Ha.)	Medium (2-4 Ha.)	Large (4-7 Ha.)	Total	
1	Narau	253.89	180	15	12	8	215	
2	Tundakheda	183.32	65	12	11	4	92	
3	Ban	38.40	28	6	4	3	41	
4	Lalgarhi	5.12	3	2	1	-	6	
Total		470.63	270	35	28	15	354	

(3.10) Live Stock Population :

Total live stock population of the watershed is 2911 Nos. Buffalos is preferred as much animal compared to Cow. But milk yield is poor. Goats are also kept for milk as well as for meat purpose. The breakup of livestock population is as follows :

Table – 8 : Live Stock Position

S. No.	Name of Village	Unit	Live Stock Position				Total
			Buffaloes	Cows	Bullocks	Goats	
1	Narau		1371	305	48	185	1829
2	Tundakhera		885	210	41	85	1221
3	Ban		400	175	14	35	624
4	Lalgarhi		315	135	16	17	536
Total			2911				

(3.11) Infrastructure Social Feature :

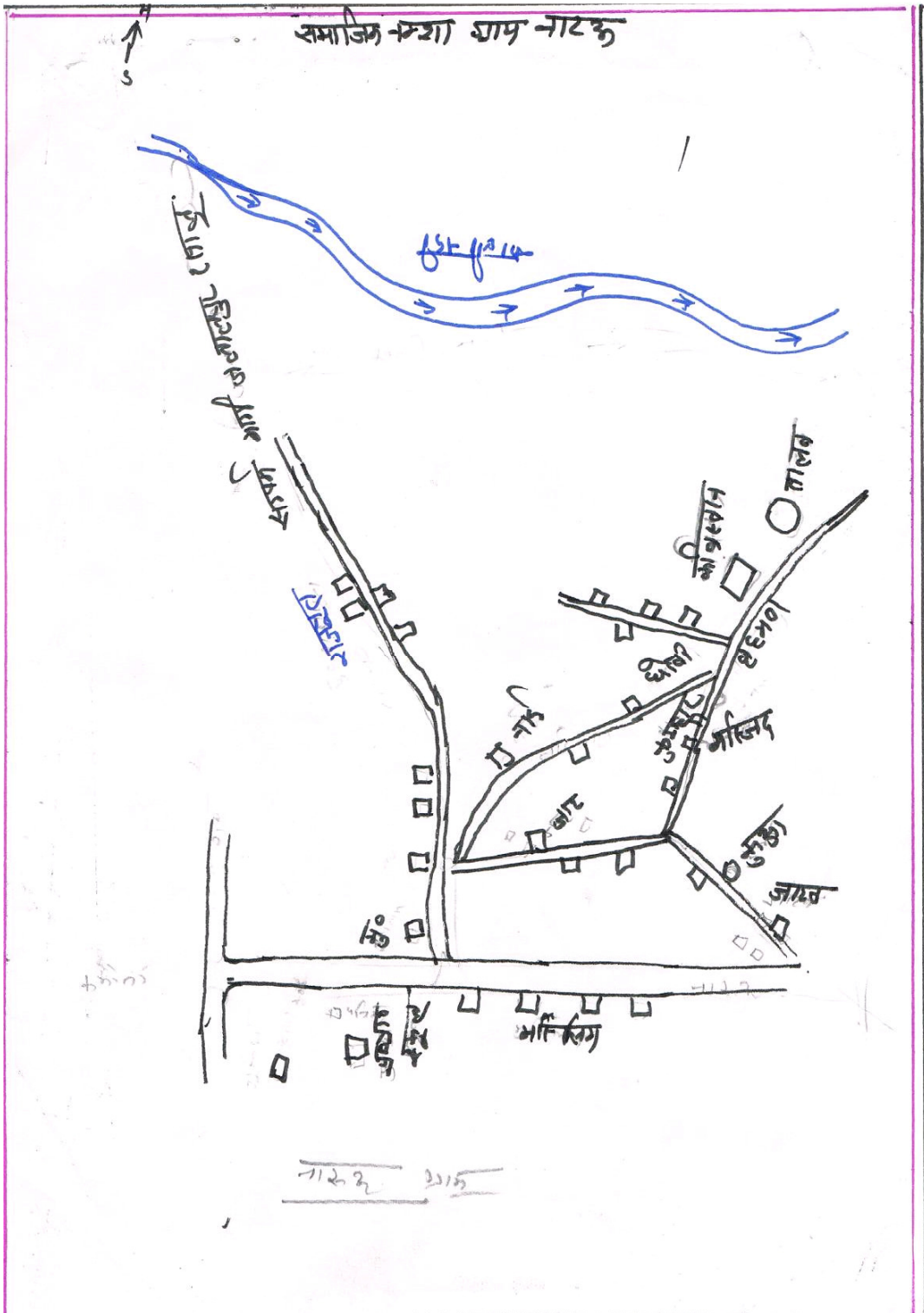
- a- Comprised villages in the micro watershed has moderate communication facilities. Watershed linked with metaled road and approachable through motarable road.
- h- All the villages are electrified and have T.V. and Telephone connection.
- i- Literacy rate in the watershed is very low all villages are having education upto Junior High School.
- j- Nearest small market is at Pahasu 10 Km. Nearest big market Bulandshahar is about 50 Km. from watershed. Religious and ritual features are almost common as in other parts of U.P. small land holding with large family size and more than 25% of the labour force of the total population living below poverty line indicate poor socio economic status of the watershed community.

Participatory Rural Appraisal

Participatory mode of the villagers shows positive indication for the success of the programme. Traditionally the entire village community participate in the individual works. Social map of one of the watershed village drawn by villagers themselves, depicting various village figures is shown in sketched map in Fig.-4 & 5. Infrastructures position of the village recorded as follows :

Table – 9 : MW.S. Project – Dalpatpur

S. No.	Infrastructure	Unit	Qty.
1	2	3	4
1	Primary School	No.	6
2	Junior High School	No.	2
3	Kanya Pathshala	No.	-
4	Public Health Center	No.	1
5	Vet nary Hospital	No.	1
6	Panchayat Ghar	No.	2
7	Post Office	No.	1
8	Agan Bari Center	No.	-
9	Electricity	-	Yes
10	Road	-	Yes
11	Pond	No.	3
12	Hand Pump	No.	-
13	Irrigation Well	No.	7
14	Canal	No.	Yes
15	Temple	No.	3
16	Well (Drinking Water)	No.	2
17	Pumping Set	No.	235
18	Toilet	No.	30
19	Market	No.	Yes



Recorded importance of development institution

Farmers perception recorded for importance and role of different development institution in relation to infrastructure. Importance has been depicted with size of circle and role with distance from village circle. (Fig 8)

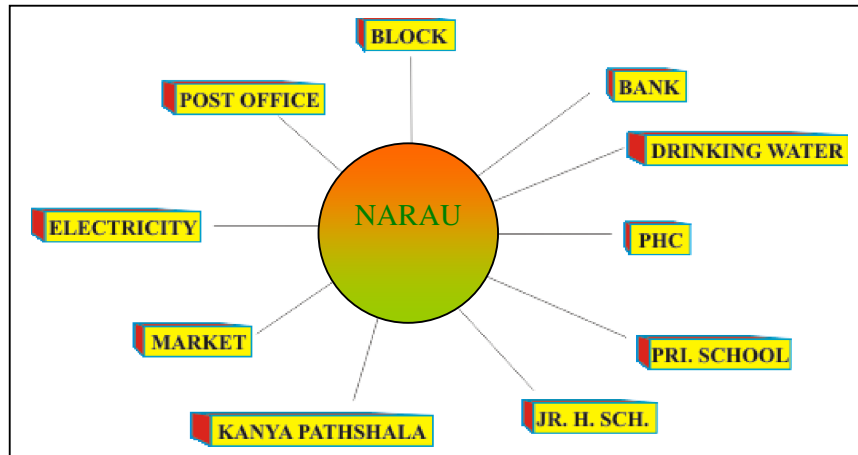


Fig. -8 (Venn diagram of Micro watershed)

(3.12) Communication :

Watershed can be approached from District Headquarter Bulandshahar to Project area 35 km. by Road.

(3.13) Natural Resource Base :

Transact of watershed showed typical land use profile consisting of plain agriculture land, erodic area and medium ravenous ridge. Main source of the irrigation are the canal for pre showing irrigation only. The total geographical area of the watershed is 574.00 Ha. classification.

Approach roads for the micro watershed is shown for the communication is shown on topo sheet map Fig 9 as next page.

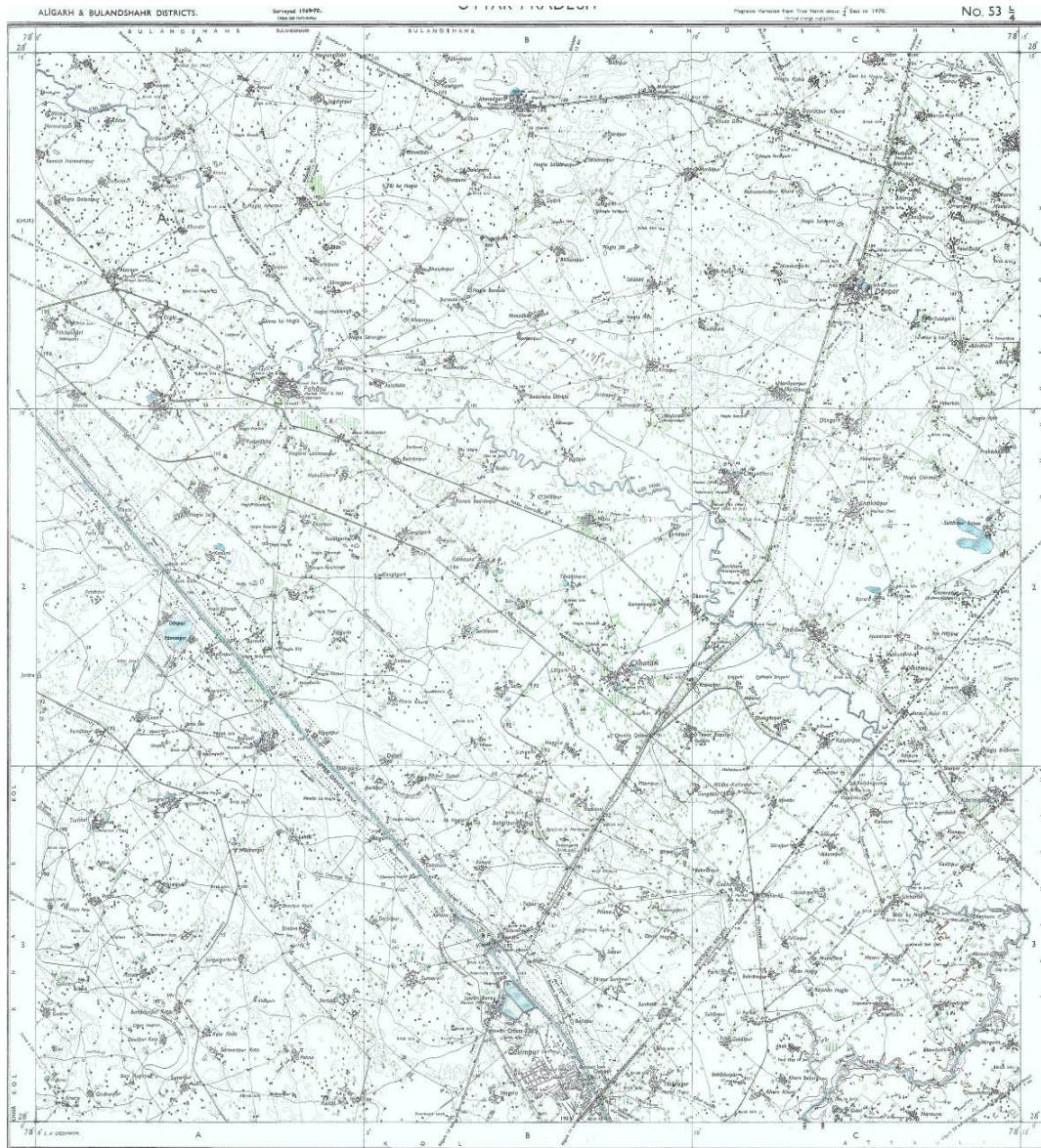


Fig.- 7 Communication Map on Toposheet

Table – 10 : Classification of area(Hect.)

S.No.	Name of Village	Unit	Total Geographical Area	Rainfed Area	Wasteland	Village Land and Road	Irrigation Resource	
							Water Bodies	Borewell
1	2	3	4	5	6	7	8	9
1	Narau	Ha.	253.08	202.39	16.00	6.38	-	17.10
2	Tundakhera	Ha.	183.32	146.62	9.00	5.10	-	7.70
3	Ban	Ha.	38.48	30.76	3.00	4.0	-	3.50
4	Lalgarhi		5.12	4.09	0.04	3.0	-	-
Total			480.00	383.86	28.04	18.48		28.30

(3.14) Livelihood :

Total Population of the watershed is 8936 and out of the total population a majority more than 80% has farming as their major source of livelihood followed by labours, serviceman and small business class. Classified livelihood given in form as follows :

Table – 11 : Livelihood Classification in population :

S. No.	Name of Village	Farmer	Labour	In Service	In Local small business	Others
1	2	3	4	5	6	7
1.	Narau	215	125	15	35	7
2.	Tundakhera	92	65	7	40	2
3.	Ban	41	37	4	21	1
4.	Lalgarhi	6	3	-	1	1
	Total	354	230	26	92	11

(3.15) Dependency of forest fuel wood and fodder :

- a. Fuel wood :-** The main source of fuel is from cow dung cake, woody stem of crops. About 70% of the climactic energy requirement is met from the agriculture by product and cow dung cake. Rest is met out from the forest outside the village and watershed boundary, most preferred fuel wood is Juliflora fuel wood Juliflora obtained from standing along and between watershed.
- d- Fodder :-** Villages have not any sufficient signified dependency on forest based fodder as these resource are nothing availability in the forest.

(3.16) Labour requirement :

Labour requirements was found to be maximum at the time of October, November and December when the sowing of Rabi crops are done. The crucial periods are March and April coinciding harvesting and threshing of Rabi crops and July/August is sowing Kharif Crops take a little place. Other income generating enterprises having potential during the remaining.

(3.17) Crop Rotation :

Present Crop rotation in the watershed comprise of :

Kharif	-	Bajra	-	Rare
		Maize	-	Rare
		Jwar	-	Rare
Rabi	-	Fallow Wheat	-	Major
		Fallow Barly	-	Major
		Fallow Sugarcane	-	Major
		Fallow Mustard	-	Major
Zayad	-	Urad, Moong, Makka		

The above said Rabi Crops is the most prevailing crop rotation on the agriculture lands both in the rainfed and irrigated conditions.

Organized vegetable cultivation fruit plantation and traditional agro forestry systems are lacking as per requirement in the watershed the limited vegetable cultivation in the watershed is confined as kitchen gardens and field to the irrigated condition in a scattered manner. The cultivation of cash crops other than the sugarcane, wheat and mustard also in the watershed.

(3.18) Historical Events :

Chronological record of important events of the watershed village is prepared through participatory rural appraisal (PRA) which is very useful in understanding of its background and chronology is given as follows :

Table – 12 : Historical Events

S. No.	Events/Activities	Year	Rem.
1	2	3	4
1	Established	1665	
2	Opening of Primary School	1960	
3	Opening of Junior School	-	
4	Opening of Kanya Pathshala	-	
5	Opening of PHC	-	
6	Opening of Vet. Hospital	-	
7	Panchayat Ghar	-	
8	Introduction of Tractor	1967	
9	Gobar Gas Plant	-	
10	Thresher	1970	
11	First Tube well/Pumpset	1975	
12	First Motorcycle	1978	
13	T.V. & D.V.D. Players	2001	
14	Electricity in Village	2003	
15	Bituminous Road	2000	
16	First Hand Pump	1950	
17	Templo Renovation	1999	
18	First Land Line Telephone	2004	
19	Planning for Watershed Project	2010-11	

(3.19) Present Land Use in the Watershed :-

The watershed has diversified land uses. The varied present land use under different use in the watershed. The mixed land use followed in the watershed is almost similar in other parts of U.P. During P.R.A. Exercise prepared land has been shown in Table No. 13, 14 & 15.

Table – 13 : (Ownership)

S. No.	Name of Village	Pvt. Agri. Land		Govt. Revenu Land	Forest Land	Other Land
		S.C./S.T.	Others			
1	2	3	4	5	6	7
1	Narau	25.05	228.03	-	-	-
2	Tundakhera	19.40	163.92	-	-	-
3	Ban	5.30	33.18	-	-	-
4	Lalgarhi	1.30	3.82	-	-	-

Table –14 : (Present Land under different categories)

S. No.	Name of Village	Land Use (Ha.)				Total
		Agricultural	Wasteland (All Types)	Seasonal waterbodies	Village/Road Etc.	
1	2	3	4	5	6	7
1	Narau	245	16.00	-	6.38	267.38
2	Tundakhera	182	9.00	-	5.10	196.10
3	Ban	38.63	3.00	-	4.00	45.63
4	Lalgarhi	5	0.04	-	3.00	8.04
Total		47.63	28.04	-	18.48	517.15

Table – 15 : (Present land use classified)

S. No.	Land Use Under	Unit (ha.)	Area (Ha.)	Percentage
1	2	3	4	5
1	Under Agriculture		470.63	
	A- Rainfed-			
	I- Crops		367.04	78%
	II- Agro forestry		7.65	1.5%
	B- Irrigated-			
	I- Assured		42.35	9%
	II- Portial		51.75	11%
2	Wasteland			
	A- Aforestation			
	B- Pasture			
	C- Untreatable		12.60	45%
	D- Treatable		15.42	55%

Proposed Post Land Use has been given on Page No. 32

4- Focus on Present Land Use :

(4.1) Agriculture :

The total area under agriculture in the watershed is about 487.89 ha. out of which 574.00 ha. is under rainfed agriculture. Agriculture land uses in the watershed extended to diversified land capabilities starting marginal to good class II land. The irrigated and drinking water is most scarce natural resource in the watershed. The operation of tube well for irrigation of agricultural crops frequently leads to the drinking water. Problem to the farmers of watershed forcing them to carry drinking water from outside of the watershed area. The agricultural field bund are common in the watersheds however they frequently breach on heavy rains.

Various mixed texture of soils are located in patches through out the watershed. The heavy soils are almost kept fallow during rainy season. the agricultural soils also have some as share calcium pan at variable depths. The irrigation water is conveyed by the earthen channels. Surface irrigation methods following mainly border method of flood method by the formers in the watershed. These factors reduce the water use efficiency of limited and valuable irrigation water.

Drought hardy species like Juliflora suitable multi purpose trees is suitable for rehabilitation of the wasteland. Rehabilitation of waste lands promoting agro forestry with appropriate fruit and forest species suitable vegetative barriers on sloppy lands can be high future value and by these adoption would be meet out many demands of fire wood and fodder in the wasteland. Except above but also for soil and water conservation, rehabilitation of wasteland and sustainable income generation for socio-economic upliftment of farmers.

Crop Productivity :

The farmers also do not have suitable cropping system to deal aberrant weather. Weeds impose considerable constraint in productivity of both Karif and Rabi crops under irrigated as well as rainfed production system farmer undertake normally one manual weeding in mustard and other valuable crops however, practices is energy and time consuming. Use of we decide is rare in the watershed.

In the watershed area, limited cropping in the Kharif with mixed cropping practices is not only irrigational but also unscientific and best for low productivity. Subsequent Rabi crops in general. Sugarcane & Mustard crop in particular are raised on residual soil moisture under rainfed production system during post mansoon season.

(4.2) Indigenous Technological Knowledge (ITK) :

Under process of PRA tracked out rural applying technology in various field of local technology and some technology is very popular in village. In which the agriculture is an old traditional practices of farmers who have improved themselves with passage of the time according to their domestic needs and technological reforms in the nearby areas. The villages have their traditional village ponds, practice of field bunding which typically constitute agricultural related ITKs in the watershed. The Mustard & sugarcane being a cash and firewood crop of the watershed and also sugarcane crop is being. Cultivated in self designed manner by the farmers. Its carried

out that the area is totally depend on rain and under the rainfed area technology is applied by the farmers. However limited fertilizer application specifically the DAP came in the practices since about 15-20 years.

(4.3) Forest and Other Vegetation :

Forest :

The watershed have a tract of wasteland area which are under uncultivable position is liesed in the watershed. These wasteland have not any tree vegetation or very less than real requirement for the wasteland use.

Horticulture/Agro forestry :

Horticulture and agro forestry practices were observed in the watershed.

(4.4) Agro forestry :

Agro forestry practices are lacking in the watershed. Though it has good potential under existing disposition and may a role particularly with respect to minimization of cropping risk, built up soil fertility and productivity, protection of soil erosion, soil conservation partly meeting out the fire wood demand of rural community and more over optimizing the economical return from system as whole under typical semi arid climate in the watershed. Bund and boundary plantation also have good potential to care the fire wood and fodder demands of the rural community in the watershed. The existing area under agro forestry is almost negligible. Prosopis Jhliflora may be planted as block or sole plantation specifically on marginal and degraded land in the watershed.

The agro forestry interventions comprising of ber, bail, aonla, guava, papular etc. may be applied for benefit of the farmers under rainfed to irrigation production system on leveled to slopping and marginal agricultural using proper planting techniques and term it control measures.

The multipurpose trees may be also help in supplementing fire wood and fodder demands of the rural community in the watershed and my be planted as hedge rows on rainfed, marginal and degraded lands.

(4.5) Horticulture :

Fruits and vegetables practices are lacking in the watershed area. Its practices may be sustainable very good potential for the formers of watershed. There are a limited lack fruit trees in number like mango, guava, lime, ber, aonla and papaya fruit trees well as vegetables like radish, okra, tomato, cabbage, garlic, onion, chilly, bringer and cucurbits but they are found surviving well in the watershed villages. Organized orchards (vatika) commercial vegetable cultivation horti-agri and other systems of agro forestry etc. are lacking but have good agriculture.

5. Soil and land capability classification :

(5.1) Soil Morphology :

Watershed is located North East corner of Bulandshahr Distt. near about 55 Km. away. The entire terrain of watershed is topographically divided into various land forms. Accordingly the soils of watershed have been grouped major categories is given as follow :

Hill Terrain	Plane Land Sloppy	Undulated Land	Rill Erosic Land	Moderate ravenous
-	35%	30%	18%	17%

Given categories in the blocks is located the soil morphology in the watershed areas. Representation of soil characteristics by soil profile is represented as follows :

Soil Profile :

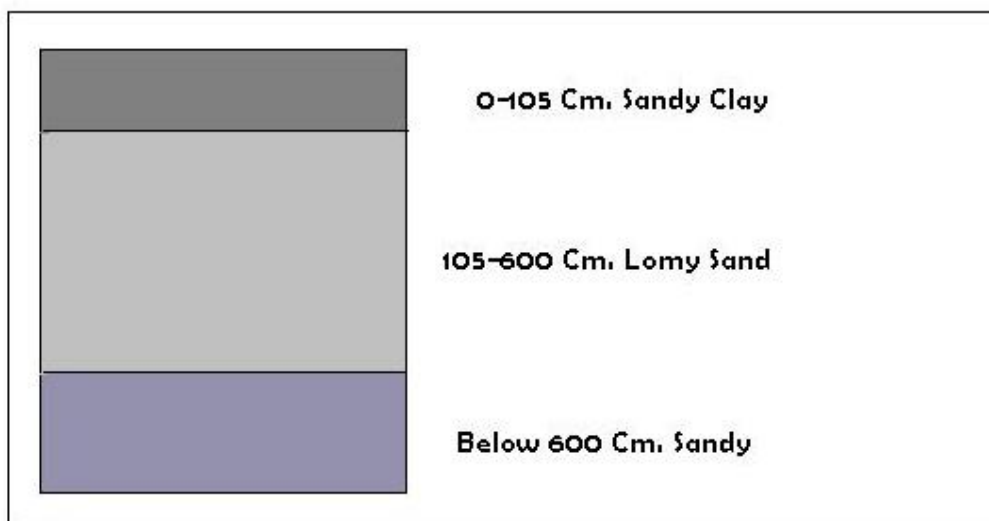


Fig. – 9 (Soil Profile)

Table – 16 : (Morphology of a Typical Soil Profile) :

Horizone	Depth in Cm.	Morphology
1	2	3
A V & H	0-150	Silky when moist, Hard when dry quick soluble, high elasticity, fissures, and cracks, occasional occurrence of free calcium carbonate granules black in colour, clay content 29%, PH- 8 to 8.7
B V & H	150-160	Whitish yellow in colour, very fine mixed with free cacaos and gravels, Hard when dry compact and indurate hard pan restricting development of root and down ward water transmission.
C V & H	7600	Red and white sand stone

(5.2) Soil and Characteristic and Fertility Status :

Soil characteristic pertaining to soil fertility of various classes accruing around villages in the watershed are given as follows :

Table – 17 : Soil Characteristic & Fertility Status :

Sl. No.	Soil Properties	LCC-II	LCC-III & IV
1	2	3	4
1	Sand %	47.04	74.04
2	Silt %	24.60	18.60
3	Clay %	28.36	6.3.6
4	Texture	Sandy Clay	Lomy Sand
5	PH (1:2)	6.41	6.67
6	Organic Carbon %	0.37	0.12
7	Available N Kg ha ⁻¹	316.00	173
8	Available P Kg ha ⁻¹	29.00	15
9	Available K Kg ha ⁻¹	95.00	265
10	EC (dS m ⁻¹)	0.47	0.12

(5.3) Land Capability Classification (LCC) :

Land capability classification (LCC) was done to classification the soils in different groups based upon the limitations and to emphasize the hazards prevailing in the watershed in order to find out the different topo-sequences, landforms, soil depth and erosion hazards. This was followed by the detailed investigation of selected landforms to bring out the LCC classes of the Watershed. Classes of land capability namely II, III, IV and V are demarcated in the watershed. The areas under different classes are shown as follows :

Table – 18 : Land Capability Classification (LCC) :

S. No.	Land capability class	Area in Ha.	Colour
1	2	3	4
1	I Class	-	-
2	II Class	70.59	15%
3	III Class	329.44	70%
4	IV Class	47.00	10%
5	V Class	23.53	5%
6	VI Class	-	-
7	VII Class	-	-
8	VIII Class	-	-

Land capability classification of various agricultural practices under land use can be classified as groups, class, sub class and units. Utilization of various land class is given as follows :

Table – 19 : Utilization of various land uses

S. N.	LCC	Forestry	Ltd. Grazing	Light Grazing	Dense Grazing	Limited Agriculture	Light Agriculture	Dense Agriculture	More Dense Agriculture
1	I								
2	II								
3	III								
4	IV								
5	V								
6	VI								
7	VII								
8	VIII								

(5.4) Land Capability Class II & III :

This group is one of the most extensive LCC watershed. and also near to class III for the agricultural practices. The soils are sandy & sandy loam in texture. The land under this class is nearly level to mild sloping (1-3%). The soils are deep and erosion hazard is slight. Most of the productive agriculture land comes under class II & III. These lands potentially very productive but due to rainfed a single cropping pattern is in habitation.

(5.5) Land Capability Class IV :

This class is found in lower portion near the outlets of watershed. The soils are coarser in texture, deep, erosion hazard and undulating in topography. Rill and initiation of gully can be seen near the outlet of the watershed.

(5.6) Land Capability Class VII & VIII :

This class of land is not found in watershed. Somewhere lack of soil are found with admixture gravels fragments in these classes of lands.

(5.7) Conclusions :

The majority of land form is coming under class II, which give an insight of good agriculture production potential of the watershed.

The land capability classification provides reasonable good information with regard to capability of soil, that could be used for agriculture, agrihorticulture, silviculture and posture development.

The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like bunding practices.

The reasonable area is under watershed of wasteland and other wasteland including grater potential of this watershed for forestry and pasture development. Rare places namely water body of low portion of land area under seasonally works as water harvesting structures and these harvested water is used or can use for some other beneficial activities during the crop season also.

6. Problems and needs of the watershed indentified during the PRA

(6.1) Problem Identification and prioritization :

- k- The are has undulating topography, steep unstable slopes, gradient of excessive branches of rills and hence highly prone to soil erosion.
- l- Major issues addressed to food sufficiency economic growth and environmental security in the watershed area.

- m- Effective soil depth is limited and highly variable hampering good crop growth.
- n- The watershed have low productive cropping due to tradition single cropping pattern and over all average crop production percentage not sufficient against requirement.
- o- Identified that there is no assured irrigation system has been development capacity of water bodies are reduced due to silt ration which are utilized to store of rainy water and they are renovatable.

(6.4) Transact walk during the PRA :

Problems identified and prioritized during the transact walk and PRA exercises in all comprised villages of watershed. There were pooled and a list of problems representing the whole watershed was prepared. Problems were ranked as per their total weight age in the watershed village.

Table – 20 : Ranking of Problem identification and prioritization of watershed

S.No.	Problem	Rank
1	2	3
1	Lack of irrigation	5
2	Lack of drinking water	6
3	Low production of field crops	8
4	Lack of fodder availability and low productivity	4
5	Lack of availability of fuel wood	6
6	Lack of market facility	8
7	Lack of quality seeds, fertilizer, pesticides etc.	7
8.	Medical and Health care facilities for milching animals and low productivity.	8
9	Lack of medical, educational and transportation facilities	9
10	Lack of water bodies renovation	9
11	Lack of run of earthen check bunds	3
12	Lack of water harvesting structures	2
13	Lack of livelihoods opportunity	6

Prioritized ranking (Upto four Numbers) :-

- 7- Lack of earthen check bunds.
- 8- Lack of livelihood opportunities.
- 9- Lack of irrigation water was the greatest problem. Lack of irrigation water problem experienced by the people followed by low crop production.

(6.3) Analysis of SWOT of the watershed :

Strength (S), Weakness (W), Opportunity (O) and Threat (T) analysis is a useful decision support tool. A SWOT analysis of watershed is presented as follows :

SWOT analysis of the watershed

<p style="text-align: center;">Strengths (S)</p> <ul style="list-style-type: none"> xxi. Cooperative work culture in traditional activities xxii. Close ethnic ties xxiii. Road at the top as well as outlet of the watershed xxiv. Hard working xxv. Resource pool of crop genetics diversity xxvi. Awareness of farmers about watershed management programme xxvii. Well established CPR maintaining and sharing system xxviii. Stall feeding of animals xxix. Well maintained seasonal water bodies xxx. Social outlook of the community towards land less 	<p style="text-align: center;">Weakness (W)</p> <ul style="list-style-type: none"> xix. Poor water management xx. Resource poor farmers xxi. Out migration of youth xxii. Low and erratic rainfall xxiii. Fragile geology xxiv. Fragmented land holding xxv. Heavy infestation of wild animals xxvi. Problem of fuel and fodder xxvii. Shallow soil depth and with high percentage of gravel
<p style="text-align: center;">Opportunities (O)</p> <ul style="list-style-type: none"> xiii. Wide range of annual and perennial crops xiv. Scope of regular employment opportunities to check out migration xv. Strengthening of existing irrigation system xvi. Conducive climate for rainfed crop diversification xvii. Good scope for Agro forestry and dry land horticulture xviii. Potential for collective action and management of CPR 	<p style="text-align: center;">Threats (T)</p> <ul style="list-style-type: none"> xi. Prone to adverse climate like drought xii. High market risk xiii. Social conflicts owing to PRI and WSM policies and local politics xiv. Weak coordination among line departments xv. Lack of expertise of implementing agency in different aspects of WSM

7. Proposed land use for the watershed :

Watershed management plan preparation due importance is given to topographic, land suitability, irrigation potentiality, prevailing farming systems, micro farming situation, farming, farmers preferences and priorities along with economic and environment securities.

Crop and tree selection and area distribution was done as per farmers priorities revealed through PRA exercise.

The watershed management plan for watershed is prepared with specific objectives of food sufficiency, income and employment generation with environment security.

Technical options were with the ITK based on the latest available experiment findings. Due attention was given to the resource of the farmers and adjustments were made in capital intensive resource demanding technological outputs while making them adoptable to the resource poor farmers. Emphasis was given on maximum use of farm yard manure. The proposed land use plan of the watershed is shown as follow as in table

Table – 21 : Present and proposed land use plan of the watershed

S.No.	Land use	Present (ha)	Proposed area (ha)
1	2	3	4
1	Agriculture		
a	Rainfed		
	I Crops	367.04	442.63
	II Agro-forestry	7.05	17.00
b	Irrigated		
	I Assured	42.35	42.35
	II Partial	51.78	53.00
2	Waste land		
a	Aforestation		
b	Pasture		
c	Untreatable	12.61	10.00
d	Treatable	15.42	11.00
3	Village land	18.48	-

(7.1) Status of Present Water Resources Utilization :

Watershed is having some canal system. Management and maintenance of these canal are required. Before sowing of Rabi crops, water from these canal is issued as supplementary irrigation for Rabi sowing ar allowed to go as waste. After releasing water from canal, submergence area also put under cultivation.

Some where bore well irrigation applied by the farmers in the watershed.

(7.2) Proposed Plan for Irrigation Development :

- a- Present system of irrigation and wastage of water during October–November need to be made more efficient from water management point of view by minimizing conveyance losses in the existing water courses.
- b- Present irrigation canal capacity have to build up by the reform. Which are lack capacity of water.
- c- Construction of new water harvesting earthen structures, Pucca Check Dem, Series Gully Plugging, etc. has been sloppy portion to increase irrigation potential and for recharging of ground water, soil and moisture conservation maximum field irrigation, best production and expected change of crop rotation.
- d- The up gradation of the exciting system of irrigation will result in :
 - i- Minimization of conveyance losses.
 - ii- Increase in frequency of irrigation.
 - iii- Adoption of high yielding varieties of crops.
 - iv- Assured cultivation of cash crops.
 - v- Capacity buildup by the planning of new water harvesting structures.

(7.3) Ground Water Recharge :

For the purpose of ground water recharge, the area of the upper side of watershed is recommended for Field Bunds, Contour Bunds, Peripheral Bunds and Submergence Bunds and in the lower portion Contour Staggered Trenches, Gully Plugs, Earthen Check Dem and Pacca Outlets. In the undulated sloppy portion of the watershed recommended water harvesting structure for dual purpose as ground water storage and under ground water recharge.

(7.4) Crop Production :

Practices proposed in the watershed is given as follows :-

- a- Mulching and crop residue management.
- b- Application of green manuring.
- c- Vermi Composting.
- d- Crop rotation and inter cropping.
- e- Biofertilizers.

(7.5) Tillage Operation :

Deep tillage technology is proposed to apply to be demonstrated for benefit of farmers in the watershed.

(7.6) Improved Seeds of High Yielding Verities (H.Y.V.) :

Recommendation of improved varieties is necessary for improving the productivity and farm income. Through replacement of low yielding traditional verities of seeds in villages of watershed.

(7.7) Balanced Fertilizer Use :-

Demonstration of use of fertilizer in various crops of watershed recommended balance fertilizer use in different crops will be benefited of forming community.

(7.8) Control of insects and diseases :

Aphid in the mustard 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 pest and diseased will also be demonstrated in the watershed for benefit of the growers.

(7.9) Dry Land Horticulture :

Such portion of dry land in which proposed horticulture development planning recommended species like Ber, Bel and Aonla will be planted at suitable spacing in the watershed.

(7.10) Agri Horticulture :

Aonla and Sahjan would be suitable horticultural crops to the locality. Therefore, a part of land in the farmer field shall be selected and brought under Agri-horticulture system. The cropping system followed will be Jwar and Wheat.

(7.11) Plantation (Fuel wood) :

Such a portion which are under wasteland will be taken falling in the class-IV category in the watershed. These lands will be planted with species like Vilayati Babool (Prosopis Juliflora), Babool (Acacia Nilotica), Karanj (Pangamia Glabra).

9. Socio Economic Analysis of the of the Project :

(9.1) Sustainability and environment security :

The proposed land use plan will improve the land utilization index and crop diversification index significantly as compared to the existing one. in the proposed watershed management plan proper blending of the bio engineering measures will be applied on above 80% of the total area of watershed. It is estimated that more than above 70% of the watershed area will be treated and consequently the soil loss and runoff from the area is expected to be reduced by 70% respectively.

It will help in maintaining ecosystem integrity on sustained basis along with improving the livelihood security of the farming community.

(9.2) Economic Analysis :

Economic analysis of the project was carried by taking direct benefits and costs considering 10 years for project life at 10% discount rate. Whole watershed development plan was divided into three sector as agriculture, horticulture and forest/Fuel wood plantation. Net Present Value (NPV) and Benefit Cost ratio criteria were applied judge the economic efficiency of each enterprises and sector. Net present value (NPV) of the project life is considered to be 10 years and discount rate for NPV estimation is 10% is given NPV and benefits as follows :-

Table – 22 : Present productivity income analysis :

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	3.00	4300.00	12900.00	6450.00	6450.00	1:1
		Moong	3.00	4500.00	13500.00	6075.00	7425.00	1.22:1
		Jwar	4.80	600.00	2880.00	1584.00	1296.00	0.82:1
		Wheat	18.50	850.00	15725.00	8650.00	7075.00	0.82:1
		Pea	7.50	2250.00	16875.00	10970.00	5905.00	0.54:1
		Mustard	3.50	1850.00	6475.00	3235.00	3240.00	1:1
Total		-			105105.00	54105.00	51000.00	0.94:1
Average		-			13138.00	6763.00	6375.00	0.94:1
B	Forestry	Vilayati				15000.00	-	Nil
		Babool						
C	Horticulture	Ber				20000.00	-	Nil
		Aonla				20000.00	-	Nil
		Bel				20000.00	-	Nil
Total		-				60000.00	-	Nil
Average		-				20000.00	-	Nil
Grand Total								

Table –23 : Post productivity and income analysis for Post Productivity**Value and B.C.:**

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	4.00	5000.00	20000.00	8325.00	11615.00	1.39:1
		Moong	4.00	5000.00	20000.00	8200.00	11800.00	1.44:1
		Jwar	5.50	800.00	4400.00	1900.00	2500.00	1.32:1
		Wheat	25.00	1000.00	25000.00	11680.00	13320.00	1.14:1
		Pea	9.50	3300.00	31350.00	14810.00	18540.00	1.12:1
		Mustard	5.00	2500.00	12500.00	4370.00	8130.00	1.86:1
Total		-	-	-	172250.00	72845.00	99765.00	1.38:1
Average		-	-	-	21531.00	9061.00	12471.00	1.38:1
B	Forestry	Vilayati Babool	80.00	500.00	40000.00	15000.00	25000.00	1.67:1
C	Horticulture	Ber	35.00	1500.00	52500.00	20000.00	32500.00	1.63:1
		Aonla	35.00	2000.00	70000.00	20000.00	50000.00	2.50:1
		Bel	40.00	1500.00	80000.00	20000.00	40000.00	2:1
Total		-	-	-	182500.00	60000.00	122500.00	2.04:1
Average		-	-	-	60833.00	20000.00	40833.00	2.04:1
Grand Total		-	-	-	1394750.00	147485.00	247265.00	1.68:1

Table –24 : Summary of NPV, PPV and B.C. Ratio (Sector wise) :

S. No.	Name of Sector	NPV		PPV		B.C. Ratio
		Expend.	Net Income	Expend.	Net Income	
1	2	3	4	5	6	7
1	Rain fed Agriculture	54105.00	51000.00	72485.00	99765.00	1.38:1
2	Forest/Fuel wood Plantation	15000.00	-	15000.00	25000.00	1.67 : 1
3	Horticulture	60000.00	-	60000.00	122500.00	2.04:1
Total		129105.00	51000.00	147485.00	247265.00	1.68:1

(9.3) Economics of Agriculture Sector :

The development cost can be recovered by the adoption of plan in present rain fed agriculture is being done on well maintained field, therefore does not require much investment. In rain fed agriculture, investment of Rs. 44.50 lacs is proposed to made is given as follows :

Table – 25 : Economics of Agriculture Sector :

S. No.	Name of sector	Name of Activities / Plan	Treatble Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Rainfed	Soil, moisture and water cons works	457	260.78	620.47	359.88	1.38:1

(9.4) Economics of forest fuel wood plantation :

Economic analysis of fuel wood plantation in the watershed. Project life is considered to be 20 years and discount rate for NPV estimation is 10 % is followed and as is given follows :

Table –26 : Economics of forest fuel wood Plantation :

S. No.	Name of sector	Comman Name of Plant	Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Forest Fuel wood sector	Vilayati Babool (Prasopis Juliflora)	25.00	2. 50	6.675	4.175	1.67 : 1

(9.5) Economics of Horticulture Sector :

Economic analysis of Horticulture Plantation in agri-horti system and on wasteland patches of watershed project, life is considered about 15-20 years and discount factor rate for NPV estimation is 10% is follows :

Table – 27 : Economics of Horticulture system :

S. No.	Name of Sector	Common name of Plants	Area (Ha.)	NPV (Lacs)	Post Productive Value (Lacs)	Benefit Lacs	B.C. Ratio
1	2	3	4	5	6	7	8
1	Horticulture	Ber (zyziphus mouritana)	4.00	0.80	2.104	1.304	1.63: 1
		Aonla (Embelica officianalis)	3.80	0.76	2.660	1.90	2.5 : 1
		Bel (Aegle marmelos)	2.20	0.44	1.320	0.88	2 : 1
Total			10.00	2.00	6.084	4.084	2.04 : 1

(9.6) Food requirement and sufficiency :

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

Table – 28 : Status of food requirement and availability of per annual :

S. No.	Name of Foods	Requirement Q./Yr.	Present Status		Expected Post Status	
			Availability Q./Yr.	Deficit or surplus Q./Yr.	Availability Q./Yr.	Deficit or surplus Q./Yr.
1	2	3	4	5	6	7
1	Cereals 110 Kg.	8575	7119	1259	14237	5862
2	Pulses 36.50	2779	1528	1251	5002	2223
3	Oil Seeds 29.20	2223	889	1334	3556	1333
4	Vegetable 71 kg	6928	1385	5543	12471	5543

(9.7) Employment generation :

One of the major problem of the labour migration in watershed project. By the implementation of the project activities employment opportunities will be generated. However the changes in land use pattern and adoption of other subsidiary enterprise will generate employment opportunities in the watershed as given in table follows :

Table – 29 : Employment generation under proposed works :

S. No.	Employment activities/works	Area under work	Cost	Mandays generation (Nos.)			
				Unskilled	Skill	Total	Person
1	2	3	4	5	6	7	8
2	Graded Contour Bund	51	1.53	1530	-	1530	51
3	Gully Plug, C.D.	84	6.30	4410	323	4733	158
4	Submergence Bund	72	2.88	2880	-	2880	96
1	Peripheral Bund	71	2.485	2485	-	2485	83
5	W.H.B.	89	8.01	4806	272	5078	169
6	Renovation of Bund	55	1.65	1650	-	1650	55
7	Reno. of W.H.B.	-	-	-	-	-	-
8	Community Pond	-	-	-	-	-	-
9	Afforestation	25	2.565	513	-	513	17
10	Horticulture	10	2.00	400	-	480	13
Total		457	27.42	18674	595	19269	642

10. Formation of watershed committee :

Under compliance of common guideline Para (6.3) is followed and by the help of watershed development team, watershed committee is organized in the micro watershed village Ranayach Narendrapur with 10 members as prescribed in common guide line. List for organization of W.C. village details given as follows :

Table – 30 : Details of comprised village W.C. organization in M.W.S. :

S. No.	Particulars	Details	Block	Geographical Area
1	2	3	4	5
1	Micro watershed code	3B3E3c2c	Pahasu	480
2	Name of Gram Panchayat in M.W.S.	Narau		

Table – 31 : List of organized W.C. for the Gram Panchyat Narau in watershed.

S. No.	Name of selected members	Age	Representation Members from	Post	Qualification	Village
1	2	3	4	5	6	7
1	Anvar khan	45	Gram Sabha	President	Sakshar	Narau
2	Sajid	32	From – U.G	Secretary	High School	Narau
3	S.K. Sharma	55	From – U.G	Member	Ag. Engg	Narau
4	Bhikki Singh	40	From – U.G	Member	-	Narau
5	Prem Kumar	45	From – U.G	Member	-	Narau
6	Sunil Kumar	42	From – S.H.G.	Member	Intermediate	Narau
7	Mohh. Raphi	40	From – S.H.G.	Member	Nirkshar	Narau
8	Nanhi	35	Landless	Member	10	Narau
9	Smt. Posish	40	From – Female	Member	Sakhar	Narau
10	Chandra Pal	60	From – Landless	Member	5	Narau
11	Jhamman Singh	38	From – P.L.A.	Work	Ph.D.	Narau

(10.1) Formation of Self Help Groups in M.W.S.

By the help of watershed committee and watershed development team self help group are formatted / organized. Families and persons are selected from poor, small and marginal farmers families, landless poor families, agriculture labour families, women, herdsman and shepherd and S.C. families in the formatted self help groups are given as follow :

Table – 32 : Ganga Ji Self help group – Narau .

S. No.	Name of member in formatted SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Kanhish	35	SC	Milk Palan	New
2	Moh. Raphim	40	General	Milk Palan	New
3	Sunil Kumar Sharma	42	Jat	Milk Palan	New
4	Masrur	35	Jat	Milk Palan	New
5	Sahid	35	Jat	Milk Palan	New
6	Samma	45	Jat	Milk Palan	New
7	Sajid	55	Jat	Milk Palan	New
8	Israt	45	Jat	Milk Palan	New
9	Yasin	40	Jat	Milk Palan	New
10	Babu khan	60	BC	Milk Palan	New

Table – 33 : Self help group Lalgarhi (Goat)

S. No.	Name of member in formed SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Arvind	30	Gene	Goat Palan	New
2	Vijay Singh	45	Gene	Goat Palan	New
3	Hari	47	OBC	Goat Palan	New
4	Satish Sharma	38	Gene	Goat Palan	New
5	Raju	35	BC	Goat Palan	New
6	Kharchand	40	SC	Goat Palan	New
7	Ranvir	30	SC	Goat Palan	New
8	Yogesh	40	BC	Goat Palan	New
9	Pradeep	32	BC	Goat Palan	New
10	Bhagwan	32	BC	Goat Palan	New

Table – 34 : Self help group in Lalgarhi village of watershed.

S. No.	Name of member in farmated SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Prempal Sharma	36	Gen	Live Stock	New
2	Jagdish Sharma	34	Gen	Live Stock	New
3	Ajeet	21	Gen	Live Stock	New
4	Chandan	20	OBC	Live Stock	New
5	Naresh	28	OBC	Live Stock	New
6	Arvind	20	Gen	Live Stock	New
7	Parethamas	22	Gene	Live Stock	New
8	Sheela Devi	20	OBC	Live Stock	New
9	Chandan Singh	22	SC	Live Stock	New
10	Raju	20	SC	Live Stock	New

Formation of User's Groups :

User's groups are formed by the help of watershed committee and watershed development team in the micro watershed comprised villages. Farmers which have land village are involved in the User's groups and they will be directly benefited as expected by the implementation of watershed project. Easy and convenient conditions are made to resource use between user's groups and they will be responsible to operate and maintenance for the created assets in the watershed. Nos. of formed user's groups details are given as follows :

Table – 35 : Village wise user's groups

S. No.	Name of village	No. of groups	No. of farmers	Total Agri. Land	Area under treatment	Cost of assets
1	2	3	4	5	6	7
1	Narau	14	215	253.08	240.95	-
2	Tundakhera	7	92	183.32	174.55	-
3	Ban	3	41	38.48	36.63	-
4	Lalgarhi	-	6	5.12	4.87	-

10. Estimation and Costing of Proposed activities of the watershed Project Year 2009-10.

Proposed works / activities for the Project Period (Year 2010-11) under proposed treatable area 457.00 Ha. Out of total Geographical area 480.00 Ha.

(10.1) Financial and Physical Outlets :**Table – 36 : Financial and Physical Outlets for the Year 2009-10 :**

Sl. No.	Components	Unit cost per ha.	Physical ha.	Financial (Lacs)			Man-days Generation
				Labour Component	Material Component	Total	
1	2	3	4	5	6	7	8
A	Management Cost 10%						
1	Administrative Cost – TA & DA Hiring of Vehicles, Official Expenditure Electricity & Phone bill Computer, Stationery and office consumable materials & contingency	1200	-	-	5.484	5.484	-
2	Monitoring	120	-	-	0.5484	0.5484	
3	Evaluation	120	-	-	0.5484	0.5484	
	Sub Total	1440		-	6.5808	6.5808	
B	Preparatory Phase 10%						
1	Entry Point Activities 4%	480	-	0.4387	1.7549	2.1936	438
2	Institutional & Capacity Building 5%	600	-	-	2.242	2.742	
3	Detailed Project Report 1%	120	-	-	0.5484	0.5484	
	Sub Total	1200	-	0.4387	5.0453	5.484	438
C	Watershed Work Phase						
a	Watershed Development Works						
1	Graded, Contour & Field Bunds	3000	51	1.530	-	1.53	1530
2	Gully Plug, Earthen Checkdam /WHS	7500	84	4.410	1.80	6.30	4733
3	Submergence bunds	4000	72	2.88	-	2.88	2800
4	Peripheral Bund	3500	71	2.485	-	2.485	2485
5	Earthen Water Harvesting Bund	9000	89	4.806	3.168	8.01	5078
6	Renovation of existing Bunds	3000	55	1.650	-	1.65	1650
7	Renovation of existing W.H.B	-	-	-	-	-	-
8	Aforestation and Development of silvi postural system	10260	25	0.513	2.052	2.565	513
9	Dry Land Horticulture		10	0.40	1.60	2.00	400
10	Community Pound (Renovation)	-			-	-	
	Sub Total	6000	457	18.674	8.746	27.42	19269
B	Livelihood Programme (Community Based) 7.620						
	Income generating activities through SHG's for landless and marginal farmers 10%						
1	Live stock development activities	200	-	-	.9142	.9142	-
2	Bee Keeping	100	-	-	.4568	.4568	-
3	Poultry Farming	200	-	-	.9142	.9142	-
4	Nursery Development	300	-	-	1.3710	1.3710	-
5	Vegetable Production	100	-	-	.4568	.4568	-
6	Milk Dairy Promotion Unit	200	-	-	.9142	.9142	-
7	Establishment of Vermi compost Unit	100	-	-	.4568	.4568	-
8	Sub Total	1200	-	-	5.4840	5.4840	-
C	Production System and micro Enterprises						
1	Crop production, diversification of agriculture and introduction of agro forestry	1170	-	-	5.3468	5.3468	-
2	Demonstration of improved composting system	390	-	-	1.7824	1.7824	-
	Sub Total	1560	-	-	7.1295	7.1293	-
D	Consolidation Phase 5% Sub Total	600	-	-	2.742	2.742	-
Grand Total		12000	-	19.1127	35.7276	54.840	19705

संकल्प पत्र

ग्राम पंचायत – नारऊ कोड सं० 2B3E3c2c विकास खण्ड –पहासू जिला – बुलन्दशहर

यह कि आई०डब्लू०एम०पी० परियोजना में तैयार की गयी निर्माण की नयी सृजित परिसम्पत्तियों को ग्राम पंचायत नारऊ एवं माइक्रो वाटरशेड के अन्तर्गत सम्मिलित ग्रामों में योजना क्रियान्वयन कराने एवं योजना उपरान्त चालू रखने तथा सृजित परिसम्पत्तियों के अनुरक्षण हेतु कृत संकल्प एवं इच्छुक है।

नारऊ ग्राम पंचायत के सभी स्रोत स्थल जैसे तालाब, ग्रामसभा गोचर (चारागाह), जल संसाधन, जंगल आदि में भूमि विकास परियोजना के अन्तर्गत किये जायेंगे। उन कार्यों को समाज के कमजोर वर्ग जैसे अनुसूचित जाति/जनजाति, महिला वर्ग एवं अल्प भूमिहीन गरीबी रेखा के नीचे के लाभाथियों को लाभ पहुँचाने हेतु इच्छुक होंगे।

हम योजना संचालन हेतु प्रस्तावित करते हैं एवं सहमति देते हैं कि भारत सरकार के समस्त मार्गदर्शी सिद्धान्तों के अनुपालन में कार्य सम्पन्न करायेगें यह भी घोषित करते हैं कि चयनित क्षेत्र जिसको मेरे द्वारा भलीभाँति देखा गया है, और प्रस्तावित योजना में प्रस्तावित समस्त कार्य 15 सालों से नहीं कराया गया है जिसकी मुझे पूर्ण रूप से जानकारी है और अनुमोदन करते हैं।

① श्री. गंगा राम

2 श्री. राजपाल

श्री. गंगा राम
श्री. राजपाल
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नारऊ

श्री. गंगा राम
श्री. राजपाल

श्री. गंगा राम
श्री. राजपाल

श्री. गंगा राम



PROJECT AT A GLANCE

IWMP-III (Bulandshahar)

1	State	Uttar Pradesh
2	Distt.	Bulandshahar
3	Block	Pahasu
4	M.W.S. Code	2B3E3c2b
5	Name of M.W.S. Project	Barkatpur
6	Involved Village	08
7	Geographical Area of M.W.S.	852.00
8	Rainfed Area	683
9	Treatable Area	775
10	Weightage	
11	Cost of Project	93.00
12	For the year	2010-11

Budget Components

S. No.	Components	Area (Ha.)	Cost (in Lacs)
1	2	3	4
1	Management Cost 12%	-	11.16
2	Preparatory Phase 10%	-	9.30
3	Watershed Work Phase	-	-
	A- Watershed Development Works 50%	775	46.50
	B- Livelihood Programme (Community Base) 10%	-	9.30
	C- Production System & Micro Enterprises 13%	-	12.090
4	Consolidation Phase 5%	-	4.65
	Total	775	93.00

Executive Summary of the Project

Identified selected micro watershed project Barkatpur is coded as **2B3E3c2b** has been proposed from cluster of I.W.M.P. Bulandshahar – II project in Pahasu Block district Bulandshahar four villages namely Barkatpur, Beramnagar, ban, Lalgarhi, Dhaurau, Chaudhera and Barkheda comprised in the micro watershed which is located in the east of district Bulandshahar on the east bank of River Ganga border. It lies between 28° -15' and 15° N Latitudes and 78° -E and 78° -5 N Longitudes Covering area. Its altitudes ranges from 187 meter to 190 meter above the mean sea level. Khurja Railway Station 184.11 m, Bulandshahar Railway station is 201.18 m above mean sea level is displayed. Project area of I.W.M.P. BSR-II is lied in the Pahasu Block of Bulandshahar District which is come in the western plan zone under semi arid area. The annual average rainfall is near to 397 mm which an average of 35 rainy days. Out of which about 85% is received during the mansoon season from July to September and very less rainfall is received in the winter season.

Temperature ranges from as high as 42°C in the May-June to as 3° - 4°C during December – January. The Trend of rain fall is highly eratic and maximum water goes as runoff.

Main occupation of the dwellers is agriculture in the watershed. Some part of the lands are shown during the Kharif season. Cane sugar are preferred crops in the project area. The main Crops raised are Wheat, Pea & Mustered and maze.

The topmost portion of the watershed is sloppy flat land. Other than topmost portion of the watershed is under soil erotic portion and depreciative. The soil of the land are sandy loam Soil. The middle agricultural position of watershed relatively smooth sloppy flat land with sandy loam soil texture. These soil is yellow in colour and are inherently good in fertility status.

Natural vegetation of the watershed is very poor. Somewhere forest vegetation is seen which are predominant with Vilayati Babool (*Prosopis Juliflora*), followed by Babool (*Accasia nilotica*), somewhere Neem Plants (*Azadirachta Indica*), Shisham (*Dolbergia Sisson*) and Karanj (*Pongamia Glabra*) are seen in occasional occurrence. There is no grass land in the watershed. Somewhere grass patches are seen only on the bunds, road sides and other such places. Coverage of massive green belt is in poor percentage for environment which is envisaged. That watershed is very poor climate area.

There is normal condition of animal physics and for their fodder arrangement is the watershed and creative possibility would be expected by the implementations of the project.

Due to Aerial soil erosion poor harvesting managements, cropping pattern, non treated watershed etc. are very anti effective causes for the watershed. Problem of the watershed is to be tackled by harvesting structures which have last most of their capacity new water bodies for the prevention of erosion and conservation of soil and moistures various type of earthen bunds in the watershed field, necessity has been observed. Wasteland will be treated with staggered Trenches, afforestation and bunding for the changing of characteristics.

The detail project report has been prepared by the applying of nine process steps for the micro watershed code no. **2B3E3c2b** brief is as follows.

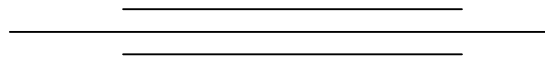
- STEP-1 Secondary data collection:-** During the five days visit programme in the micro watershed project with of all available documents of village label by approaching the Gram panchayat collected secondary data.
- STEP-2 Village meeting & conducting PRA exercise:-** Community meeting conducted on fix days for the consultation with villagers for the PRA Exercise. Participatory mode of the villages was positive indicated for the success of programm. With good in testing participation has been drawn social & resource map on ground & paper & discussed un various topics of problematic thoughts in the micro watershed.
- STEP-3 Socio economic survey:-** The resource organization of village label volunteers identified to conduct house hold socio economic survey/states.
- STEP-4 Probel typology analysis:-** Thoroughly analyzed the data & identified problem type as soil & moisture conservation, crop rotation, crop coverage, productivity, livelihoods, social issues & capacity building gaps etc. Problems discussed with the watershed committee & came up with alternative solution.
- STEP-5 Conduct of net participatory planning (NPP):-** The planning team visited together in the planning blocks on the scheduled date along with the beneficiaries of the villages & data gathered as for the participatory net planning.
- STEP-6 Productivity & livelihood planning exercise:-** For the product livelihood exercise, group discussion on various livelihood as Agriculture, Animal husbandry enterprise development held discussion with the villagers in the micro watershed.
- STEP-7 Institutional & capacity building :-** This plan is prepared based on the data available in the field and auscultations with the watershed committee.
- STEP-8 Data consolidation & documentation of DPR :-** After gathering all required information compiled collected data. Thoroughly discussed and finalized the expected outcomes and benefits specially in the respect of livelihood for different segments. These are the target and performers indicators for the micro watershed.

STEP-9 Conduct of Gram Sabha obtaining approvals submissions of DPR:-After preparation of the draft DPR convened to Gram sabha and activities proposed expected outcomes benefits of implementing the programm are explained in case of any changes are proposed in the Gram sabha approval obtained by the Gram sabha and already singed of Mau paper.

STEP-9A Attachment of detail estimate, cost and design:-Estimating, Costing and design prepared technically According to plan in the micro watershed project. And attached with the DPR.

STEP-9B Various type of mapping :- DPR prepared in the support of micro watershed project using various type of maps is as follows :

- | | |
|---------------------------------------|-----------------------------|
| 1. Index Map of Watershed | 2. Watershed Map |
| 3. Relief/ Drainage Map | 4. Slop Map |
| 5. Soil and Land Capability class map | 6. Land use/ Land Cover Map |
| 7. Cadastral map | 8. Proposed Action Plan map |
| 9. Social Map | |



Project Report

Table – 1 : Micro watershed project brief : -

1	State	U.P.
2	District	Bulandshahar
3	Block	Pahasu
4	Comprised Villages (Nos.)	08
5	Name of Watershed	Barkatpur
6	Name of MWS Project	Barkatpur
7	MWS Code No.	2B3E3c2b
8	Geographical Area of MWS	574.00
9	Treatable Area	510

1- Project Objectives :- The aim and objectives of the Project are :

- v- Conservation, development and sustainable management of natural resources including their users.
- w- Enhancement of agriculture production and productivity in a sustainable manner.
- x- Restoration of ecological balance in the degraded and fragile rain fed ecosystem.
- y- Reduction in regional disparity between rains fed and irrigated area.
- z- Creation of sustainable employment opportunities for the rural community for livelihood security.
- aa- Generation of massive employment.
- bb- Reduce migration from rural employment.

2- Major Problem of Project Area :

- s- Actual shortage of drinking water.
- t- Near to nil activated water bodies and water harvesting structures.
- u- Low depth of ground water table.
- v- Undulated and generally sloppy rainfed area.
- w- Large number of Small, Marginal and S.C. farmer land holding.
- x- Lower wages of agriculture labour and also migration of labour due to shortage of employment in the watershed.

3- General Description :

(3.1) Location :-

Barkatpur Watershed has been taken with MWS Code No. **2B3E3c2b** in Pahasu Block of Distt. Bulandshahar is located on Bulandshahar via Khurja to Shikarpur Via Pahasu road about 30 Km. between 28⁰15' and 28⁰ E Latitudes and 78⁰0' and 78⁰5' N Longitudes. Location and delineation of watershed has been located on watershed map **Fig. 2** and on top sheet **Fig. 3**.

(3.2) Area and Elevation :

Elevation ranges from 181 to 208 mtr. above the mean sea level(MSL) altogether comprised villages and their's area is described as follows. (Comprises village map Fig. 3)

Table – 2 : Area and Elevation

Sl. No.	MWS Code	Block	Name of Village	Geographical Area	Treatable Area
1	2	3	4	5	6
1	2B3E3c2b	Pahasu	Barkatpur	275.011	240.050
			Baramnagar	186.210	184.105
			Ban	20.150	18.005
			Lalgarhi	30.150	28.145
			Dhaurau	225.105	202.104
			Chattari	60.00	55.402
			Chodera	40.00	35.015
			Barkheda	15.324	14.124
				852.00	775.00

(3.3) Shape of the Micro Watershed:

The shape of watershed is Elongated and as Rectangular. The maximum length and width of the watershed are 5000 Mtr. and 1814 Mtr. respectively with the Length: Width ratio of 2.76:1.

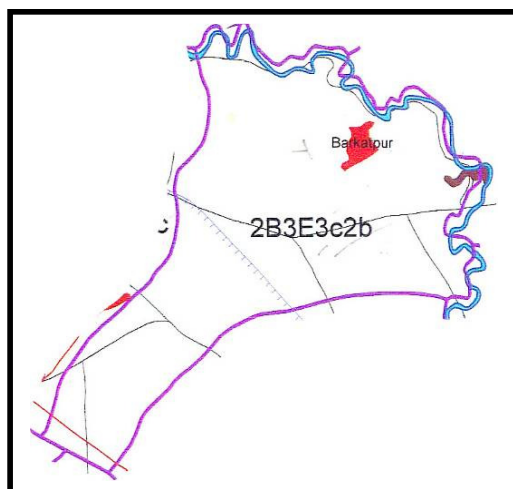


Fig. 1 (Shape of Micro Watershed)

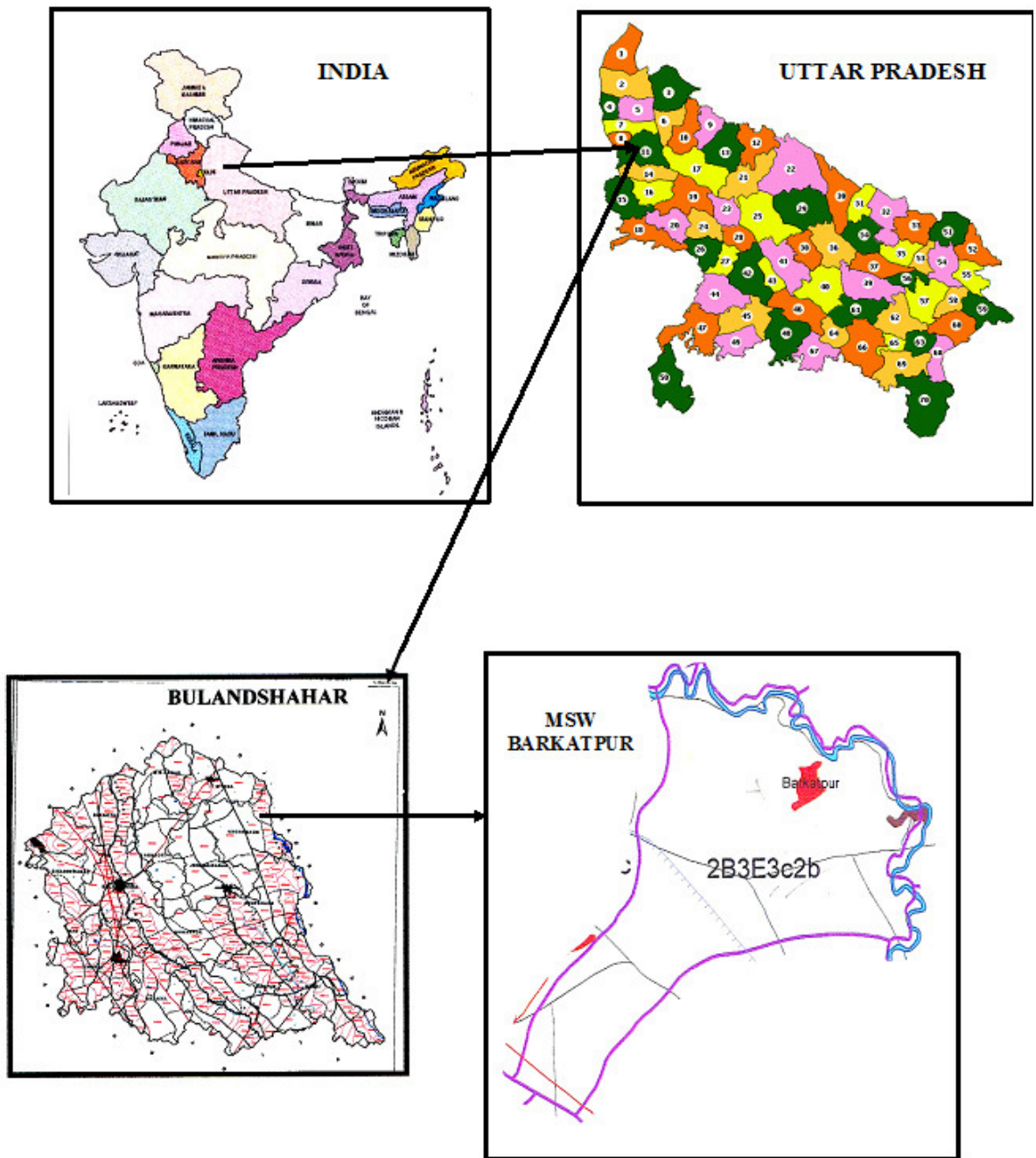
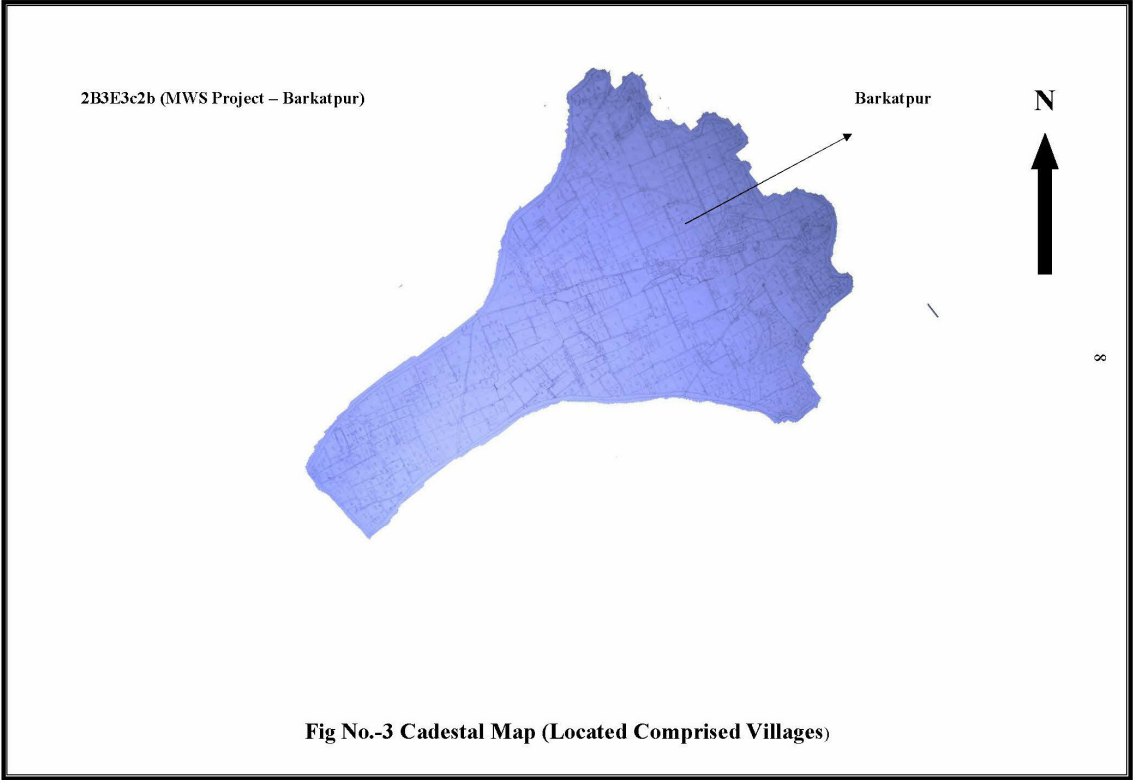


Fig.- 2 Location of the Micro Watershed



Sl. No.	Name of Project	Name of Village	Geographical Area (in ha.)	Raifed Area (in ha.)	Treatable Area	Agri. Land
1	2	3	4	5	6	7
1	BARKATPUR	Barkatpur	275.011	200.105	240.050	256.435
2		Baramnagar	186.210	180.259	184.105	118.723
3		Ban	20.150	15.105	18.005	17.005
4		Lalgarhi	30.150	20.105	28.145	27.142
5		Dhaurau	225.105	185.110	202.104	201.104
6		Chatari	60.00	32.105	55.402	59.105
7		Chodera	40.00	40.115	35.015	34.115
8		Barkheda	15.374	10.105	14.174	14.305
Total			852.00	683.00	775.00	727.934

(3.4) Climate :

The Watershed falls under semi arid region of tropical climate inclined in Western Plan Zone. The average annual precipitation is about approx. is 397 mm. spreading over 35 rainy days. Most of the rain fall (about 85%) is received during July to September. The rain fall of moderate intensity. Nothing the area receives of scarcity rainfall in the winter season. The temperator variation ranges from as high as 43⁰c in the month of May-June to as low as 4⁰c in December-January.

(3.5) Geomorphology and Soils :

Geomorphology :

The entire watershed is topographically divided into major landforms. Accordingly the soils of watershed can be grouped into various categories such plane land, undulated land, sloppy land and erosic ravenous land.

Soil :**(a) Fine textured soil :**

The soil are the most extensive soil group found in the watershed. Some portion of the watershed is relatively sloppy flat land with fine soil texture as sandy sandy lome. The soils are in color and are inherently good high in fertility status. Soil texture is sandy lome loam particularly in depressions and loam in the elevated portion. The soil characteristic texture is dispersive and smooth. Therefore without impeded the downward movement of water productive layer of soil are easily by high runoff.

a- Coarsed Textured Soil :

These soil are lying mostly in downward portion, along with erosic gully and drainage line upto end of watershed outlet. These soils are coarser in texture and are relatively poor in fertility status. The soils are lomy sand in texture. Rill and gully formation in same parts particularly near the outlet of watershed can be seen.

(3.6) Drainage and Slope:

Due to prevalence of mild steep slope and presence of a number of drainage lines in the watershed the drainage system is adequate. The watershed from part of Ganga Basin and watershed. Under mild to steep topographical slope of MWS as divided as follow : (Drainage and slope map fig.-4)

Table - 4 : Drainage and Slope

S. No.	Grade	Slope Percent	Area in Ha.	Remark
1	A	0.5-1	205	-
2	B	1-2	170	-
3	C	2-3.	132	-
4	D	3-4	108	-
5	E	4-5	42	-
6	F	5-6	32	-

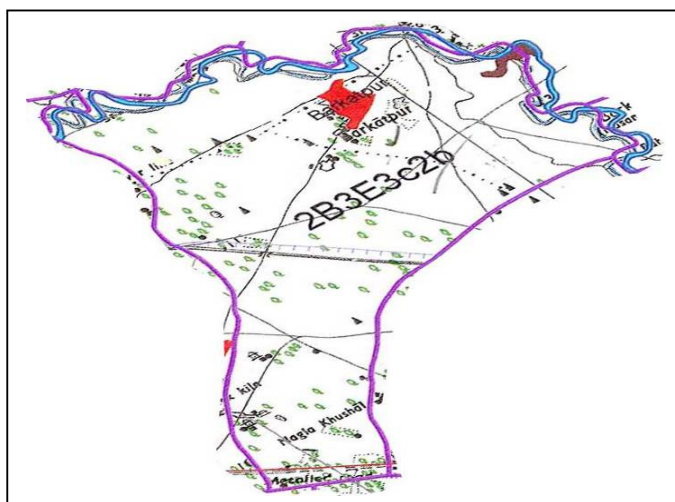


Fig-4 (Drainage & Scrub Map)

(3.7) Vegetation :

a- Natural Vegetation :

Natural vegetation is very poor in the watershed. The forest vegetation is predominant with Vilayti Babool (*Prosopis Juliflora*). There are occasional occurrence of Neem Plants (*Azadirachta Indica*), Shisham (*Dalbergia Sissoo*) and Karanj (*Pongamia Glabra*) and anywhere some scrubs are seen. There are no grass land in the watershed. Somewhere grass patches are seen only on the bunds, roadside and other such places. Poor percentage of massive green trees has been not seen in the watershed except Horticulture backyard.

b- Horticulture :

There is no backyards or commercial horticulture plantation in villages are been in some part of watershed.

c- Agroforestry :

The agriculture fields of the villages have some horticulture plantation at places isolated trees whose frequency is seen as under agroforestry and some where in where in backyards.

(3.8) Human Population:

a- Human Population:

Total Population of involved villages in watershed is 8936 with average family size of six persons as detailed as follows

Table – 5 : Human Population

S. No.	Name of village	Nos. of families	Human Population			Total
			Male	Female	Children	
1	Barkatpur	420	1434	1127	2215	4776
2	Baramnagar	440	615	565	1211	2391
3	Ban	435	525	480	1062	2067
4	Lalgarhi	320	340	310	400	1050
5	Dhaurau	400	415	420	390	1225
6	Cha	515	1330	119	1200	3721
7	Chodera	1323	3012	2941	1985	7938
8	Barkheda	295	581	522	370	1473
						24641

e- Categorization of Human Population :

In the total population of watershed villages, categories are defined as below :

Table – 6 : Population Categories

S. No.	Particulars	Unit	Number of families in population in the villages		
			Population	Family	Remark
1	2	3	4	5	6
1	Agri Farmer	No.	3221	802	-
2	Landless	No.	121	30	-
3	Agri. Labour	No.	300	90	-
4	Land less Labour	No.	160	80	-
5	BPL Family	No.	405	60	-
6	SC Family	No.	311	50	-
7	ST Family	No.	35	05	-

(3.9) Land Holding :

All the categories of farmers as small, marginal, medium and large are involved in land holding average of about 1-18 ha. Small land holding farmers are further scattered at different places which makes cultivation very difficult. Distribution of term families according to the size of the land holdings are given as below :

Table – 7 : Distribution of farm families according to their size of land holdings

S. No.	Name of Village	Total Agri. Land in MWS	Land Holding Family (Nos.)				Total	Percentage
			Marginal (< - 1Ha.)	Small (1-2 Ha.)	Medium (2-4 Ha.)	Large (4-7 Ha.)		
1	Barkatpur	256.435	120	40	05	02	167	
2	Baramnagar	118.723	105	20	04	04	133	
3	Ban	17.005	09	04	02	01	16	
4	Lalgarhi	27.142	11	02	01	04	18	
5	Dhaurau	59.105	20	03	03	03	29	
6	Chatari	201.104	125	27	05	15	172	
7	Chodera	34.115	28	24	02	04	58	
8	Barkheda	14.305	6	03	01	01	11	
Total		727.934						

(3.10) Live Stock Population :

Total live stock population of the watershed is 3848 Nos. Buffalos is preferred as mulch animal compared to Cow. But milk yield is poor. Goats are also kept for milk as well as for meat purpose. The breakup of livestock population is as follows :

Table – 8 : Live Stock Position

S. No.	Name of Village	Unit	Live Stock Position				Total
			Buffaloes	Cows	Bullocks	Goats	
1	Barkatpur	No.	305	125	12	450	892
2	Baramnagar	No.	500	150	25	40	715
3	Ban	No.	400	175	14	35	624
4	Lalgarhi	No.	315	135	16	70	536
5	Dhaurau	No.	380	175	13	400	968
6	Chatari	No.	300	115	16	120	551
7	Chodera	No.	4070	352	171	154	4944
8	Barkheda	No.	470	30	38	-	538
Total							

(3.11) Infrastructure Social Feature :

- a- Comprised villages in the micro watershed has moderate communication facilities. Watershed linked with metaled road and approachable through motarable road.
- k- All the villages are electrified and have T.V. and Telephone connection.
- l- Literacy rate in the watershed is very low all villages are having education upto Junior High School.
- m- Nearest small market is at Pahasu 13 Km. Nearest big market Bulandshahar is about 60 Km. from watershed. Religious and ritual features are almost common as in other parts of U.P. small land holding with large family size and more than 25% of the labour force of the total population living below poverty line indicate poor socio economic status of the watershed community.

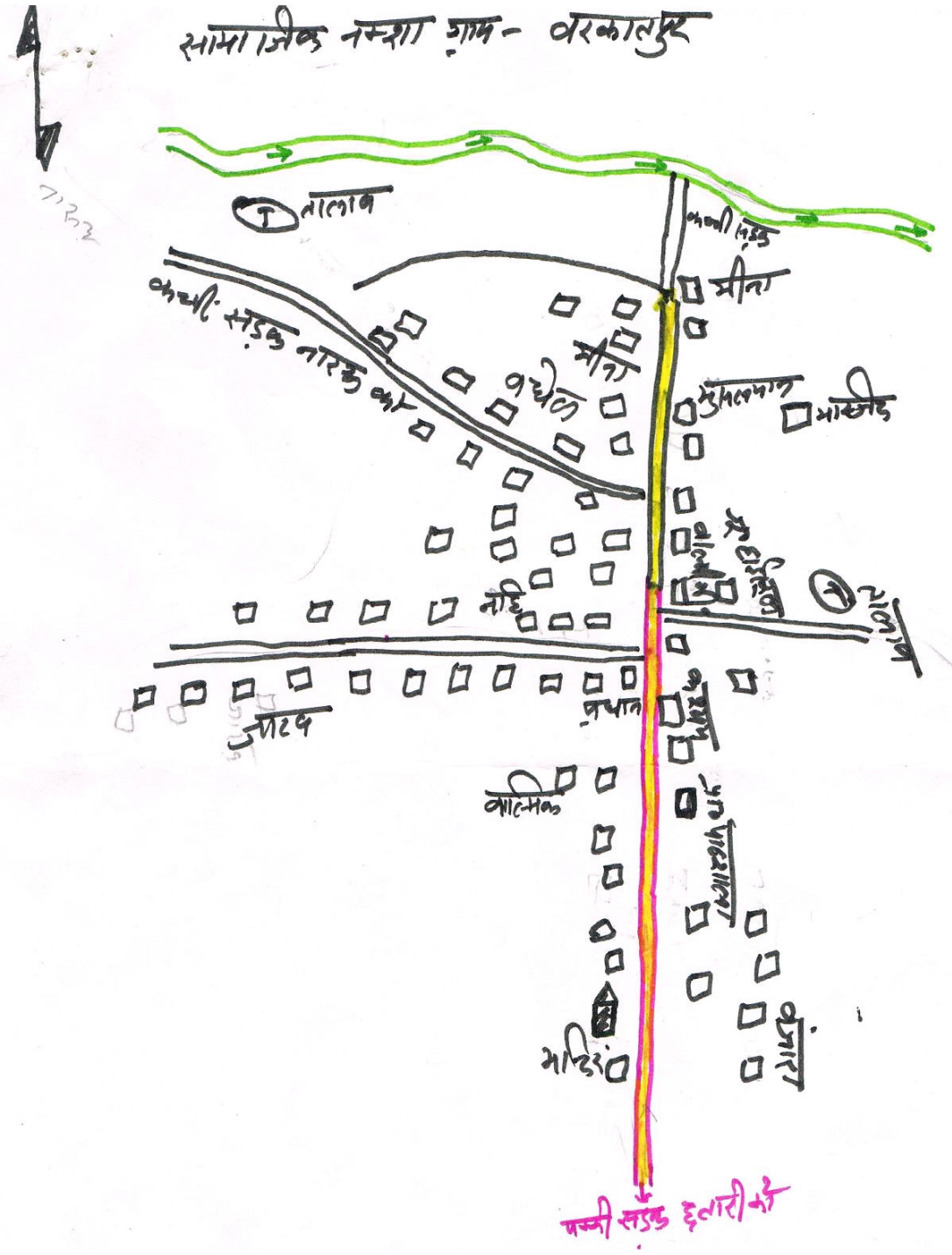
Participatory Rural Appraisal

Participatory mode of the villagers shows positive indication for the success of the programme. Traditionally the entire village community participate in the individual works. Social map of one of the watershed village drawn by villagers themselves, depicting various village figures is shown in sketched map in Fig.-4 & 5. Infrastructures position of the village recorded as follows :

Table – 9 : MW.S. Project – Dalpatpur

S. No.	Infrastructure	Unit	Qty.
1	2	3	4
1	Primary School	No.	1
2	Junior High School	No.	1
3	Kanya Pathshala	No.	-
4	Public Health Center	No.	1
5	Vet nary Hospital	No.	-
6	Panchayat Ghar	No.	-
7	Post Office	No.	-
8	Agan Bari Center	No.	-
9	Electricity	-	Yes
10	Road	-	Yes
11	Pond	No.	2
12	Hand Pump	No.	19
13	Irrigation Well	No.	-
14	Canal	No.	1
15	Temple	No.	1
16	Well (Drinking Water)	No.	-
17	Pumping Set	No.	15
18	Toilet	No.	20
19	Market	No.	No

सामाजिक नक्शा ग्राम - वरकालपुर



Recorded importance of development institution

Farmers perception recorded for importance and role of different development institution in relation to infrastructure. Importance has been depicted with size of circle and role with distance from village circle. (Fig 8)

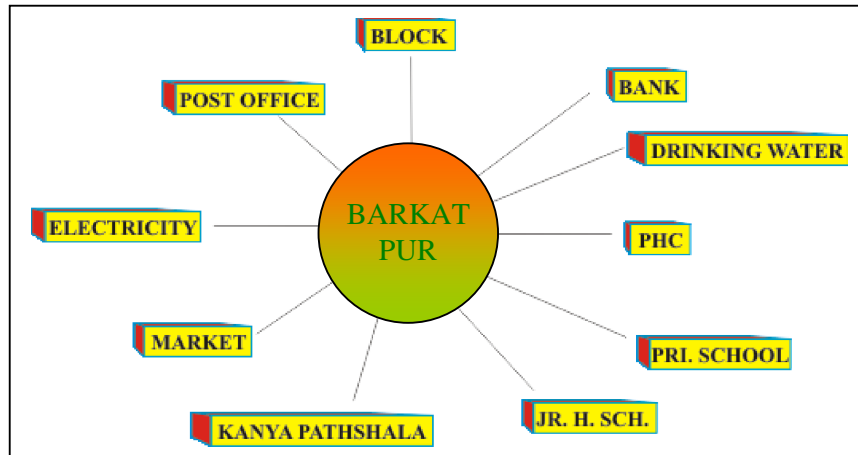


Fig. -8 (Venn diagram of Micro watershed)

(3.12) Communication :

Watershed can be approached from District Headquarter Bulandshahar to Project area 35 km. by Road.

(3.13) Natural Resource Base :

Transact of watershed showed typical land use profile consisting of plain agriculture land, erodic area and medium ravenous ridge. Main source of the irrigation are the canal for pre showing irrigation only. The total geographical area of the watershed is 574.00 Ha. classification.

Approach roads for the micro watershed is shown for the communication is shown on topo sheet map Fig 9 as next page.

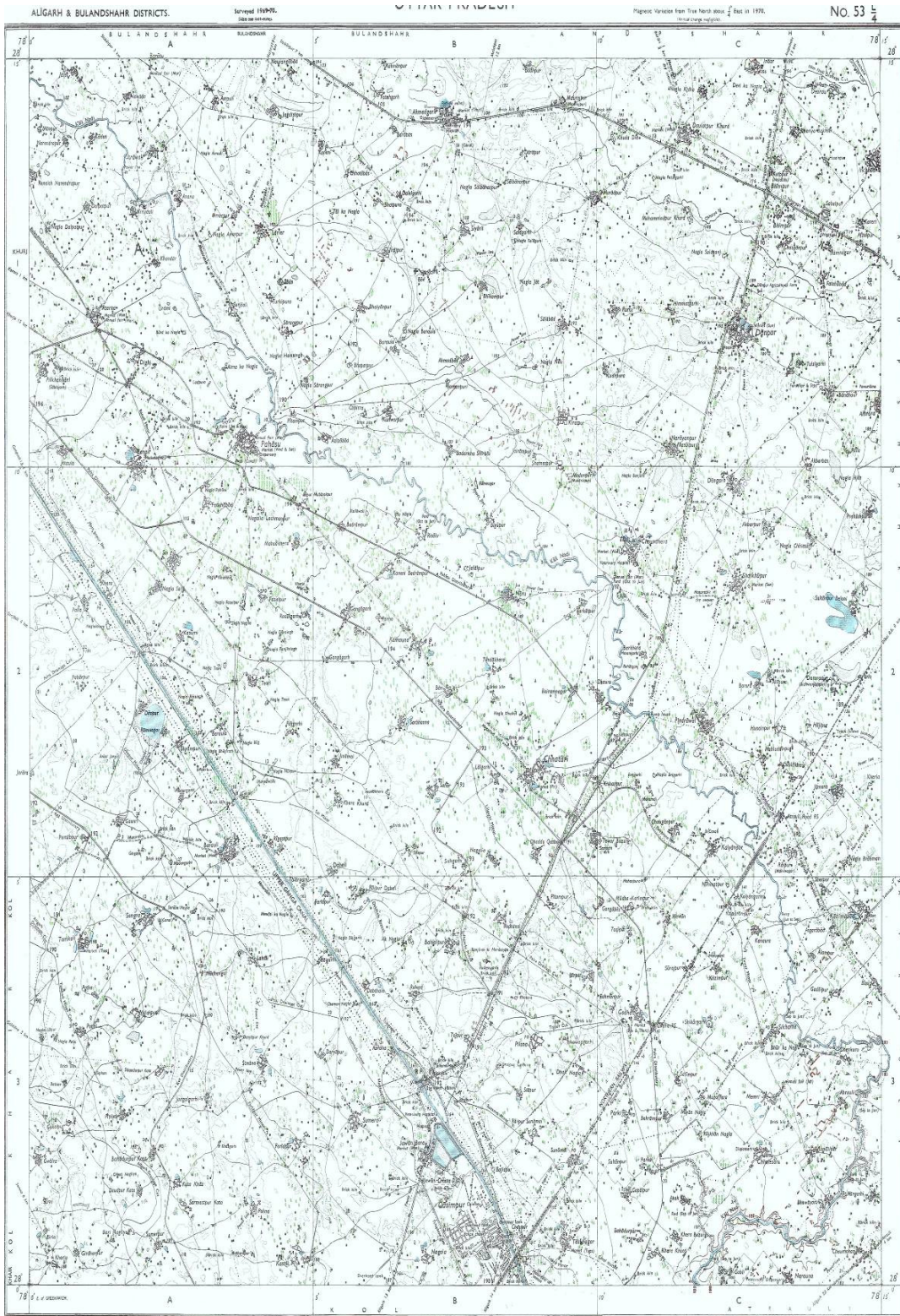


Fig.- 7 Communication Map on Toposheet

Table – 10 : Classification of area(Hect.)

S.No.	Name of Village	Unit	Total Geographical Area	Rainfed Area	Wasteland	Village Land and Road	Irrigation Resource	
							Water Bodies	Borewell
1	2	3	4	5	6	7	8	9
1	Barkatpur	Ha.	275.011	200.105	25.105	1.205	1.605	104.71
2	Baramnagar	Ha.	186.210	180.259	20.104	2.105	15.105	100.00
3	Ban	Ha.	20.150	15.105	2.105	1.005	-	-
4	Lalgarhi	Ha.	30.150	20.105	4.103	0.975	-	-
5	Dhaurau	Ha.	125.105	185.110	3.106	0.605	1.205	20.00
6	Cha	Ha.	60.00	32.105	3.205	1.822	1.608	4.00
7	Chodera	Ha.	40.00	40.115	2.105	2.975	2.506	2.00
8	Barkheda	Ha.	15.374	10.105	3.205	1.105	-	1.00
Total			852.00	683.00				

(3.14) Livelihood :

Total Population of the watershed is 8936 and out of the total population a majority more than 80% has farming as their major source of livelihood followed by labours, serviceman and small business class. Classified livelihood given in form as follows :

Table – 11 : Livelihood Classification in population :

S. No.	Name of Village	Farmer	Labour	In Service	In Local small business	Others
1	2	3	4	5	6	7
1.	Barkatpur	420	310	90	20	-
2.	Baramnagar	440	320	80	40	-
3.	Ban	435	310	90	35	-
4.	Lalgarhi	320	300	10	10	-
5	Dhaurau	400	280	20	100	-
6	Cha	515	280	80	120	-
7	Chodera	1323	300	600	223	-
8	Barkheda	295	500	80	15	-

(3.15) Dependency of forest fuel wood and fodder :

- a. **Fuel wood :-** The main source of fuel is from cow dung cake, woody stem of crops. About 70% of the climactic energy requirement is met from the agriculture by product and cow dung cake. Rest is met out from the forest outside the village and watershed boundary, most preferred fuel wood is Juliflora fuel wood Juliflora obtained from standing along and between watershed.
- e- **Fodder :-** Villages have not any sufficient signified dependency on forest based fodder as these resource are nothing availability in the forest.

(3.16) Labour requirement :

Labour requirements was found to be maximum at the time of October, November and December when the sowing of Rabi crops are done. The crucial periods are March and April coinciding harvesting and threshing of Rabi crops and July/August is sowing Kharif Crops take a little place. Other income generating enterprises having potential during the remaining.

(3.17) Crop Rotation :

Present Crop rotation in the watershed comprise of :

Kharif	-	Bajra	-	Rare
		Maize	-	Rare
		Jwar	-	Rare
Rabi	-	Fallow Wheat	-	Major
		Fallow Barly	-	Major
		Fallow Sugarcane	-	Major
		Fallow Mustard	-	Major
Zayad	-	Urad, Moong, Makka		

The above said Rabi Crops is the most prevailing crop rotation on the agriculture lands both in the rainfed and irrigated conditions.

Organized vegetable cultivation fruit plantation and traditional agro forestry systems are lacking as per requirement in the watershed the limited vegetable cultivation in the watershed is confined as kitchen gardens and field to the irrigated condition in a scattered manner. The cultivation of cash crops other than the sugarcane, wheat and mustard also in the watershed.

(3.18) Historical Events :

Chronological record of important events of the watershed village is prepared through participatory rural appraisal (PRA) which is very useful in understanding of its background and chronology is given as follows :

Table – 12 : Historical Events

S. No.	Events/Activities	Year	Rem.
1	2	3	4
1	Established	1845	
2	Opening of Primary School	1980-81	
3	Opening of Junior School	2000-2001	
4	Opening of Kanya Pathshala	-	
5	Opening of PHC	2004-05	
6	Opening of Vet. Hospital	-	
7	Panchayat Ghar	-	
8	Introduction of Tractor	1994	
9	Gobar Gas Plant	1998	
10	Thresher	1995	
11	First Tube well/Pumpset	1975	
12	First Motorcycle	1982	
13	T.V. & D.V.D. Players	2000-01	
14	Electricity in Village	2003-04	
15	Bituminous Road	2004-05	
16	First Hand Pump	1968-69	
17	Templo Renovation	1950-51	
18	First Land Line Telephone	2005-06	
19	Planning for Watershed Project	2010-11	

(3.19) Present Land Use in the Watershed :-

The watershed has diversified land uses. The varied present land use under different use in the watershed. The mixed land use followed in the watershed is almost similar in other parts of U.P. During P.R.A. Exercise prepared land has been shown in Table No. 13, 14 & 15.

Table – 13 : (Ownership)

S. No.	Name of Village	Pvt. Agri. Land		Govt. Revenu Land	Forest Land	Other Land
		S.C./S.T.	Others			
1	2	3	4	5	6	7
1	Barkatpur	15.20	241.235	-	-	-
2	Baramnagar	-	118.723	-	-	-
3	Ban	3.25	13.755	-	-	-
4	Lalgarhi	1.75	25.392	-	-	-
5	Dhaurau	4.25	54.855	-	-	-
6	Cha	2.75	198.354	-	-	-
7	Chodera	4.75	29.865	-	-	-
8	Barkheda	1.05	13.255	-	-	-

Table –14 : (Present Land under different categories)

S. No.	Name of Village	Land Use (Ha.)				
		Agricultural	Wasteland (All Types)	Seasonal waterbodies	Village/Road Etc.	Total
1	2	3	4	5	6	7
1	Barkatpur	256.435	25.105	-	1.265	282.805
2	Baramnagar	118.723	20.104	-	2.105	140.432
3	Ban	17.005	2.105	-	1.005	20.115
4	Lalgarhi	27.142	4.103	-	0.975	3.222
5	Dhaurau	59.142	3.205	-	0.605	62.915
6	Cha	29.104	3.106	-	1.822	34.082
7	Chodera	34.115	2.105	-	2.975	38.037
8	Barkheda	14.305	3.205	-	1.105	18.615

Table – 15 : (Present land use classified)

S. No.	Land Use Under	Unit (ha.)	Area (Ha.)	Percentage
1	2	3	4	5
1	Under Agriculture			
	A- Rainfed-			
	I- Crops	Ha	492.50	70%
	II- Agro forestry	Ha	52.25	8%
	B- Irrigated-		-	
	I- Assured	Ha	-	
	II- Portial	Ha	121.65	18%
2	Wasteland			
	A- Aforestation	Ha		
	B- Pasture	Ha		
	C- Untreatable	Ha		
	D- Treatable	Ha	160.92	100%

n given on Page No. 32

4- Focus on Present Land Use :

(4.1) Agriculture :

The total area under agriculture in the watershed is about 487.89 ha. out of which 574.00 ha. is under rainfed agriculture. Agriculture land uses in the watershed extended to diversified land capabilities starting marginal to good class II land. The irrigated and drinking water is most scarce natural resource in the watershed. The operation of tube well for irrigation of agricultural crops frequently leads to the drinking water. Problem to the farmers of watershed forcing them to carry drinking

water from outside of the watershed area. The agricultural field bund are common in the watersheds however they frequently breach on heavy rains.

Various mixed texture of soils are located in patches through out the watershed. The heavy soils are almost kept fallow during rainy season. the agricultural soils also have some as share calcium pan at variable depths. The irrigation water is conveyed by the earthen channels. Surface irrigation methods following mainly border method of flood method by the formers in the watershed. These factors reduce the water use efficiency of limited and valuable irrigation water.

Drought hardy species like Juliflora suitable multi purpose trees is suitable for rehabilitation of the wasteland. Rehabilitation of waste lands promoting agro forestry with appropriate fruit and forest species suitable vegetative barriers on sloppy lands can be high future value and by these adoption would be meet out many demands of fire wood and fodder in the wasteland. Except above but also for soil and water conservation, rehabilitation of wasteland and sustainable income generation for socio-economic upliftment of farmers.

Crop Productivity :

The farmers also do not have suitable cropping system to deal aberrant weather. Weeds impose considerable constraint in productivity of both Karif and Rabi crops under irrigated as well as rainfed production system farmer undertake normally one manual weeding in mustard and other valuable crops however, practices is energy and time consuming. Use of we decide is rare in the watershed.

In the watershed area, limited cropping in the Kharif with mixed cropping practices is not only irrigational but also unscientific and best for low productivity. Subsequent Rabi crops in general. Sugarcane & Mustard crop in particular are raised on residual soil moisture under rainfed production system during post mansoon season.

(4.2) Indigenous Technological Knowledge (ITK) :

Under process of PRA tracked out rural applying technology in various field of local technology and some technology is very popular in village. In which the agriculture is an old traditional practices of farmers who have improved themselves with passage of the time according to their domestic needs and technological reforms in the nearby areas. The villages have their traditional village ponds, practice of field bunding which typically constitute agricultural related ITKs in the watershed. The

Mustard & sugarcane being a cash and firewood crop of the watershed and also sugarcane crop is being. Cultivated in self designed manner by the farmers. Its carried out that the area is totally depend on rain and under the rainfed area technology is applied by the farmers. However limited fertilizer application specifically the DAP came in the practices since about 15-20 years.

(4.3) Forest and Other Vegetation :

Forest :

The watershed have a tract of wasteland area which are under uncultivable position is liesed in the watershed. These wasteland have not any tree vegetation or very less than real requirement for the wasteland use.

Horticulture/Agro forestry :

Horticulture and agro forestry practices were observed in the watershed.

(4.4) Agro forestry :

Agro forestry practices are lacking in the watershed. Though it has good potential under existing disposition and may a role particularly with respect to minimization of cropping risk, built up soil fertility and productivity, protection of soil erosion, soil conservation partly meeting out the fire wood demand of rural community and more over optimizing the economical return from system as whole under typical semi arid climate in the watershed. Bund and boundary plantation also have good potential to care the fire wood and fodder demands of the rural community in the watershed. The existing area under agro forestry is almost negligible. Prosopis Jhliflora may be planted as block or sole plantation specifically on marginal and degraded land in the watershed.

The agro forestry interventions comprising of ber, bail, aonla, guava, papular etc. may be applied for benefit of the farmers under rainfed to irrigation production system on leveled to slopping and marginal agricultural using proper planting techniques and term it control measures.

The multipurpose trees may be also help in supplementing fire wood and fodder demands of the rural community in the watershed and my be planted as hedge rows on rainfed, marginal and degraded lands.

(4.5) Horticulture :

Fruits and vegetables practices are lacking in the watershed area. Its practices may be sustainable very good potential for the formers of watershed. There are a

limited lack fruit trees in number like mango, guava, lime, ber, aonla and papaya fruit trees well as vegetables like radish, okra, tomato, cabbage, garlic, onion, chilly, brinjal and cucurbits but they are found surviving well in the watershed villages. Organized orchards (vatika) commercial vegetable cultivation horti-agri and other systems of agro forestry etc. are lacking but have good agriculture.

5. Soil and land capability classification :

(5.1) Soil Morphology :

Watershed is located North East corner of Bulandshahr Distt. near about 55 Km. away. The entire terrain of watershed is topographically divided into various land forms. Accordingly the soils of watershed have been grouped major categories is given as follow :

Hill Terrain	Plane Land Sloppy	Undulated Land	Rill Erosic Land	Moderate ravenous
-	25%	20%	15%	6%

Given categories in the blocks is located the soil morphology in the watershed areas. Representation of soil characteristics by soil profile is represented as follows :

Soil Profile :

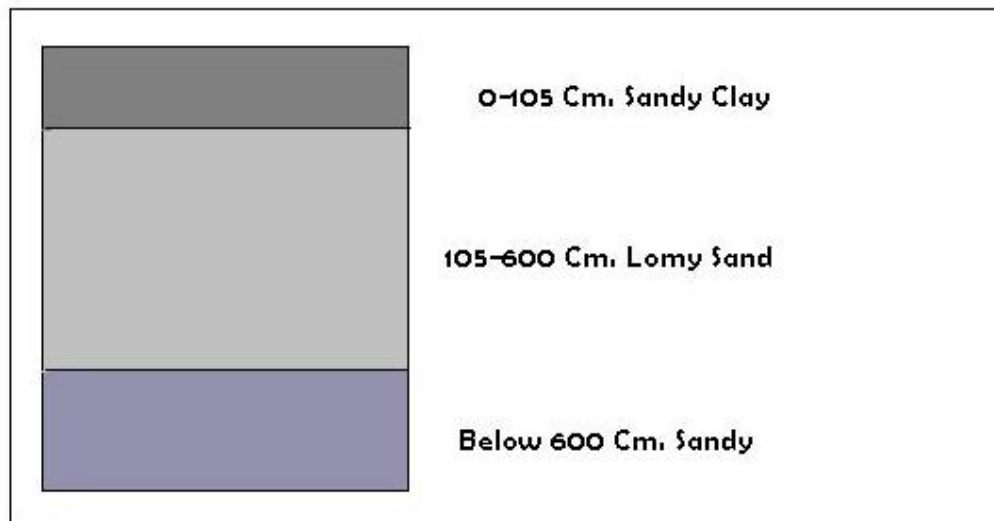


Fig. – 9 (Soil Profile)

Table – 16 : (Morphology of a Typical Soil Profile) :

Horizone	Depth in Cm.	Morphology
1	2	3
A V & H	0-150	Silky when moist, Hard when dry quick soluble, high elasticity, fissures, and cracks, occasional occurrence of free calcium carbonate granules black in colour, clay content 29%, PH- 8 to 8.7
B V & H	150-160	Whitish yellow in colour, very fine mixed with free cacaos and gravels, Hard when dry compact and indurate hard pan restricting development of root and down ward water transmission.
C V & H	7600	Red and white sand stone

(5.2) Soil and Characteristic and Fertility Status :

Soil characteristic pertaining to soil fertility of various classes accruing around villages in the watershed are given as follows :

Table – 17 : Soil Characteristic & Fertility Status :

Sl. No.	Soil Properties	LCC-II	LCC-III & IV
1	2	3	4
1	Sand %	48.05	76.05
2	Silt %	65.62	19.02
3	Clay %	29.30	6:3:6
4	Texture	Sandy Clay	Lomy Sand
5	PH (1:2)	8.56	9.01
6	Organic Carbon %	0.42	0.13
7	Available N Kg ha ⁻¹	318	174
8	Available P Kg ha ⁻¹	30	16
9	Available K Kg ha ⁻¹	190	326
10	EC (dS m ⁻¹)	0.48	0.13

(5.3) Land Capability Classification (LCC) :

Land capability classification (LCC) was done to classification the soils in different groups based upon the limitations and to emphasize the hazards prevailing in the watershed in order to find out the different topo-sequences, landforms, soil depth and erosion hazards. This was followed by the detailed investigation of selected landforms to bring out the LCC classes of the Watershed. Classes of land capability namely II, III, IV and V are demarcated in the watershed. The areas under different classes are sown as follows :

Table – 18 : Land Capability Classification (LCC) :

S. No.	Land capability class	Area in Ha.	Colour
1	2	3	4
1	I Class	-	-
2	II Class	108.105	
3	III Class	425.400	
4	IV Class	108.150	
5	V Class	86.279	
6	VI Class	-	
7	VII Class	-	
8	VIII Class	-	

Land capability classification of various agricultural practices under land use can be classified as groups, class, sub class and units. Utilization of various land class is given as follows :

Table – 19 : Utilization of various land uses

S. N.	LCC	Forestry	Ltd. Grazing	Light Grazing	Dense Grazing	Limited Agriculture	Light Agriculture	Dense Agriculture	More Dense Agriculture
1	I								
2	II								
3	III								
4	IV								
5	V								
6	VI								
7	VII								
8	VIII								

(5.4) Land Capability Class II & III :

This group is one of the most extensive LCC watershed. and also near to class III for the agricultural practices. The soils are sandy & sandy loam in texture. The land under this class is nearly level to mild sloping (1-3%). The soils are deep and erosion hazard is slight. Most of the productive agriculture land comes under class II & III. These lands potentially very productive but due to rainfed a single cropping pattern is in habitation.

(5.5) Land Capability Class IV :

This class is found in lower portion near the outlets of watershed. The soils are coarser in texture, deep, erosion hazard and undulating in topography. Rill and initiation of gully can be seen near the outlet of the watershed.

(5.6) Land Capability Class VII & VIII :

This class of land is not found in watershed. Somewhere lack of soil are found with admixture gravels fragments in these classes of lands.

(5.7) Conclusions :

The majority of land form is coming under class II, which give an insight of good agriculture production potential of the watershed.

The land capability classification provides reasonable good information with regard to capability of soil, that could be used for agriculture, agrihorticulture, silviculture and posture development.

The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like bunding practices.

The reasonable area is under watershed of wasteland and other wasteland including grater potential of this watershed for forestry and pasture development. Rare places namely water body of low portion of land area under seasonally works as water harvesting structures and these harvested water is used or can use for some other beneficial activities during the crop season also.

6. Problems and needs of the watershed indentified during the PRA

(6.1) Problem Identification and prioritization :

p- The are has undulating topography, steep unstable slopes, gradient of excessive branches of rills and hence highly prone to soil erosion.

q- Major issues addressed to food sufficiency economic growth and environmental security in the watershed area.

- r- Effective soil depth is limited and highly variable hampering good crop growth.
- s- The watershed have low productive cropping due to tradition single cropping pattern and over all average crop production percentage not sufficient against requirement.
- t- Identified that there is no assured irrigation system has been development capacity of water bodies are reduced due to silt ration which are utilized to store of rainy water and they are renovatable.

(6.5) Transact walk during the PRA :

Problems identified and prioritized during the transact walk and PRA exercises in all comprised villages of watershed. There were pooled and a list of problems representing the whole watershed was prepared. Problems were ranked as per their total weight age in the watershed village.

Table – 20 : Ranking of Problem identification and prioritization of watershed

S.No.	Problem	Rank
1	2	4
1	Lack of irrigation	7
2	Lack of drinking water	5
3	Low production of field crops	4
4	Lack of fodder availability and low productivity	5
5	Lack of availability of fuel wood	6
6	Lack of market facility	4
7	Lack of quality seeds, fertilizer, pesticides etc.	8
8.	Medical and Health care facilities for milching animals and low productivity.	7
9	Lack of medical, educational and transportation facilities	8
10	Lack of water bodies renovation	2
11	Lack of run of earthen check bunds	2
12	Lack of water harvesting structures	3
13	Lack of livelihoods opportunity	3

Prioritized ranking (Upto four Numbers) :-

- 10- Lack of earthen check bunds.
- 11- Lack of livelihood opportunities.
- 12- Lack of irrigation water was the greatest problem. Lack of irrigation water problem experienced by the people followed by low crop production.

(6.3) Analysis of SWOT of the watershed :

Strength (S), Weakness (W), Opportunity (O) and Threat (T) analysis is a useful decision support tool. A SWOT analysis of watershed is presented as follows :

SWOT analysis of the watershed

<p style="text-align: center;">Strengths (S)</p> <p>xxx. Cooperative work culture in traditional activities xxxii. Close ethnic ties xxxiii. Road at the top as well as outlet of the watershed xxxiv. Hard working xxxv. Resource pool of crop genetics diversity xxxvi. Awareness of farmers about watershed management programme xxxvii. Well established CPR maintaining and sharing system xxxviii. Stall feeding of animals xxxix. Well maintained seasonal water bodies xl. Social outlook of the community towards land less</p>	<p style="text-align: center;">Weakness (W)</p> <p>xxviii. Poor water management xxix. Resource poor farmers xxx. Out migration of youth xxxi. Low and erratic rainfall xxxii. Fragile geology xxxiii. Fragmented land holding xxxiv. Heavy infestation of wild animals xxxv. Problem of fuel and fodder xxxvi. Shallow soil depth and with high percentage of gravel</p>
<p style="text-align: center;">Opportunities (O)</p> <p>xix. Wide range of annual and perennial crops xx. Scope of regular employment opportunities to check out migration xxi. Strengthening of existing irrigation system xxii. Conducive climate for rainfed crop diversification xxiii. Good scope for Agro forestry and dry land horticulture xxiv. Potential for collective action and management of CPR</p>	<p style="text-align: center;">Threats (T)</p> <p>xvi. Prone to adverse climate like drought xvii. High market risk xviii. Social conflicts owing to PRI and WSM policies and local politics xix. Weak coordination among line departments xx. Lack of expertise of implementing agency in different aspects of WSM</p>

7. Proposed land use for the watershed :

Watershed management plan preparation due importance is given to topographic, land suitability, irrigation potentially, prevailing farming systems, micro farming situation, farming, farmers preferences and priorities along with economic and environment securities.

Crop and tree selection and area distribution was done as per farmers priorities revealed through PRA exercise.

The watershed management plan for watershed is prepared with specific objectives of food sufficiency, income and employment generation with environment security.

Technical options were with the ITK based on the latest available experiment findings. Due attention was given to the resource of the farmers and adjustments were made in capital intensive resource demanding technological outputs while making them adoptable to the resource poor farmers. Emphasis was given on maximum use of farm yard manure. The proposed land use plan of the watershed is shown as follow as in table

Table – 21 : Present and proposed land use plan of the watershed

S.No.	Land use	Present (ha)	Proposed area (ha)
1	2	3	4
1	Agriculture		
a	Rainfed		
	I Crops	492.500	520.105
	II Agro-forestry	52.25	60.105
b	Irrigated		
	I Assured		
	II Partial	121.650	142.165
2	Waste land	-	
a	Aforestation	-	
b	Pasture	-	
c	Untreatable	77.00	
d	Treatable	775.00	775.00
3	Village land	852.00	852.00

(7.1) Status of Present Water Resources Utilization :

Watershed is having some canal system. Management and maintenance of these canal are required. Before sowing of Rabi crops, water from these canal is issued as supplementary irrigation for Rabi sowing ar allowed to go as waste. After releasing water from canal, submergence area also put under cultivation.

Some where bore well irrigation applied by the farmers in the watershed.

(7.2) Proposed Plan for Irrigation Development :

- a- Present system of irrigation and wastage of water during October–November need to be made more efficient from water management point of view by minimizing conveyance losses in the existing water courses.
- b- Present irrigation canal capacity have to build up by the reform. Which are lack capacity of water.
- c- Construction of new water harvesting earthen structures, Pucca Check Dem, Series Gully Plugging, etc. has been sloppy portion to increase irrigation potential and for recharging of ground water, soil and moisture conservation maximum field irrigation, best production and expected change of crop rotation.
- d- The up gradation of the exciting system of irrigation will result in :
 - i- Minimization of conveyance losses.
 - ii- Increase in frequency of irrigation.
 - iii- Adoption of high yielding varieties of crops.
 - iv- Assured cultivation of cash crops.
 - v- Capacity buildup by the planning of new water harvesting structures.

(7.3) Ground Water Recharge :

For the purpose of ground water recharge, the area of the upper side of watershed is recommended for Field Bunds, Contour Bunds, Peripheral Bunds and Submergence Bunds and in the lower portion Contour Staggered Trenches, Gully Plugs, Earthen Check Dem and Pacca Outlets. In the undulated sloppy portion of the watershed recommended water harvesting structure for dual purpose as ground water storage and under ground water recharge.

(7.4) Crop Production :

Practices proposed in the watershed is given as follows :-

- a- Mulching and crop residue management.
- b- Application of green manuring.
- c- Vermi Composting.
- d- Crop rotation and inter cropping.
- e- Biofertilizers.

(7.5) Tillage Operation :

Deep tillage technology is proposed to apply to be demonstrated for benefit of farmers in the watershed.

(7.6) Improved Seeds of High Yielding Verities (H.Y.V.) :

Recommendation of improved varieties is necessary for improving the productivity and farm income. Through replacement of low yielding traditional verities of seeds in villages of watershed.

(7.7) Balanced Fertilizer Use :-

Demonstration of use of fertilizer in various crops of watershed recommended balance fertilizer use in different crops will be benefited of forming community.

(7.8) Control of insects and diseases :

Aphid in the mustard 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 pest and diseased will also be demonstrated in the watershed for benefit of the growers.

(7.9) Dry Land Horticulture :

Such portion of dry land in which proposed horticulture development planning recommended species like Ber, Bel and Aonla will be planted at suitable spacing in the watershed.

(7.10) Agri Horticulture :

Aonla and Sahjan would be suitable horticultural crops to the locality. Therefore, a part of land in the farmer field shall be selected and brought under Agri-horticulture system. The cropping system followed will be Jwar and Wheat.

(7.11) Plantation (Fuel wood) :

Such a portion which are under wasteland will be taken falling in the class-IV category in the watershed. These lands will be planted with species like Vilayati Babool (Prosopis Juliflora), Babool (Acacia Nilotica), Karanj (Pangamia Glabra).

9. Socio Economic Analysis of the of the Project :

(9.1) Sustainability and environment security :

The proposed land use plan will improve the land utilization index and crop diversification index significantly as compared to the existing one. in the proposed watershed management plan proper blending of the bio engineering measures will be applied on above 80% of the total area of watershed. It is estimated that more than above 70% of the watershed area will be treated and consequently the soil loss and runoff from the area is expected to be reduced by 70% respectively.

It will help in maintaining ecosystem integrity on sustained basis along with improving the livelihood security of the farming community.

(9.2) Economic Analysis :

Economic analysis of the project was carried by taking direct benefits and costs considering 10 years for project life at 10% discount rate. Whole watershed development plan was divided into three sector as agriculture, horticulture and forest/Fuel wood plantation. Net Present Value (NPV) and Benefit Cost ratio criteria were applied judge the economic efficiency of each enterprises and sector. Net present value (NPV) of the project life is considered to be 10 years and discount rate for NPV estimation is 10% is given NPV and benefits as follows :-

Table – 22 : Present productivity income analysis :

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	3.00	4300.00	12900.00	6450.00	6450.00	1:1
		Moong	3.00	4500.00	13500.00	6075.00	7425.00	1.22:1
		Jwar	4.80	600.00	2880.00	1584.00	1296.00	0.82:1
		Wheat	18.50	1000.00	15725.00	8650.00	7075.00	0.82:1
		Pea	7.50	2250.00	16875.00	10970.00	5905.00	0.54:1
		Mustard	3.50	1850.00	6475.00	3235.00	3240.00	1:1
Total		-			105105.00	54105.00	51000.00	0.94:1
Average		-			13138.00	6763.00	6375.00	0.94:1
B	Forestry	Vilayati				15000.00	-	Nil
		Babool						
C	Horticulture	Ber				20000.00	-	Nil
		Aonla				20000.00	-	Nil
		Bel				20000.00	-	Nil
Total		-				60000.00	-	Nil
Average		-				20000.00	-	Nil
Grand Total								

Table –23 : Post productivity and income analysis for Post Productivity

Value and B.C.:

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	4.00	5000.00	20000.00	8325.00	11615.00	1.39:1
		Moong	4.00	5000.00	20000.00	8200.00	11800.00	1.44:1
		Jwar	5.50	800.00	4400.00	1900.00	2500.00	1.32:1
		Wheat	25.00	1000.00	25000.00	11680.00	13320.00	1.14:1
		Pea	9.50	3300.00	31350.00	14810.00	18540.00	1.12:1
		Mustard	5.00	2500.00	12500.00	4370.00	8130.00	1.86:1
Total		-	-	-	172250.00	72845.00	99765.00	1.38:1
Average		-	-	-	21531.00	9061.00	12471.00	1.38:1
B	Forestry	Vilayati Babool	80.00	500.00	40000.00	15000.00	25000.00	1.67:1
C	Horticulture	Ber	35.00	1500.00	52500.00	20000.00	32500.00	1.63:1
		Aonla	35.00	2000.00	70000.00	20000.00	50000.00	2.50:1
		Bel	40.00	1500.00	80000.00	20000.00	40000.00	2:1
Total		-	-	-	182500.00	60000.00	122500.00	2.04:1
Average		-	-	-	60833.00	20000.00	40833.00	2.04:1
Grand Total		-	-	-	1394750.00	147485.00	247265.00	1.68:1

Table –24 : Summary of NPV, PPV and B.C. Ratio (Sector wise) :

S. No.	Name of Sector	NPV		PPV		B.C. Ratio
		Expend.	Net Income	Expend.	Net Income	
1	2	3	4	5	6	7
1	Rain fed Agriculture	54105.00	51000.00	72485.00	99765.00	1.38:1
2	Forest/Fuel wood Plantation	15000.00	-	15000.00	25000.00	1.67 : 1
3	Horticulture	60000.00	-	60000.00	122500.00	2.04:1
Total		129105.00	51000.00	147485.00	247265.00	1.68:1

(9.3) Economics of Agriculture Sector :

The development cost can be recovered by the adoption of plan in present rain fed agriculture is being done on well maintained field, therefore does not require much investment. In rain fed agriculture, investment of Rs. 44.50 lacs is proposed to made is given as follows :

Table – 25 : Economics of Agriculture Sector :

S. No.	Name of sector	Name of Activities / Plan	Treatable Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Rainfed	Soil, moisture and water cons works	775	442.258	1052.564	610.30	1.38:1

(9.4) Economics of forest fuel wood plantation :

Economic analysis of fuel wood plantation in the watershed. Project life is considered to be 20 years and discount rate for NPV estimation is 10 % is followed and as is given follows :

Table –26 : Economics of forest fuel wood Plantation :

S. No.	Name of sector	Comman Name of Plant	Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Forest Fuel wood sector	Vilayati Babool (Prasopis Juliflora)	25.00	2.50	6.675	4.175	1.67 : 1

(9.5) Economics of Horticulture Sector :

Economic analysis of Horticulture Plantation in agri-horti system and on wasteland patches of watershed project, life is considered about 15-20 years and discount factor rate for NPV estimation is 10% is follows :

Table – 27 : Economics of Horticulture system :

S. No.	Name of Sector	Common name of Plants	Area (Ha.)	NPV (Lacs)	Post Productive Value (Lacs)	Benefit Lacs	B.C. Ratio
1	2	3	4	5	6	7	8
1	Horticulture	Ber (zyziphus mouritana)	4.00	0.80	2.104	1.304	1.63: 1
		Aonla (Embelica officianalis)	3.80	0.76	2.660	1.90	2.5 : 1
		Bel (Aegle marmelos)	2.20	0.44	1.320	0.88	2 : 1
Total			10.00	2.00	6.084	4.084	2.04 : 1

(9.6) Food requirement and sufficiency :

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

Table – 28 : Status of food requirement and availability of per annual :

S. No.	Name of Foods	Requirement Q./Yr.	Present Status		Expected Post Status	
			Availability Q./Yr.	Deficit or surplus Q./Yr.	Availability Q./Yr.	Deficit or surplus Q./Yr.
1	2	3	4	5	6	7
1	Cereals 110 Kg.	27105	23039	4065	46078	18973
2	Pulses 36.50	8993	4946	4047	76187	7194
3	Oil Seeds 29.20	7195	2878	4316	11512	4317
4	Vegetable 71 kg	24423	4484	19939	43691	19538.00

(9.7) Employment generation :

One of the major problem of the labour migration in watershed project. By the implementation of the project activities employment opportunities will be generated. However the changes in land use pattern and adoption of other subsidiary enterprise will generate employment opportunities in the watershed as given in table follows :

Table – 29 : Employment generation under proposed works :

S. No.	Employment activities/works	Area under work	Cost	Mandays generation (Nos.)			
				Unskilled	Skill	Total	Person
1	2	3	4	5	6	7	8
2	Graded Contour Bund	90	2.70	2700	-	2700	90
3	Gully Plug, C.D.	148	11.10	3770	181	7951	265
4	Submergence Bund	126	5.04	5040	-	5040	168
1	Peripheral Bund	125	4.375	4375	-	4375	146
5	W.H.B.	155	13.95	8370	474	8844	294
6	Renovation of Bund	96	2.88	2880		2880	96
7	Reno. of W.H.B.	-	-		-	-	-
8	Community Pond	-	-		-	-	-
9	Afforestation	25	4.45	891	-	891	30
10	Horticulture	10	2.00	400	-	400	13
Total		775	46.50	32426	655	33081	1102

10. Formation of watershed committee :

Under compliance of common guideline Para (6.3) is followed and by the help of watershed development team, watershed committee is organized in the micro watershed village Ranayach Narendrapur with 10 members as prescribed in common guide line. List for organization of W.C. village details given as follows :

Table – 30 : Details of comprised village W.C. organization in M.W.S. :

S. No.	Particulars	Details	Block	Geographical Area
1	2	3	4	5
1	Micro watershed code	3B3E3c2b	Pahasu	852.00
2	Name of Gram Panchayat in M.W.S.	Barkatpur		

Table – 31 : List of organized W.C. for the Gram Panchyat Barkatpur in watershed.

S. No.	Name of selected members	Age	Representation Members from	Post	Qualification	Village
1	2	3	4	5	6	7
1	Smt. Vijay devi	50	Gram Sabha	President	Sakshar	Barkatpur
2	Uday beer	45	Gram Sabha	Secretary	Sakshar	Barkatpur
3	Mohanlal	54	WDT	Member	PHD Ag.	Barkatpur
4	Harbanse	52	S.H.G.	Member	Sakshar	Barkatpur
5	Raghuraj	30	S.H.G.	Member	Sakshar	Barkatpur
6	Ahmad Hasan	35	U.G. group	Member	Sakshar	Barkatpur
7	Harpal	42	From U.G	Member	Sakshar	Barkatpur
8	Omprakash	45	From U.G	Member	Sakshar	Barkatpur
9	Bhawani	45	S.C. Female	Member	Sakshar	Barkatpur
10	Manak Chand	35	S,C. Landless	Member	Sakshar	Barkatpur
11	Vyas Rai	54	Frpm PIA	Work	Sakshar	Barkatpur

(10.1) Formation of Self Help Groups in M.W.S.

By the help of watershed committee and watershed development team self help group are formatted / organized. Families and persons are selected from poor, small and marginal farmers families, landless poor families, agriculture labour families, women, herdsman and shepherd and S.C. families in the formatted self help groups are given as follow :

Table – 32 : Ganga Ji Self help group – Barkat Pur .

S. No.	Name of member in formatted SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Harbans	40	SC	Livestock	New
2	Ahmad Hasan	35	BC	Livestock	New
3	Ghasi	45	BC	Livestock	New
4	Rajesh	50	BC	Livestock	New
5	Yadram	50	BC	Livestock	New
6	Jagdish	45	SC	Livestock	New
7	Raju	32	SC	Livestock	New
8	Lakhpal	35	BC	Livestock	New
9	Rinku	45	BC	Livestock	New
10	Nowat	50	BC	Livestock	New

Table – 33 : Self help group Barkatpur (Goat)

S. No.	Name of member in formed SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Kalu	30	General	Livestock	New
2	Dharpal	40	BC	Livestock	New
3	Rajendra	60	BC	Livestock	New
4	Raju	50	BC	Livestock	New
5	Suresh	70	BC	Livestock	New
6	Sumwarpal	55	BC	Livestock	New
7	Tatiram	40	BC	Livestock	New
8	Bedram	40	BC	Livestock	New
9	Ram Kumar	35	BC	Livestock	New
10	Mahesh	35	BC	Livestock	New

Table – 34 : Self help group in Barkatpur village of watershed.

S. No.	Name of member in farmated SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Jaipal	50	SC	Live Stock	New
2	Omprakash	45	SC	Live Stock	New
3	Manak Chand	35	SC	Live Stock	New
4	Harish Chand	40	SC	Live Stock	New
5	Lekhraj	40	SC	Live Stock	New
6	Bhawani	45	SC	Live Stock	New
7	Jaiwanti	43	SC	Live Stock	New
8	Lajawati	44	SC	Live Stock	New
9	Nahar Singh	35	SC	Live Stock	New
10	Manohar	44	SC	Live Stock	New

Formation of User's Groups :

User's groups are formed by the help of watershed committee and watershed development team in the micro watershed comprised villages. Farmers which have land village are involved in the User's groups and they will be directly benefited as expected by the implementation of watershed project. Easy and convenient conditions are made to resource use between user's groups and they will be responsible to operate and maintenance for the created assets in the watershed. Nos. of formed user's groups details are given as follows :

Table – 35 : Village wise user's groups

S. No.	Name of village	No. of groups	No. of farmers	Total Agri. Land	Area under treatment	Cost of assets
1	2	3	4	5	6	7
1	Barkat pur	1	10	256.435	240.050	-
2	Dorau	2	10	201.104	184.105	-
3	Barkatpur	3	10	256.435	240.050	-

10. Estimation and Costing of Proposed activities of the watershed Project Year 2009-

10.

Proposed works / activities for the Project Period (Year 2009-10) under proposed treatable area 635.00 Ha. Out of total Geographical area 906.61 Ha.

(10.1) Financial and Physical Outlets :**Table – 36 : Financial and Physical Outlets for the Year 2009-10 :**

Sl. No.	Components	Unit cost per ha.	Physical ha.	Financial (Lacs)			Man-days Generation
				Labour Component	Material Component	Total	
1	2	3	4	5	6	7	8
A	Management Cost 10%						
1	Administrative Cost – TA & DA Hiring of Vehicles, Official Expenditure Electricity & Phone bill Computer, Stationery and office consumable materials & contingency	1200	-	-	930.	9.30	-
2	Monitoring	120	-	-	0.93	0.93	
3	Evaluation	120	-	-	0.93	0.93	
	Sub Total	1440		-	11.16	11.16	
B	Preparatory Phase 10%						
1	Entry Point Activities 4%	480	-	0.744	2.976	3.720	744
2	Institutional & Capacity Building 5%	600	-	-	4.65	4.65	
3	Detailed Project Report 1%	120	-	-	0.930	0.930	
	Sub Total	1200	-	0.744	8.556	9.30	744
C	Watershed Work Phase						
a	Watershed Development Works						
1	Graded, Contour & Field Bunds	3000	90	2.70	-	2.70	2700
2	Gully Plug, Earthen Checkdam /WHS	7500	148	7.77	3.33	11.10	7951
3	Submergence bunds	4000	126	5.04	-	5.04	5040
4	Peripheral Bund	3500	155	4.375	-	4.375	4375
5	Earthen Water Harvesting Bund	9000	96	8.37	5.58	13.95	8844
6	Renovation of existing Bunds	3000	-	2.88	-	2.88	2880
7	Renovation of existing W.H.B	-	-	-	-	-	-
8	Aforestation and Development of silvi postural system	13500	25	0.891	3.564	4.455	891
9	Dry Land Horticulture	20000	10	0.40	1.60	2.00	400
10	Community Pound (Renovation)	-	-	-	-	-	-
	Sub Total	6000	775	32.426	14.074	46.50	33081
B	Livelihood Programme (Community Based) 7.620						
	Income generating activities through SHG's for landless and marginal farmers 10%						
1	Live stock development activities	200	-	-	1.5503	1.5503	-
2	Bee Keeping	100	-	-	0.7746	0.7746	-
3	Poultry Farming	200	-	-	1.5503	1.5503	-
4	Nursery Development	300	-	-	2.3253	2.3253	-
5	Vegetable Production	100	-	-	0.7746	0.7746	-
6	Milk Dairy Promotion Unit	200	-	-	1.5503	1.5503	-
7	Establishment of Vermi compost Unit	100	-	-	0.7746	0.7746	-
8	Sub Total	1200	-	-	9.30	9.30	-
C	Production System and micro Enterprises						
1	Crop production, diversification of agriculture and introduction of agro forestry	1170	-	-	9.0675	9.0675	-
2	Demonstration of improved composting system	390	-	-	3.0225	3.0225	-
	Sub Total	1560	-	-	12.09	12.09	-
D	Consolidation Phase 5% Sub Total	600	-	-	4.65	4.65	-
Grand Total		12000	-	32.17	59.83	63.00	33825

:-: संकल्प पत्र :-:

ग्राम पंचायत:- बरकातपुर, कोड सं०- 2B3E3c2b विकास खण्ड- पहासू जिला- बुलन्दशहर

यह कि आई०डब्लू०एम०पी० परियोजना में तैयार की गयी निर्माण की नयी सृजित परिसम्पत्तियों को ग्राम पंचायत चौडेरा एवं माइकोवाटरशेड के अन्तर्गत सम्मिलित ग्रामों में योजना क्रियान्वयन कराने एवं योजना उपरान्त चालू रखने तथा सुजित परिसम्पत्तियों के अनुरक्षण हेतु कृत संकल्प एवं इच्छुक है।

बरकातपुर ग्राम पंचायत के सभी स्रोत स्थल जैसे तालाब ग्राम सभा गोघर (चारागाह) जल संसाधन, जंगल आदि में भूमि विकास परियोजना के अन्तर्गत किये जायेंगे। उन कार्यों को समाज के कमजोर वर्ग जैसे अनुसूचित जाति/जनजाति, महिला वर्ग एवं अल्प भूमिहीन गरीबी रेखा के नीचे के लाभार्थियों को लाभ पहुंचाने हेतु इच्छुक होंगे।

हम योजना संचालन हेतु प्रस्तावित करते हैं एवं सहमति देते हैं कि भारत सरकार के समस्त मार्गदर्शी सिद्धान्तों के अनुपालन में कार्य सम्पन्न करायेगे। यह भी घोषित करते हैं कि चयनित क्षेत्र जिसको मेरे द्वारा भलीभाँति देखा गया है, और प्रस्तावित योजना में प्रस्तावित समस्त कार्य 15 सालों से नहीं कराया गया है। जिसकी मुझे पूर्णरूप से जानकारी है और अनुमोदन करते हैं।

①

उदयवीर सिंह
संजय कुमार
अशोक चन्द
गव्वारा सिंह
राधकान्त शर्मा
शमशेर सिंह
वीरेंद्र सिंह
पुष्पेंद्र कुमार
नरेश सिंह



PROJECT AT A GLANCE

IWMP-III (Bulandshahar)

1	State	Uttar Pradesh
2	Distt.	Bulandshahar
3	Block	Pahasu
4	M.W.S. Code	2B3E4d1e
5	Name of M.W.S. Project	Madanpur Mubarikpur
6	Involved Village	04
7	Geographical Area of M.W.S.	677 Ha.
8	Rainfed Area	542.00
9	Treatable Area	629
10	Weightage	
11	Cost of Project	
12	For the year	2010-11

Budget Components

S. No.	Components	Area (Ha.)	Cost (in Lacs)
1	2	3	4
1	Management Cost 12%	-	9.057
2	Preparatory Phase 10%	-	7.548
3	Watershed Work Phase	-	
	A- Watershed Development Works 50%	629	37.74
	B- Livelihood Programme (Community Base) 10%	-	7.58
	C- Production System & Micro Enterprises 13%	-	9.812
4	Consolidation Phase 5%	-	3.743
	Total	629	75.48

Executive Summary of the Project

Identified selected micro watershed project Madanpur Mabarikpur is coded as **2B3E4d1e** has been proposed from cluster of I.W.M.P. Bulandshahar – III project in Pahasu Block district Bulandshahar four villages namely Madanpur, Samaspur, Chodera and Kutubpur is comprised in the micro watershed which is located in the east of district Bulandshahar on the west bank of River Upper Kali Nadi and border of district area is known as Khadar. It lies between $28^{\circ} -5'$ and $28^{\circ} -15'$ N Latitudes and $78^{\circ} -0$ and $78^{\circ} -10$ W Longitudes Covering area. Its altitudes ranges from 181 meter to 190 meter above the mean sea level. Khurja Railway Station 184.11 m, Bulandshahar Railway station is 201.18 m above mean sea level is displayed. Project area of I.W.M.P. BSR-III is lied in the Pahasu Block of Bulandshahar District which is come in the western plan zone under semi arid area. The annual average rainfall is near to 397 mm which an average of 35 rainy days. Out of which about 85% is received during the mansoon season from July to September and very less rainfall is received in the winter season.

Temperature ranges from as high as 43°C in the May-June to as $3^{\circ}-4^{\circ}\text{C}$ during December – January. The Trend of rain fall is highly erotic and maximum water goes as runoff.

Main occupation of the dwellers is agriculture in the watershed. Some part of the lands are shown during the Kharif season. Cane sugar are preferred crops in the project area. The main Crops raised are Wheat, Pea & Mustered & Maize

The topmost portion of the watershed is sloppy flat land. Other than topmost portion of the watershed is under soil erotic portion and depreciative. The soil of the land are sandy loam Soil. The middle agricultural position of watershed relatively smooth sloppy flat land with sandy loam soil texture. These soil is yellow in colour and are inherently good in fertility status.

Natural vegetation of the watershed is very poor. Somewhere forest vegetation is seen which are predominant with Vilayati Babool (*Prosopis Juliflora*), followed by Babool (*Accasia nilotica*), somewhere Neem Plants (*Azadirachta Indica*), Shisham (*Dolbergia Sisson*) and Karanj (*Pongamia Glabra*) are seen in occasional occurrence. There is no grass land in the watershed. Somewhere grass patches are seen only on the bunds, road sides and other such places. Coverage of massive green belt is in poor percentage for environment which is envisaged. That watershed is very poor climate area.

There is normal condition of animal physics and for their fodder arrangement is the watershed and creative possibility would be expected by the implementations of the project.

Due to Aerial soil erosion poor harvesting managements, cropping pattern, non treated watershed etc. are very anti effective causes for the watershed. Problem of the watershed is to be tackled by harvesting structures which have last most of their capacity new water bodies for the prevention of erosion and conservation of soil and moistures various type of earthen bunds in the watershed field, necessity has been observed. Wasteland will be treated with staggered Trenches, afforestation and bunding for the changing of characteristics.

The detail project report has been prepared by the applying of nine process steps for the micro watershed code no. **2B3E4d1e** brief is as follows.

- STEP-1 Secondary data collection:-** During the five days visit programme in the micro watershed project with of all available documents of village label by approaching the Gram panchayat collected secondary data.
- STEP-2 Village meeting & conducting PRA exercise:-** Community meeting conducted on six days for the consultation with villagers for the PRA Exercise. Participatory mode of the villages was positive indicated for the success of programme. With good in testing participation has been drawn social & resource map on ground & paper & discussed un various topics of problematic thoughts in the micro watershed.
- STEP-3 Socio economic survey:-** The resource organization of village label volunteers identified to conduct house hold socio economic survey/states.
- STEP-4 Probem typology analysis:-** Thoroughly analyzed the data & identified problem type as soil & moisture conservation, crop rotation, crop coverage, productivity, livelihoods, social issues & capacity building gaps etc. Probelms discussed with the watershed committee & came up with alternative solution.
- STEP-5 Conduct of net participatory planning (NPP):-** The planning team visited together in the planning blocks on the scheduled date along with the beneficiaries of the villages & data gathered as for the participatory net planning.
- STEP-6 Productivity & livelihood planning exercise:-** For the product livelihood exercise, group discussion on various livelihood as Agriculture, Animal husbandry enterprise development held discussion with the villagers in the micro watershed.
- STEP-7 Institutional & capacity building :-** This plan is prepared based on the data available in the field and auscultations with the watershed committee.
- STEP-8 Data consolidation & documentation of DPR :-** After gathering all required information compiled collected data. Thoroughly discussed and finalized the

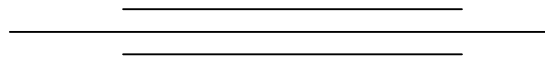
expected outcomes and benefits specially in the respect of livelihood for different segments. These are the target and performers indicators for the micro watershed.

STEP-9 Conduct of Gram Sabha obtaining approvals submissions of DPR:-After preparation of the draft DPR convened to Gram sabha and activities proposed expected outcomes benefits of implementing the programm are explained in case of any changes are proposed in the Gram sabha approval obtained by the Gram sabha and already singed of Mau paper.

STEP-9A Attachment of detail estimate, cost and design:-Estimating, Costing and design prepared technically According to plan in the micro watershed project. And attached with the DPR.

STEP-9B Various type of mapping :- DPR prepared in the support of micro watershed project using various type of maps is as follows :

- | | |
|---------------------------------------|-----------------------------|
| 1. Index Map of Watershed | 2. Watershed Map |
| 3. Relief/ Drainage Map | 4. Slop Map |
| 5. Soil and Land Capability class map | 6. Land use/ Land Cover Map |
| 7. Cadastral map | 8. Proposed Action Plan map |
| 9. Social Map | |



Project Report

Table – 1 : Micro watershed project brief : -

1	State	U.P.
2	District	Bulandshahar
3	Block	Pahasu
4	Comprised Villages (Nos.)	04
5	Name of Watershed	Madanpur Mabarikpur
6	Name of MWS Project	Madanpur Mabarikpur
7	MWS Code No.	2B3E4d1e
8	Geographical Area of MWS	677.000
9	Treatable Area	629.000

1- Project Objectives :- The aim and objectives of the Project are :

- cc- Conservation, development and sustainable management of natural resources including their users.
- dd- Enhancement of agriculture production and productivity in a sustainable manner.
- ee- Restoration of ecological balance in the degraded and fragile rain fed ecosystem.
- ff- Reduction in regional disparity between rains fed and irrigated area.
- gg- Creation of sustainable employment opportunities for the rural community for livelihood security.
- hh- Generation of massive employment.
- ii- Reduce migration from rural employment.

2- Major Problem of Project Area :

- y- Actual shortage of drinking water.
- z- Near to nil activated water bodies and water harvesting structures.
- aa- Low depth of ground water table.
- bb- Undulated and generally sloppy rainfed area.
- cc- Large number of Small, Marginal and S.C. farmer land holding.
- dd- Lower wages of agriculture labour and also migration of labour due to shortage of employment in the watershed.

3- General Description :

(3.1) Location :-

Madanpur Mubarikpur Watershed has been taken with MWS Code No. **2B3E4d3d** in Pahasu Block of Distt. Bulandshahar is located on Khurja via Shikarpur Syana to Pahasu road about 25 Km. between 28⁰15' and 28⁰10' N Latitudes and 78⁰0' and 78⁰5' N Longitudes. Location and delineation of watershed has been located on watershed map **Fig. 2** and on top sheet **Fig. 3**.

(3.2) Area and Elevation :

Elevation ranges from 181 to 208 mtr. above the mean sea level(MSL) altogether comprised villages and their's area is described as follows.

(Comprises village map Fig. 3)

Table – 2 : Area and Elevation

Sl. No.	MWS Code	Block	Name of Village	Geographical Area	Treatable Area
1	2	3	4	5	6
1	2B3E4d1e	Pahasu	Madanpur	180.113	170.105
			Samaspur	185.639	175.00
			Chodhera	129.115	115.00
			Kutubpur	182.133	168.895
				677.00	629.00

(3.3) Shape of the Micro Watershed:

The shape of watershed is Elongated and as Rectangular. The maximum length and width of the watershed are 5000 Mtr. and 1814 Mtr. respectively with the Length: Width ratio of 2.76:1.

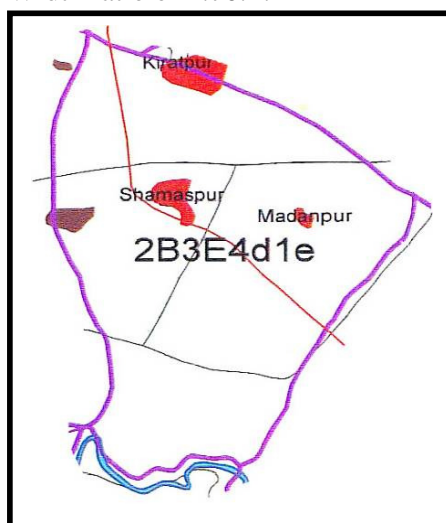


Fig. 1 (Shape of Micro Watershed)

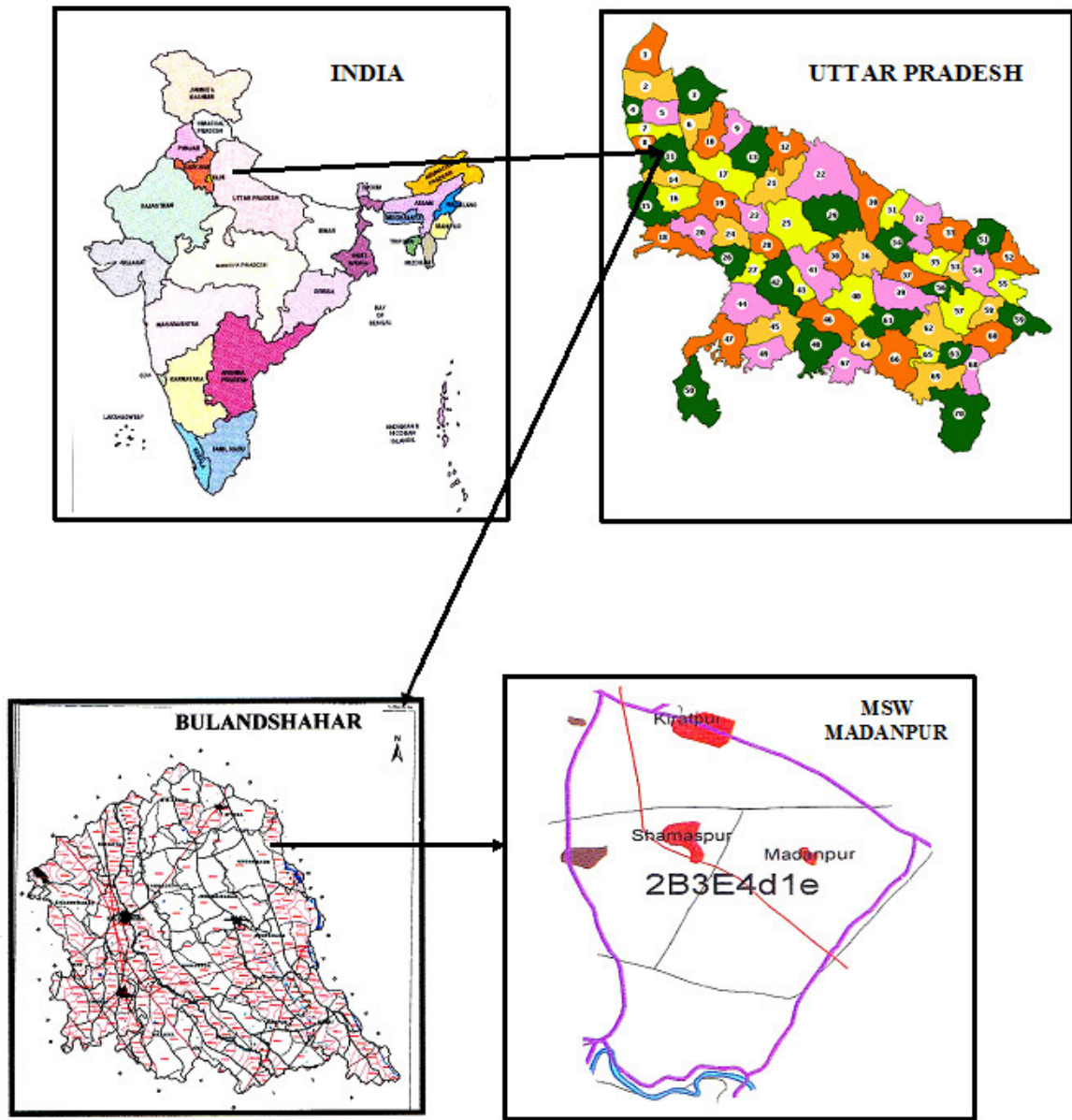
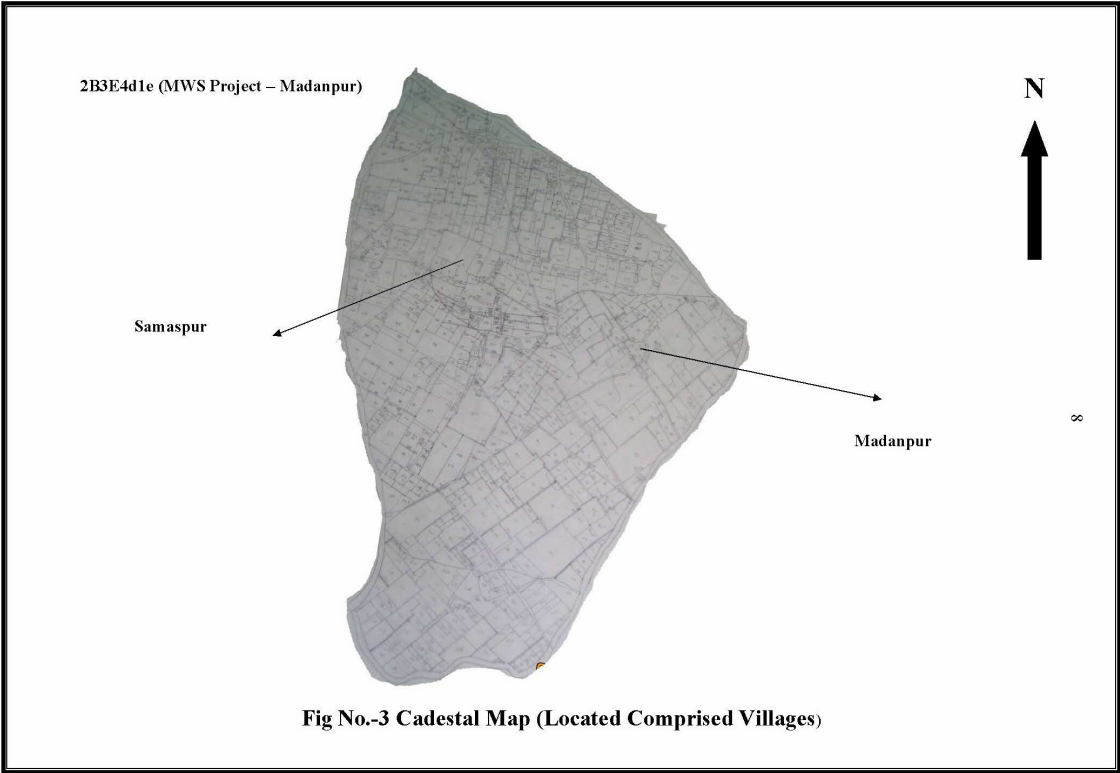


Fig.- 2 Location of the Micro Watershed



Sl. No.	Name of Project	Name of Village	Geographical Area (in ha.)	Raifed Area (in ha.)	Treatable Area	Agri. Land
1	2	3	4	5	6	7
1	Madanpur Mubarikpur	Madanpur	180.113	160.00	170.105	175.00
2		Samaspur	185.639	155.00	175.00	182.319
3		Chodhera	129.115	119.00	115.00	121.000
4		Kutubpur	182.133	108.00	168.895	140.245
Total			677.000	542.00	629.00	618.564

(3.4) Climate :

The Watershed falls under semi arid region of tropical climate inclined in Western Plan Zone. The average annual precipitation is about approx. is 397 mm. spreading over 35 rainy days. Most of the rain fall (about 85%) is received during July to September. The rain fall of moderate intensity. Nothing the area receives of scarcity rainfall in the winter season. The temperator variation ranges from as high as 43⁰c in the month of May-June to as low as 4⁰c in December-January.

(3.5) Geomorphology and Soils :

Geomorphology :

The entire watershed is topographically divided into major landforms. Accordingly the soils of watershed can be grouped into various categories such plane land, undulated land, sloppy land and erosic ravenous land.

Soil :

(a) Fine textured soil :

The soil are the most extensive soil group found in the watershed. Some portion of the watershed is relatively sloppy flat land with fine soil texture as sandy loam. The soils are in color and are inherently good high in fertility status. Soil texture is sandy lome loam particularly in depressions and loam in the elevated portion. The soil characteristic texture is dispersive and smooth. Therefore without impeded the downward movement of water productive layer of soil are easily by high runoff.

a- Coarse Textured Soil :

These soil are lying mostly in downward portion, along with erosic gully and drainage line upto end of watershed outlet. These soils are coarser in texture and are relatively poor in fertility status. The soils are lomy sand in texture. Rill and gully formation in same parts particularly near the outlet of watershed can be seen.

(3.6) Drainage and Slope:

Due to prevalence of mild steep slope and presence of a number of drainage lines in the watershed the drainage system is adequate. The watershed from part of Ganga Basin and watershed. Under mild to steep topographical slope of MWS as divided as follow : (Drainage and slope map fig.-4)

Table - 4 : Drainage and Slope

S. No.	Grade	Slope Percent	Area in Ha.	Remark
1	A	.05 – 1	188	-
2	B	1 – 2	156	-
3	C	3 – 4	125	-
4	D	4 – 5	94	-
5	E	5 – 6	39	-
6	F	6 - 7	27	-

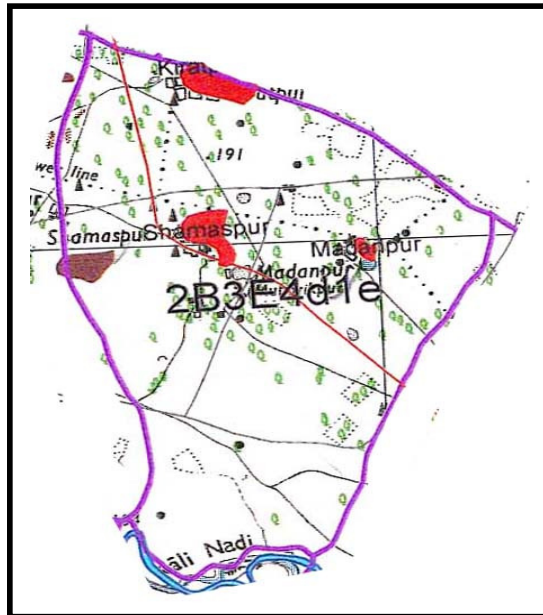


Fig-4 (Drainage & Scrub Map)

(3.7) Vegetation :

a- Natural Vegetation :

Natural vegetation is very poor in the watershed. The forest vegetation is predominant with Vilayti Babool (*Prosopis Juliflora*). There are occasional occurrence of Neem Plants (*Azadirochta Indica*), Shisham (*Dalbergia Sissoo*) and Karanj (*Pangamia Glabra*) and anywhere some scrubs are seen. There are no grass land in the watershed. Somewhere grass patches are seen only on the bunds, roadside and other such places. Poor percentage of massive green trees has been not seen in the watershed except Horticulture backyard.

b- Horticulture :

There is no backyards or commercial horticulture plantation in villages are been in some part of watershed.

c- Agroforestry :

The agriculture fields of the villages have some horticulture plantation at places isolated trees whose frequency is seen as under agroforestry and some where in where in backyards.

(3.8) Human Population:

a- Human Population:

Total Population of involved villages in watershed is 8936 with average family size of six persons as detailed as follows

Table – 5 : Human Population

S. No.	Name of village	Nos. of families	Human Population			Total
			Male	Female	Children	
1	Madanpur	44	82	66	73	221
2	Samaspur	500	666	604	1200	2470
3	Chodhera	1323	3012	2941	1985	7938
4	Kutubpur	715	805	750	1407	2962
						13591

f- Categorization of Human Population :

In the total population of watershed villages, categories are defined as below :

Table – 6 : Population Categories

S. No.	Particulars	Unit	Number of families in population in the villages		
			Population	Family	Remark
1	2	3	4	5	6
1	Agri Farmer	No.	348	284	
2	Landless	No.	22	8	
3	Agri. Labour	No.	135	35	
4	Land less Labour	No.	44	10	
5	BPL Family	No.	25	7	
6	SC Family	No.	300	70	
7	ST Family	No.	-	-	
			874	414	

(3.9) Land Holding :

All the categories of farmers as small, marginal, medium and large are involved in land holding average of about 1-18 ha. Small land holding farmers 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 as below :

Table – 7 : Distribution of farm families according to their size of land holdings

S. No.	Name of Village	Total Agri. Land in MWS	Land Holding Family (Nos.)					Percentage
			Marginal (< - 1Ha.)	Small (1-2 Ha.)	Medium (2-4 Ha.)	Large (4-7 Ha.)	Total	
1	Madanpur	175	105	20	35	5	165	
2	Samaspur	182.319	109	24	17	6	156	
3	Chodhera	121.00	101	22	12	8	143	
4	Kutubpur	140.245	104	28	10	6	148	
Total			419	94	74	25	612	

(3.10) Live Stock Population :

Total live stock population of the watershed is Nos. Buffalos is preferred as much animal compared to Cow. But milk yield is poor. Goats are also kept for milk as well as for meat purpose. The breakup of livestock population is as follows :

Table – 8 : Live Stock Position

S. No.	Name of Village	Unit	Live Stock Position				Total
			Buffaloes	Cows	Bullocks	Goats	
1	Madanpur	No.	50	150	6	20	226
2	Samaspur	No.	345	165	12	80	602
3	Chodhera	No.	1323	3012	2941	1985	7938
4	Kutubpur	No.	600	200	8	30	838
		Total	2318	3527	2967	2115	9604

(3.11) Infrastructure Social Feature :

- a- Comprised villages in the micro watershed has moderate communication facilities. Watershed linked with metaled road and approachable through motarable road.
- n- All the villages are electrified and have T.V. and Telephone connection.
- o- Literacy rate in the watershed is very low all villages are having education upto Junior High School.
- p- Nearest small market is at Pahasu 13 Km. Nearest big market Bulandshahar is about 55 Km. from watershed. Religious and ritual features are almost common as in other parts af U.P. small land holding with large family size and more than 25% of the labour force of the total population living below poverty line indicate poor socio economic status of the watershed community.

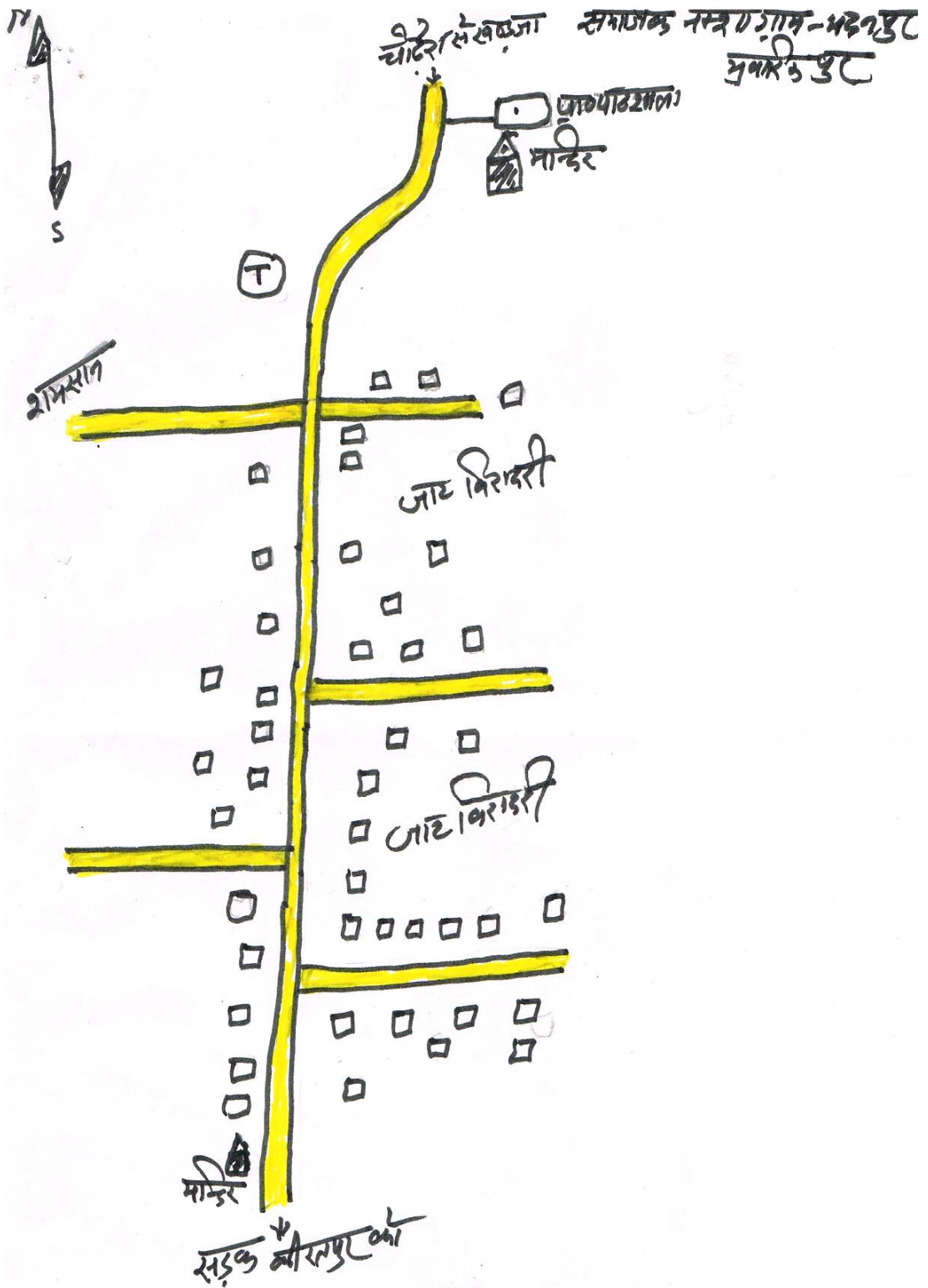
Participatory Rural Appraisal

Participatory mode of the villagers shows positive indication for the success of the programme. Traditionally the entire village community participate in the individual works. Social map of one of the watershed village drawn by villagers themselves, depicting various village figures is shown in sketched map in Fig.-4 & 5. Infrastructures position of the village recorded as follows :

Table – 9 : MW.S. Project – Farida

S. No.	Infrastructure	Unit	Qty.
1	2	3	4
1	Primary School	No.	2
2	Junior High School	No.	1
3	Kanya Pathshala	No.	-
4	Public Health Center	No.	-
5	Vet nary Hospital	No.	1
6	Panchayat Ghar	No.	1
7	Post Office	No.	1
8	Agan Bari Center	No.	1
9	Electricity	-	Yes
10	Road	-	Yes
11	Pond	No.	4
12	Hand Pump	No.	18
13	Irrigation Well	No.	-
14	Canal	No.	1
15	Temple	No.	2
16	Well (Drinking Water)	No.	1
17	Pumping Set	No.	10
18	Toilet	No.	12
19	Market	No.	No

SOCIAL MAP



Recorded importance of development institution

Farmers perception recorded for importance and role of different development institution in relation to infrastructure. Importance has been depicted with size of circle and role with distance from village circle. (Fig 8)

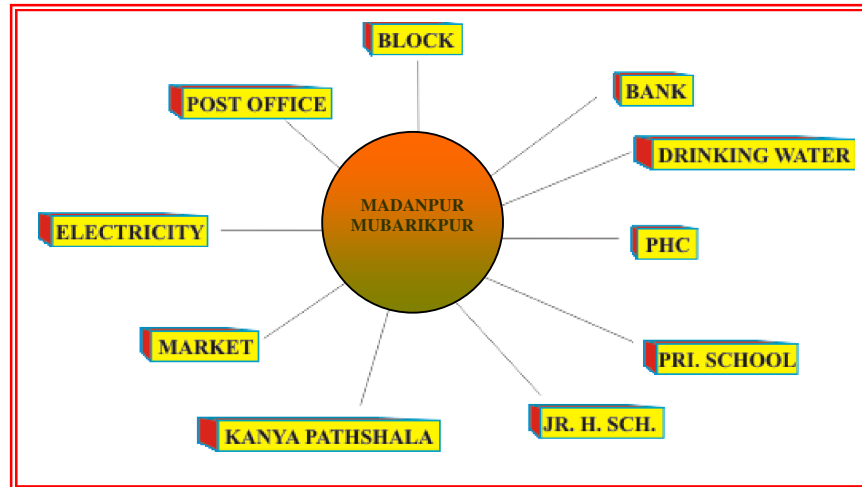


Fig. -8 (Venn diagram of Micro watershed)

(3.12) Communication :

Watershed can be approached from District Headquarter Bulandshahar to Project area 35 km. by Road.

(3.13) Natural Resource Base :

Transact of watershed showed typical land use profile consisting of plain agriculture land, erodic area and medium ravenous ridge. Main source of the irrigation are the canal for pre showing irrigation only. The total geographical area of the watershed is 468.001 Ha. classification .

Approach roads for the micro watershed is shown for the communication is shown on topo sheet map Fig 9 as next page.

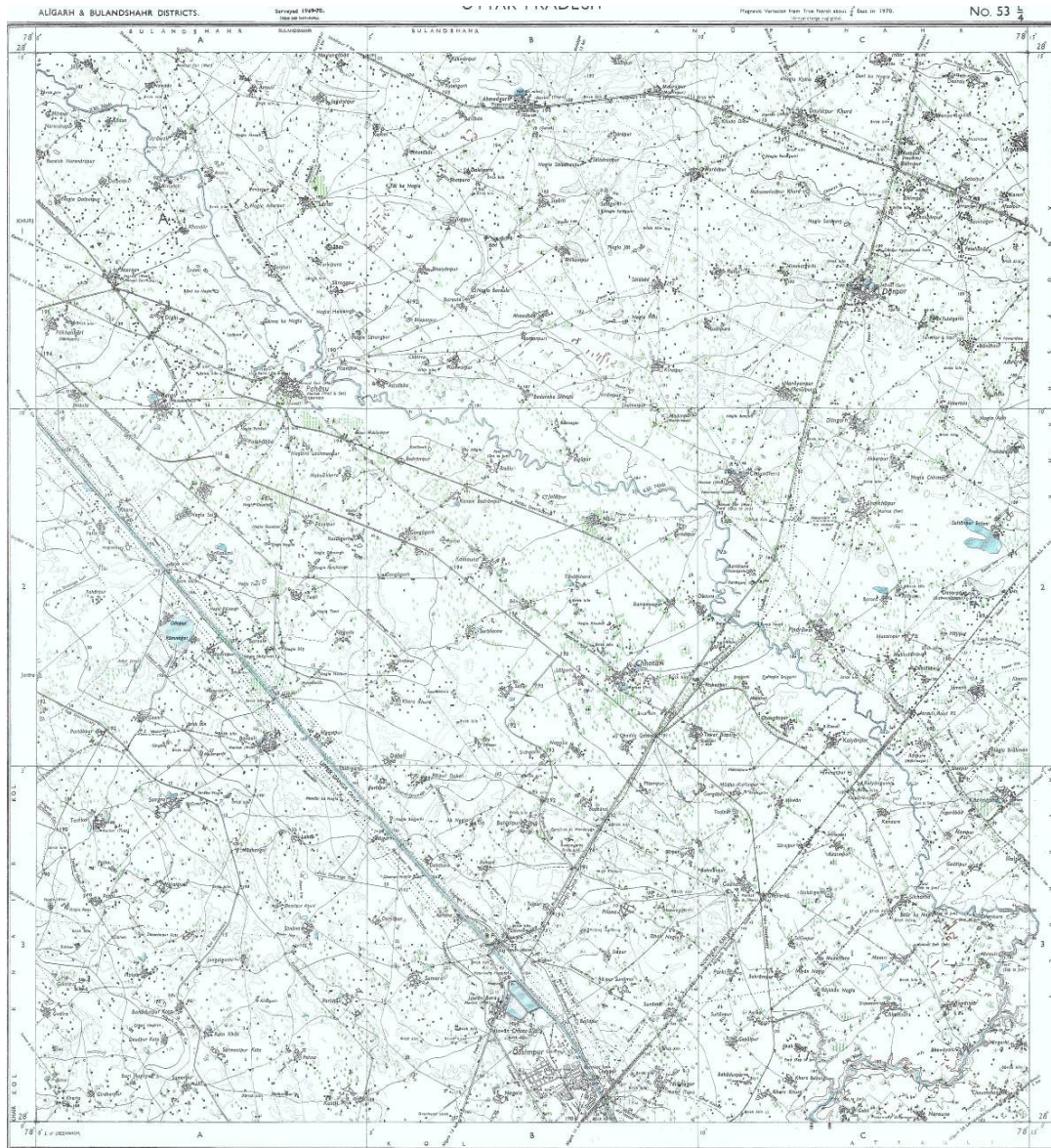


Fig.- 7 Communication Map on Toposheet

Table – 10 : Classification of area(Hect.)

S.N o.	Name of Village	Unit	Total Geographical Area	Rainfed Area	Wasteland	Village Land and Road	Irrigation Resource	
							Water Bodies	Borewell
1	2	3	4	5	6	7	8	9
1	Madanpur	Ha.	180.113	160.00	22.223	3.873	2.142	100.00
2	Samaspur	Ha.	185.639	155.00	24.455	3.435	4.145	105.00
3	Chodhera	Ha.	129.115	119.00	3.265	4.320	6.120	80.000
4	Kutubpur	Ha	182.133	108.00	11.268	13.524	1.005	120.00
Total			677.00	542.00	61.211	25.152	13.412	405.00

(3.14) Livelihood :

Total Population of the watershed is 8936 and out of the total population a majority more than 80% has farming as their major source of livelihood followed by labours, serviceman and small business class. Classified livelihood given in form as follows :

Table – 11 : Livelihood Classification in population :

S. No.	Name of Village	Farmer	Labour	In Service	In Local small business	Others
1	2	3	4	5	6	7
1	Madanpur	100	30	08	10	-
2	Samaspur	500	250	25	15	-
3	Chodhera	108	65	20	10	-
4	Kutubpur	68	20	08	05	-
	Total	776	365	61	40	-

(3.15) Dependency of forest fuel wood and fodder :

- a. Fuel wood :-** The main source of fuel is from cow dung cake, woody stem of crops. About 70% of the domestic energy requirement is met from the agriculture by product and cow dung cake. Rest is met out from the forest outside the village and watershed boundry, most preferred fuel wood is Juliflora fuel wood Juliflora obtained from standing along and between watershed.
- f- Fodder :-** Villages have not any sufficient signified dependency on forest based fodder as these resource are nothing availability in the forest.

(3.16) Labour requirement :

Labour requirements was found to be maximum at the time of October, November and December when the sowing of Rabi crops are done. The crucial periods are March and April coinciding harvesting and threshing of Rabi crops and July/August is sowing Kharif Crops take a little place. Other income generating enterprises having potential during the remaining.

(3.17) Crop Rotation :

Present Crop rotation in the watershed comprise of :

Kharif	-	Bajra	-	Rare
		Maize	-	Rare
		Jwar	-	Rare
Rabi	-	Fallow Wheat	-	Major
		Fallow Barly	-	Major
		Fallow Sugarcane	-	Major
		Fallow Mustard	-	Major
Zayad	-	Urad, Moong, Makka		

The above said Rabi Crops is the most prevailing crop rotation on the agriculture lands both in the rainfed and irrigated conditions.

Organized vegetable cultivation fruit plantation and traditional agro forestry systems are lacking as per requirement in the watershed the limited vegetable cultivation in the watershed is confined as kitchen gardens and field to the irrigated condition in a scattered manner. The cultivation of cash crops other than the sugarcane, wheat and mustard also in the watershed.

(3.18) Historical Events :

Chronological record of important events of the watershed village is prepared through participatory rural appraisal (PRA) which is very useful in understanding of its background and chronology is given as follows :

Table – 12 : Historical Events

S. No.	Events/Activities	Year	Rem.
1	2	3	4
1	Established	1657-58	
2	Opening of Primary School	1990-91	
3	Opening of Junior School	2000-01	
4	Opening of Kanya Pathshala	-	
5	Opening of PHC	-	
6	Opening of Vet. Hospital	2001-02	
7	Panchayat Ghar	1995-96	
8	Introduction of Tractor	1975-76	
9	Gobar Gas Plant	1980-81	
10	Thresher	1977-78	
11	First Tube well/Pumpset	1966-67	
12	First Motorcycle	1970-71	
13	T.V. & D.V.D. Players	2001-02	
14	Electricity in Village	2000-01	
15	Bituminous Road	2005-06	
16	First Hand Pump	1965-66	
17	Templo Renovation	1950-51	
18	First Land Line Telephone	2004-05	
19	Planning for Watershed Project	2010-11	

(3.19) Present Land Use in the Watershed :-

The watershed has diversified land uses. The varied present land use under different use in the watershed. The mixed land use followed in the watershed is almost similar in other parts of U.P. During P.R.A. Exercise prepared land has been shown in Table No. 13, 14 & 15.

Table – 13 : (Ownership)

S. No.	Name of Village	Pvt. Agri. Land		Govt. Revenu Land	Forest Land	Other Land
		S.C./S.T.	Others			
1	2	3	4	5	6	7
1	Madanpur	2.225	172.775	-	-	-
2	Samaspur	40.000	142.319	-	-	-
3.	Chodhera	3.000	118.000	-	-	-
4.	Kutubpur	2.000	138.245	-	-	-

Table –14 : (Present Land under different categories)

S. No.	Name of Village	Land Use (Ha.)				Total
		Agricultural	Wasteland (All Types)	Seasonal waterbodies	Village/Raod Etc.	
1	2	3	4	5	6	7
1	Madanpur	175.00	22.223	-	3.873	201.096
2	Samaspur	182.319	24.455	-	3.435	210.209
3	Chodhera	121.000	3.265	-	4.320	125.585
4	Kutubpur	140.245	11.268	-	13.524	165.037
Total		618.564	61.211	-	25.152	704.927

Table – 15 : (Present land use classified)

S. No.	Land Use Under	Unit (ha.)	Area (Ha.)	Percentage
1	2	3	4	5
1	Under Agriculture			
	A- Rainfed-			
	I- Crops		465.00	70%
	II- Agro forestry		45.75	7%
	B- Irrigated-		-	
	I- Assured			
	II- Portial		118.24	17%
2	Wasteland			
	A- Aforestation			
	B- Pasture			
	C- Untreatable			
	D- Treatable		156.44	100%

Proposed Post Land Use has been given on Page No. 32

4- Focus on Present Land Use :

(4.1) Agriculture :

The total area under agriculture in the watershed is about 415.02 ha. out of which 906.61 ha. is under rainfed agriculture. Agriculture land uses in the watershed extended to diversified land capabilities starting marginal to good class II land. The irrigated and drinking water is most scarce natural resource in the watershed. The operation of tube well for irrigation of agricultural crops frequently leads to the drinking water. Problem to the farmers of watershed forcing them to carry drinking water from outside of the watershed area. The agricultural field bund are common in the watersheds however they frequently breach on heavy rains.

Various mixed texture of soils are located in patches through out the watershed. The heavy soils are almost kept fallow during rainy season. the agricultural soils also have some as share calcium pan at variable depths. The irrigation water is conveyed by the earthen channels. Surface irrigation methods following mainly border method of flood method by the formers in the watershed. These factors reduce the water use efficiency of limited and valuable irrigation water.

Drought hardy species like Juliflora suitable multi purpose trees is suitable for rehabilitation of the wasteland. Rehabilitation of waste lands promoting agro forestry with appropriate fruit and forest species suitable vegetative barriers on sloppy lands can be high future value and by these adoption would be meet out many demands of fire wood and fodder in the wasteland. Except above but also for soil and water conservation, rehabilitation of wasteland and sustainable income generation for socio-economic upliftment of farmers.

Crop Productivity :

The farmers also do not have suitable cropping system to deal aberrant weather. Weeds impose considerable constraint in productivity of both Karif and Rabi crops under irrigated as well as rainfed production system farmer undertake normally one manual weeding in mustard and other valuable crops however, practices is energy and time consuming. Use of we decide is rare in the watershed.

In the watershed area, limited cropping in the Kharif with mixed cropping practices is not only irrigational but also unscientific and best for low productivity. Subsequent Rabi crops in general. Sugarcane & Mustard crop in particular are raised on residual soil moisture under rainfed production system during post mansoon season.

(4.2) Indigenous Technological Knowledge (ITK) :

Under process of PRA tracked out rural applying technology in various field of local technology and some technology is very popular in village. In which the agriculture is an old traditional practices of farmers who have improved themselves with passage of the time according to their domestic needs and technological reforms in the nearby areas. The villages have their traditional village ponds, practice of field bunding which typically constitute agricultural related ITKs in the watershed. The Mustard & sugarcane being a cash and firewood crop of the watershed and also sugarcane crop is being. Cultivated in self designed manner by the farmers. Its carried

out that the area is totally depend on rain and under the rainfed area technology is applied by the farmers. However limited fertilizer application specifically the DAP came in the practices since about 15-20 years.

(4.3) Forest and Other Vegetation :

Forest :

The watershed have a tract of wasteland area which are under uncultivable position is liesed in the watershed. These wasteland have not any tree vegetation or very less than real requirement for the wasteland use.

Horticulture/Agro forestry :

Horticulture and agro forestry practices were observed in the watershed.

(4.4) Agro forestry :

Agro forestry practices are lacking in the watershed. Though it has good potential under existing disposition and may a role particularly with respect to minimization of cropping risk, built up soil fertility and productivity, protection of soil erosion, soil conservation partly meeting out the fire wood demand of rural community and more over optimizing the economical return from system as whole under typical semi arid climate in the watershed. Bund and boundary plantation also have good potential to care the fire wood and fodder demands of the rural community in the watershed. The existing area under agro forestry is almost negligible. Prosopis Jhliiflora may be planted as block or sole plantation specifically on marginal and degraded land in the watershed.

The agro forestry interventions comprising of ber, bail, aonla, guava, papular etc. may be applied for benefit of the farmers under rainfed to irrigation production system on leveled to slopping and marginal agricultural using proper planting techniques and term it control measures.

The multipurpose trees may be also help in supplementing fire wood and fodder demands of the rural community in the watershed and my be planted as hedge rows on rainfed, marginal and degraded lands.

(4.5) Horticulture :

Fruits and vegetables practices are lacking in the watershed area. Its practices may be sustainable very good potential for the formers of watershed. There are a limited lack fruit trees in number like mango, guava, lime, ber, aonla and papaya fruit trees well as vegetables like radish, okra, tomato, cabbage, garlic, onion, chilly, bringer and cucurbits but they are found surviving well in the watershed villages. Organized orchards (vatika) commercial vegetable cultivation horti-agri and other systems of agro forestry etc. are lacking but have good agriculture.

5. Soil and land capability classification :

(5.1) Soil Morphology :

Watershed is located North East corner of Bulandshahr Distt. near about 55 Km. away. The entire terrain of watershed is topographically divided into various land forms. Accordingly the soils of watershed have been grouped major categories is given as follow :

Hill Terrain	Plane Land Sloppy	Undulated Land	Rill Erosic Land	Moderate ravenous
-	25%	20%	15%	7%

Given categories in the blocks is located the soil morphology in the watershed areas. Representation of soil characteristics by soil profile is represented as follows :

Soil Profile :

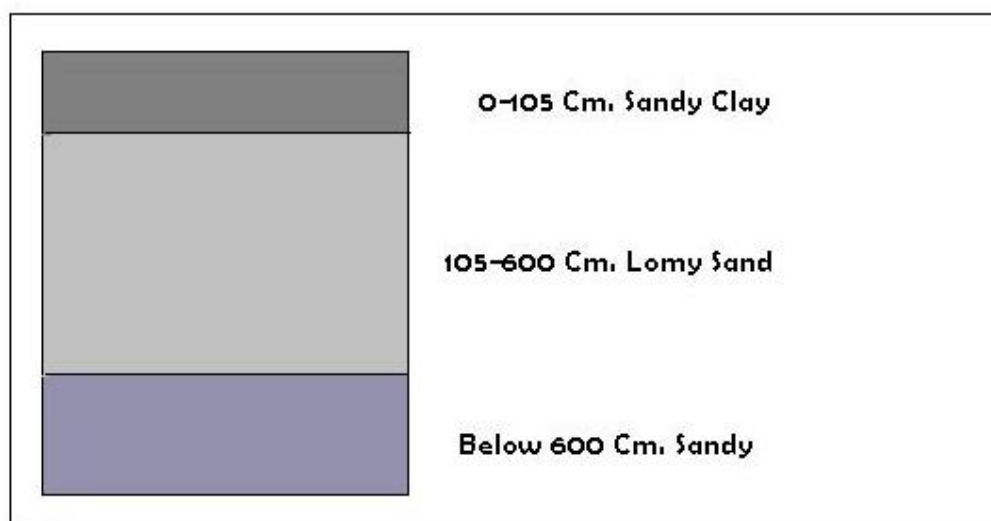


Fig. – 9 (Soil Profile)

Table – 16 : (Morphology of a Typical Soil Profile) :

Horizone	Depth in Cm.	Morphology
1	2	3
A V & H	0-150	Silky when moist, Hard when dry quick soluble, high elasticity, fissures, and cracks, occasional occurrence of free calcium carbonate granules black in colour, clay content 29%, PH- 8 to 8.7
B V & H	150-160	Whitish yellow in colour, very fine mixed with free cacaos and gravels, Hard when dry compact and indurate hard pan restricting development of root and down ward water transmission.
C V & H	7600	Red and white sand stone

(5.2) Soil and Characteristic and Fertility Status :

Soil characteristic pertaining to soil fertility of various classes accruing around villages in the watershed are given as follows :

Table – 17 : Soil Characteristic & Fertility Status :

Sl. No.	Soil Properties	LCC-II	LCC-III & IV
1	2	3	4
1	Sand %	45.04	72.04
2	Silt %	22.55	17.80
3	Clay %	28.35	6.4.6
4	Texture	Sandy Clay	Lomy Sand
5	PH (1:2)	7.05	7.55
6	Organic Carbon %	0.35	0.13
7	Available N Kg ha ⁻¹	312	171
8	Available P Kg ha ⁻¹	28	13
9	Available K Kg ha ⁻¹	185	322
10	EC (dS m ⁻¹)	0.45	0.12

(5.3) Land Capability Classification (LCC) :

Land capability classification (LCC) was done to classification the soils in different groups based upon the limitations and to emphasize the hazards prevailing in the watershed in order to find out the different topo-sequences, landforms, soil depth and erosion hazards. This was followed by the detailed investigation of selected landforms to bring out the LCC classes of the Watershed. Classes of land capability namely II, III, IV and V are demarcated in the watershed. The areas under different classes are shown as follows :

Table – 18 : Land Capability Classification (LCC) :

S. No.	Land capability class	Area in Ha.	Colour
1	2	3	4
1	I Class	-	-
2	II Class	108.560	-
3	III Class	325.004	-
4	IV Class	150.500	-
5	V Class	34.500	-
6	VI Class	-	-
7	VII Class	-	-
8	VIII Class	-	-

Land capability classification of various agricultural practices under land use can be classified as groups, class, sub class and units. Utilization of various land class is given as follows :

Table – 19 : Utilization of various land uses

S. N.	LCC	Forestry	Ltd. Grazing	Light Grazing	Dense Grazing	Limited Agriculture	Light Agriculture	Dense Agriculture	More Dense Agriculture
1	I								
2	II								
3	III								
4	IV								
5	V								
6	VI								
7	VII								
8	VIII								

(5.4) Land Capability Class II & III :

This group is one of the most extensive LCC watershed. and also near to class III for the agricultural practices. The soils are sandy & sandy loam in texture. The land under this class is nearly level to mild sloping (1-3%). The soils are deep and erosion hazard is slight. Most of the productive agriculture land comes under class II & III. These lands potentially very productive but due to rainfed a single cropping pattern is in habitation.

(5.5) Land Capability Class IV :

This class is found in lower portion near the outlets of watershed. The soils are coarser in texture, deep, erosion hazard and undulating in topography. Rill and initiation of gully can be seen near the outlet of the watershed.

(5.6) Land Capability Class VII & VIII :

This class of land is not found in watershed. Somewhere lack of soil are found with admixture gravels fragments in these classes of lands.

(5.7) Conclusions :

The majority of land form is coming under class II, which give an insight of good agriculture production potential of the watershed.

The land capability classification provides reasonable good information with regard to capability of soil, that could be used for agriculture, agrihorticulture, silviculture and posture development.

The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like bunding practices.

The reasonable area is under watershed of wasteland and other wasteland including grater potential of this watershed for forestry and pasture development. Rare places namely water body of low portion of land area under seasonally works as water harvesting structures and these harvested water is used or can use for some other beneficial activities during the crop season also.

6. Problems and needs of the watershed indentified during the PRA

(6.1) Problem Identification and prioritization :

- u- The are has undulating topography, steep unstable slopes, gradient of excessive branches of rills and hence highly prone to soil erosion.
- v- Major issues addressed to food sufficiency economic growth and environmental security in the watershed area.

- w- Effective soil depth is limited and highly variable hampering good crop growth.
- x- The watershed have low productive cropping due to tradition single cropping pattern and over all average crop production percentage not sufficient against requirement.
- y- Identified that there is no assured irrigation system has been development capacity of water bodies are reduced due to silt ration which are utilized to store of rainy water and they are renovatable.

(6.6) Transact walk during the PRA :

Problems identified and prioritized during the transact walk and PRA exercises in all comprised villages of watershed. There were pooled and a list of problems representing the whole watershed was prepared. Problems were ranked as per their total weight age in the watershed village.

Table – 20 : Ranking of Problem identification and prioritization of watershed

S.No.	Problem	Rank
1	2	3
1	Lack of irrigation	3
2	Lack of drinking water	7
3	Low production of field crops	4
4	Lack of fodder availability and low productivity	3
5	Lack of availability of fuel wood	4
6	Lack of market facility	4
7	Lack of quality seeds, fertilizer, pesticides etc.	3
8.	Medical and Health care facilities for milching animals and low productivity.	6
9	Lack of medical, educational and transportation facilities	8
10	Lack of water bodies renovation	9
11	Lack of run of earthen check bunds	1
12	Lack of water harvesting structures	1
13	Lack of livelihoods opportunity	3

Prioritized ranking (Upto four Numbers) :-

- 13- Lack of earthen check bunds.
- 14- Lack of livelihood opportunities.
- 15- Lack of irrigation water was the greatest problem. Lack of irrigation water problem experienced by the people followed by low crop production.

(6.3) Analysis of SWOT of the watershed :

Strength (S), Weakness (W), Opportunity (O) and Threat (T) analysis is a useful decision support tool. A SWOT analysis of watershed is presented as follows :

SWOT analysis of the watershed

Strengths (S)	Weakness (W)
<ul style="list-style-type: none"> xli. Cooperative work culture in traditional activities xlvi. Close ethnic ties xlvi. Road at the top as well as outlet of the watershed xliv. Hard working xlv. Resource pool of crop genetics diversity xlvi. Awareness of farmers about watershed management programme xlvi. Well established CPR maintaining and sharing system xlvi. Stall feeding of animals xlvi. Well maintained seasonal water bodies l. Social outlook of the community towards land less 	<ul style="list-style-type: none"> xxxvii. Poor water management xxxviii. Resource poor farmers xxxix. Out migration of youth xl. Low and erratic rainfall xi. Fragile geology xlii. Fragmented land holding xlvi. Heavy infestation of wild animals xliv. Problem of fuel and fodder xlvi. Shallow soil depth and with high percentage of gravel
Opportunities (O)	Threats (T)
<ul style="list-style-type: none"> xxv. Wide range of annual and perennial crops xxvi. Scope of regular employment opportunities to check out migration xxvii. Strengthening of existing irrigation system xxviii. Conducive climate for rainfed crop diversification xxix. Good scope for Agro forestry and dry land horticulture xxx. Potential for collective action and management of CPR 	<ul style="list-style-type: none"> xxi. Prone to adverse climate like drought xxii. High market risk xxiii. Social conflicts owing to PRI and WSM policies and local politics xxiv. Weak coordination among line departments xxv. Lack of expertise of implementing agency in different aspects of WSM

7. Proposed land use for the watershed :

Watershed management plan preparation due importance is given to topographic, land suitability, irrigation potentiality, prevailing farming systems, micro farming situation, farming, farmers preferences and priorities along with economic and environment securities.

Crop and tree selection and area distribution was done as per farmers priorities revealed through PRA exercise.

The watershed management plan for watershed is prepared with specific objectives of food sufficiency, income and employment generation with environment security.

Technical options were with the ITK based on the latest available experiment findings. Due attention was given to the resource of the farmers and adjustments were made in capital intensive resource demanding technological outputs while making them adoptable to the resource poor farmers. Emphasis was given on maximum use of farm yard manure. The proposed land use plan of the watershed is shown as follow as in table

Table – 21 : Present and proposed land use plan of the watershed

S.No.	Land use	Present (ha)	Proposed area (ha)
1	2	3	4
1	Agriculture		
a	Rainfed		
	I Crops	475.45	618.564
	II Agro-forestry	50.00	70.45
b	Irrigated		
	I Assured		
	II Partial	118.60	152.75
2	Waste land		61.211
a	Aforestation		3.00
b	Pasture		
c	Untreatable		
d	Treatable	155.88	140.55
3	Village land	7.74	7.74

(7.1) Status of Present Water Resources Utilization :

Watershed is having some canal system. Management and maintenance of these canal are required. Before sowing of Rabi crops, water from these canal is issued as supplementary irrigation for Rabi sowing ar allowed to go as waste. After releasing water from canal, submergence area also put under cultivation.

Some where bore well irrigation applied by the farmers in the watershed.

(7.2) Proposed Plan for Irrigation Development :

- a- Present system of irrigation and wastage of water during October–November need to be made more efficient from water management point of view by minimizing conveyance losses in the existing water courses.
- b- Present irrigation canal capacity have to build up by the reform. Which are lack capacity of water.
- c- Construction of new water harvesting earthen structures, Pucca Check Dem, Series Gully Plugging, etc. has been sloppy portion to increase irrigation potential and for recharging of ground water, soil and moisture conservation maximum field irrigation, best production and expected change of crop rotation.
- d- The up gradation of the exciting system of irrigation will result in :
 - i- Minimization of conveyance losses.
 - ii- Increase in frequency of irrigation.
 - iii- Adoption of high yielding varieties of crops.
 - iv- Assured cultivation of cash crops.
 - v- Capacity buildup by the planning of new water harvesting structures.

(7.3) Ground Water Recharge :

For the purpose of ground water recharge, the area of the upper side of watershed is recommended for Field Bunds, Contour Bunds, Peripheral Bunds and Submergence Bunds and in the lower portion Contour Staggered Trenches, Gully Plugs, Earthen Check Dem and Pacca Outlets. In the undulated sloppy portion of the watershed recommended water harvesting structure for dual purpose as ground water storage and under ground water recharge.

(7.4) Crop Production :

Practices proposed in the watershed is given as follows :-

- a- Mulching and crop residue management.
- b- Application of green manuring.
- c- Vermi Composting.
- d- Crop rotation and inter cropping.
- e- Biofertilizers.

(7.5) Tillage Operation :

Deep tillage technology is proposed to apply to be demonstrated for benefit of farmers in the watershed.

(7.6) Improved Seeds of High Yielding Verities (H.Y.V.) :

Recommendation of improved varieties is necessary for improving the productivity and farm income. Through replacement of low yielding traditional verities of seeds in villages of watershed.

(7.7) Balanced Fertilizer Use :-

Demonstration of use of fertilizer in various crops of watershed recommended balance fertilizer use in different crops will be benefited of forming community.

(7.8) Control of insects and diseases :

Aphid in the mustard 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 pest and diseased will also be demonstrated in the watershed for benefit of the growers.

(7.9) Dry Land Horticulture :

Such portion of dry land in which proposed horticulture development planning recommended species like Ber, Bel and Aonla will be planted at suitable spacing in the watershed.

(7.10) Agri Horticulture :

Aonla and Sahjan would be suitable horticultural crops to the locality. Therefore, a part of land in the farmer field shall be selected and brought under Agri-horticulture system. The cropping system followed will be Jwar and Wheat.

(7.11) Plantation (Fuel wood) :

Such a portion which are under wasteland will be taken falling in the class-IV category in the watershed. These lands will be planted with species like Vilayati Babool (Prosopis Juliflora), Babool (Acacia Nilotica), Karanj (Pangamia Glabra).

9. Socio Economic Analysis of the of the Project :

(9.1) Sustainability and environment security :

The proposed land use plan will improve the land utilization index and crop diversification index significantly as compared to the existing one. in the proposed watershed management plan proper blending of the bio engineering measures will be applied on above 80% of the total area of watershed. It is estimated that more than above 70% of the watershed area will be treated and consequently the soil loss and runoff from the area is expected to be reduced by 70% respectively.

It will help in maintaining ecosystem integrity on sustained basis along with improving the livelihood security of the farming community.

(9.2) Economic Analysis :

Economic analysis of the project was carried by taking direct benefits and costs considering 10 years for project life at 10% discount rate. Whole watershed development plan was divided into three sector as agriculture, horticulture and forest/Fuel wood plantation. Net Present Value (NPV) and Benefit Cost ratio criteria were applied judge the economic efficiency of each enterprises and sector. Net present value (NPV) of the project life is considered to be 10 years and discount rate for NPV estimation is 10% is given NPV and benefits as follows :-

Table – 22 : Present productivity income analysis :

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	3.00	4300.00	12900.00	6450.00	6450.00	1:1
		Moong	3.00	4500.00	13500.00	6075.00	7425.00	1.22:1
		Jwar	4.80	600.00	2880.00	1584.00	1296.00	0.82:1
		Wheat	18.50	850.00	15275.00	8650.00	7075.00	0.82:1
		Pea	7.50	2250.00	16875.00	10970.00	5905.00	0.54:1
		Mustard	3.50	18.500	6475.00	3235.00	3240.00	1:1
Total		-			105105.00	54105.00	51000.00	0.94:1
Average		-			13138.00	6763.00	6375.00	0.94:1
B	Forestry	Vilayati				15000.00	-	Nil
		Babool						
C	Horticulture	Ber				20000.00	-	Nil
		Aonla				20000.00	-	Nil
		Bel				20000.00	-	Nil
Total		-				60000.00	-	Nil
Average		-				20000.00	-	Nil
Grand Total								

Table –23 : Post productivity and income analysis for Post Productivity**Value and B.C.:**

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	4.00	5000.00	20000.00	8325.00	11615.00	1.39:1
		Moong	4.00	5000.00	20000.00	8200.00	11800.00	1.44:1
		Jwar	5.50	800.00	4400.00	1900.00	2500.00	1.32:1
		Wheat	25.00	1000.00	25000.00	16680.00	13320.00	1.14:1
		Pea	9.50	3500.00	33250.00	14810.00	18540.00	1.12:1
		Mustard	5.00	3000.00	15000.00	4370.00	8130.00	1.86:1
Total		-	-	-	172250.00	72845.00	99765.00	1.38:1
Average		-	-	-	21531.00	9061.00	12471.00	1.38:1
B	Forestry	Vilayati Babool	80.00	500.00	40000.00	15000.00	25000.00	1.67:1
C	Horticulture	Ber	35.00	2000.00	52500.00	20000.00	32500.00	1.63:1
		Aonla	35.00	2000.00	70000.00	20000.00	50000.00	2.50:1
		Bel	40.00	1500.00	80000.00	20000.00	40000.00	2:1
Total		-	-	-	182500.00	60000.00	122500.00	2.04:1
Average		-	-	-	60833.00	20000.00	40833.00	2.04:1
Grand Total		-	-	-	1394750.00	147485.00	247265.00	1.68:1

Table –24 : Summary of NPV, PPV and B.C. Ratio (Sector wise) :

S. No.	Name of Sector	NPV		PPV		B.C. Ratio
		Expend.	Net Income	Expend.	Net Income	
1	2	3	4	5	6	7
1	Rain fed Agriculture	54105.00	51000.00	72485.00	99765.00	1.38:1
2	Forest/Fuel wood Plantation	15000.00	-	15000.00	25000.00	1.67 : 1
3	Horticulture	60000.00	-	60000.00	122500.00	2.04:1
Total		129105.00	51000.00	147485.00	247265.00	1.68:1

(9.3) Economics of Agriculture Sector :

The development cost can be recovered by the adoption of plan in present rain fed agriculture is being done on well maintained field, therefore does not require much investment. In rain fed agriculture, investment of Rs. 44.50 lacs is proposed to made is given as follows :

Table – 25 : Economics of Agriculture Sector :

S. No.	Name of sector	Name of Activities / Plan	Treatble Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Rainfed	Soil, moisture and water cons works	629	358.942	854.06	495.33	1:38.1

(9.4) Economics of forest fuel wood plantation :

Economic analysis of fuel wood plantation in the watershed. Project life is considered to be 20 years and discount rate for NPV estimation is 10 % is followed and as is given follows :

Table –26 : Economics of forest fuel wood Plantation :

S. No.	Name of sector	Comman Name of Plant	Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Forest Fuel wood sector	Vilayati Babool (Prasopis Juliflora)	25.00	2.50	6.675	4.175	1.67 : 1

(9.5) Economics of Horticulture Sector :

Economic analysis of Horticulture Plantation in agri-horti system and on wasteland patches of watershed project, life is considered about 15-20 years and discount factor rate for NPV estimation is 10% is follows :

Table – 27 : Economics of Horticulture system :

S. No.	Name of Sector	Common name of Plants	Area (Ha.)	NPV (Lacs)	Post Productive Value (Lacs)	Benefit Lacs	B.C. Ratio
1	2	3	4	5	6	7	8
1	Horticulture	Ber (zyziphus mouritana)	4.00	0.80	2.104	1.304	1.63: 1
		Aonla (Embelica officianalis)	3.80	0.76	2.660	1.40	2.5 : 1
		Bel (Aegle marmelos)	2.20	0.44	1.320	0.88	2 : 1
Total			10.00	2.00	6.084	4.084	2.04 : 1

(9.6) Food requirement and sufficiency :

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

Table – 28 : Status of food requirement and availability of per annual :

S. No.	Name of Foods	Requirement Q./Yr.	Present Status		Expected Post Status	
			Availability Q./Yr.	Deficit or surplus Q./Yr.	Availability Q./Yr.	Deficit or surplus Q./Yr.
1	2	3	4	5	6	7
1	Cereals 110 Kg.	14950	12707	- 2243	25415	10465
2	Pulses 36.50	4961	2728	- 2233	8930	3969
3	Oil Seeds 29.20	3969	1588	- 2381	6350	2381
4	Vegetable 71 kg	12368	2474	- 9894	22262	9894

(9.7) Employment generation :

One of the major problem of the labour migration in watershed project. By the implementation of the project activities employment opportunities will be generated. However the changes in land use pattern and adoption of other subsidiary enterprise will generate employment opportunities in the watershed as given in table follows :

Table – 29 : Employment generation under proposed works :

S. No.	Employment activities/works	Area under work	Cost	Mandays generation (Nos.)			
				Unskilled	Skill	Total	Person
1	2	3	4	5	6	7	8
2	Graded Contour Bund	71	2.13	2130	-	2130	71
3	Gully Plug, C.D.	119	8.925	6247	458	6705	223
4	Submergence Bund	101	4.04	4040	-	4040	135
1	Peripheral Bund	101	3.535	3535	-	3535	118
5	W.H.B.	125	11.25	6750	382	7132	237
6	Renovation of Bund	77	2.31	2310	-	2310	77
7	Reno. of W.H.B.	-	-	-	-	-	--
8	Community Pond	-	-	-	-	-	-
9	Afforestation	25	3.55	710	-	710	24
10	Horticulture	10	2.00	400	-	400	13
Total		629	37.74	26122	840	26962	898

10. Formation of watershed committee :

Under compliance of common guideline Para (6.3) is followed and by the help of watershed development team, watershed committee is organized in the micro watershed village Ghuraiya with 10 members as prescribed in common guide line. List for organization of W.C. village details given as follows :

Table – 30 : Details of comprised village W.C. organization in M.W.S. :

S. No.	Particulars	Details	Block	Geographical Area
1	2	3	4	5
1	Micro watershed code	2B3E4d1e	Pahasu	
2	Name of Gram Panchayat in M.W.S.	Madanpur Mubarikpur		677.00

Table – 31 : List of organized W.C. for the Gram Panchyat Madanpur Mubarikpur in watershed.

S. No.	Name of selected members	Age	Representation Members from	Post	Qualification	Village
1	2	3	4	5	6	7
1	Smt. Baghwati Devi	50	Gram Sabha	President	Sakhar	Samaspur
2	Sh. Omveer Singh	64	Gram Sabha	Secretary	Sakhar	Madanpur
3	Sh. Mohan Lal	54	From – U.G	Member	P.hD. Agri	Samaspur
4	Mahendra Singh	70	From – U.G	Member	Sakhar	Madanpur
5	Ramji Lal	42	From – U.G	Member	Sakhar	Samaspur
6	Shishupal	40	From – S.H.G.	Member	Sakhar	Samaspur
7	Rajendra	50	From – S.H.G.	Member	Sakhar	Madanpur
8	Dharmvir	40	From – S.H.G.	Member	Sakhar	Samaspur
9	Smt. Ramshri	75	From – S.C.	Member	Sakhar	Samaspur
10	Smt. Chameli	70	From – S.C.	Member	Nirakhar	Samaspur
11	Sh. Vyas Rai	52	From – PIA	Work out	B.Sc.	Office IWDP

(10.1) Formation of Self Help Groups in M.W.S.

By the help of watershed committee and watershed development team self help group are formatted / organized. Families and persons are selected from poor, small and marginal farmers families, landless poor families, agriculture labour families, women, herdsman and shepherd and S.C. families in the formatted self help groups are given as follow :

Table – 32 : Shiv Pashupalan Self help group – Samaspur (Livelihood) .

S. No.	Name of member in formatted SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Sh. Ganeshi	40	L.R.	Live Stock	New
2	Ramji Lal	42	L.R.	Live Stock	New
3	Netrapal	55	L.R.	Live Stock	New
4	Dharpal	60	L.R.	Live Stock	New
5	Chandrapal	62	L.R.	Live Stock	New
6	Liladhar	60	L.R.	Live Stock	New
7	Sujji	62	L.R.	Live Stock	New
8	Adal Singh	60	L.R.	Live Stock	New
9	Kehari Singh	50	L.R.	Live Stock	New
10	Ramesh Singh	40	L.R.	Live Stock	New

Table – 33 : Self help group Anona.

S. No.	Name of member in formed SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Sh. Udayvir	75	Jat	Livestock	New
2	Sh. Satish	40	Jat	Livestock	New
3	Sh. Jagat	60	Jat	Livestock	New
4	Sh. Rajendra	78	Jat	Livestock	New
5	Sh. Krishna	47	Jat	Livestock	New
6	Sh. Jitendra	78	Jat	Livestock	New
7	Sh. Prakash	60	Jat	Livestock	New
8	Sh. Ombeer	64	Jat	Livestock	New
9	Smt. Sushila	60	Jat	Livestock	New
10	Sh. Ajendra	50	Jat	Livestock	New

Table – 34 : Geeta Self help group in Anona.

S. No.	Name of member in farmated SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Sh. Raghubar	70	S.C.	Live Stock	New
2	Prabhu Dayal	72	S.C.	Live Stock	New
3	Sh. Prem	40	S.C.	Live Stock	New
4	Girwar	70	S.C.	Live Stock	New
5	Ballu Singh	80	S.C.	Live Stock	New
6	Shashipal	40	S.C.	Live Stock	New
7	Basdev	60	S.C.	Live Stock	New
8	Tej Pal	60	S.C.	Live Stock	New
9	Dharmveer	40	S.C.	Live Stock	New
10	Ramchandra	60	S.C.	Live Stock	New

Formation of User's Groups :

User's groups are formed by the help of watershed committee and watershed development team in the micro watershed comprised villages. Farmers which have land in the village are involved in the User's groups and they will be directly benefited as expected by the implementation of watershed project. Easy and convenient conditions are made to resource use between user's groups and they will be responsible to operate and maintain the created assets in the watershed. Nos. of formed user's groups details are given as follows :

Table – 35 : Village wise user's groups

S. No.	Name of village	No. of groups	No. of farmers	Total Agri. Land	Area under treatment	Cost of assets
1	2	3	4	5	6	7
1	Madanpur	1	10	175.00	170.105	-
2	Samaspur	2	10	182.319	175.00	-
3	Chodhera	3	10	182.319	175.00	-
4	Kutubpur	-	-	-		-
	Total		30			-

10. Estimation and Costing of Proposed activities of the watershed Project Year 2010-11.

Proposed works / activities for the Project Period (Year 2010-11) under proposed treatable area 629.00 Ha. Out of total Geographical area 677 Ha.

(10.1) Financial and Physical Outlets :**Table – 36 : Financial and Physical Outlets for the Year 2009-10 :**

Sl. No.	Components	Unit cost per ha.	Physical ha.	Financial (Lacs)			Man-days Generation
				Labour Component	Material Component	Total	
1	2	3	4	5	6	7	8
A	Management Cost 10%						
1	Administrative Cost – TA & DA Hiring of Vehicles, Official Expenditure Electricity & Phone bill Computer, Stationery and office consumable materials & contingency	1200	-	-	7.5480	7.548	-
2	Monitoring	120	-	-	0.7548	0.7548	
3	Evaluation	120	-	-	0.7548	0.7548	
	Sub Total	1440		-	9.0576	9.0576	
B	Preparatory Phase 10%						
1	Entry Point Activities 4%	480	-	0.6038	2.4154	3.0192	604
2	Institutional & Capacity Building 5%	600	-	-	3.7740	3.7740	
3	Detailed Project Report 1%	120	-	-	0.7548	0.7548	
	Sub Total	1200	-	06038	6.9442	7.5480	604
C	Watershed Work Phase						
a	Watershed Development Works						
1	Graded, Contour & Field Bunds	3000	71	213	-	2.13	2130
2	Gully Plug, Earthen Checkdam /WHS	7500	119	6.2475	2.6775	8.925	6705
3	Submergence bunds	4000	101	4.040	-	4.04	4040
4	Peripheral Bund	3500	101	3.5350	-	3.535	3535
5	Earthen Water Harvesting Bund	9000	125	6.7500	4.50	11.25	2132
6	Renovation of existing Bunds	3000	77	2.3100	-	2.31	2310
7	Renovation of existing W.H.B	-	-	-	-	-	-
8	Aforestation and Development of silvi postural system	14200	25	0.7100	2.84	3.55	710
9	Dry Land Horticulture	20000	10	0.400	1.60	2.00	400
10	Community Pound (Renovation)	-	-	-	-	-	-
	Sub Total	6000	629	26.1225	11.6175	37.74	26962
B	Livelihood Programme (Community Based) 7.620						
	Income generating activities through SHG's for landless and marginal farmers 10%						
1	Live stock development activities	200	-	-	1.2583	1.2583	-
2	Bee Keeping	100	-	-	.6287	.6287	-
3	Poultry Farming	200	-	-	1.2583	1.2583	-
4	Nursery Development	300	-	-	1.8870	1.8870	-
5	Vegetable Production	100	-	-	.6287	.6287	-
6	Milk Dairy Promotion Unit	200	-	-	1.2583	1.2583	-
7	Establishment of Vermi compost Unit	100	-	-	.6287	.6287	-
8	Sub Total	1200	-	-	7.5480	7.5480	-
C	Production System and micro Enterprises						
1	Crop production, diversification of agriculture and introduction of agro forestry	1170	-	-	7.3593	7.3593	-
2	Demonstration of improved composting system	390	-	-	2.4531	2.4531	-
	Sub Total	1560	-	-	9.8124	9.8124	
D	Consolidation Phase 5% Sub Total						
	Sub Total	600	-	-	3.7740	3.774	-
Grand Total		12000	629	26.7263	48.7537	48.7537	-

--: संकल्प पत्र :-

ग्राम पंचायत:- मदनपुर मुबारकपुर, कोड सं०- 2B3E4d1e विकास खण्ड- पहासू जिला- बुलन्दशहर

यह कि आई०डब्लू०एम०पी० परियोजना में तैयार की गयी निर्माण की नयी सृजित परिसम्पत्तियों को ग्राम पंचायत चौडेरा एवं माइक्रोवाटरशेड के अन्तर्गत सम्मिलित ग्रामों में योजना क्रियान्वयन कराने एवं योजना उपरान्त चालू रखने तथा सृजित परिसम्पत्तियों के अनुरक्षण हेतु कृत संकल्प एवं इच्छुक है।

मदनपुर मुबारकपुर देहात ग्राम पंचायत के सभी स्रोत स्थल जैसे तालाब ग्राम सभा गोचर (चारागाह) जल संसाधन, जंगल आदि में भूमि विकास परियोजना के अन्तर्गत किये जायेंगे। उन कार्यों को समाज के कमजोर वर्ग जैसे अनुसूचित जाति/जनजाति, महिला वर्ग एवं अल्प भूमिहीन गरीबी रेखा के नीचे के लाभार्थियों को लाभ पहुंचाने हेतु इच्छुक होंगे।

हम योजना संचालन हेतु प्रस्तावित करते हैं एवं सहमति देते हैं कि भारत सरकार के समस्त मार्गदर्शी सिद्धान्तों के अनुपालन में कार्य सम्पन्न करायेगे। यह भी घोषित करते हैं कि चयनित क्षेत्र जिसको मेरे द्वारा भलीभाँति देखा गया है, और प्रस्तावित योजना में प्रस्तावित समस्त कार्य 15 सालों से नहीं कराया गया है। जिसकी मुझे पूर्णरूप से जानकारी है और अनुमोदन करते हैं।

मोहम्मद सलमान (चौडेरा)	देवदास नरकर	सी००८
गोशवर्धन	सुरेश कुमार	— सी०३८
सुकुल्लान	मदनपुत्र	"
मोहम्मद	क. वि. देवदास	"
अ. वि. देवदास		
नातक (चौडेरा)	क. वि. देवदास	"
Rajendra Singh (नरकर)		
Vandana		
Raj Singh		
अजीत सिंह		
अजीत सिंह		
अजीत सिंह		

PROJECT AT A GLANCE

IWMP-III (Bulandshahar)

1	State	Uttar Pradesh
2	Distt.	Bulandshahar
3	Block	Pahasu
4	M.W.S. Code	2B3E3c2a
5	Name of M.W.S. Project	Chhatari Dehat
6	Involved Village	06
7	Geographical Area of M.W.S.	781.00
8	Rainfed Area	626.000
9	Treatable Area	711
10	Weightage	
11	Cost of Project	85.32
12	For the year	2011-12

Budget Components

S. No.	Components	Area (Ha.)	Cost (in Lacs)
1	2	3	4
1	Management Cost 12%	-	10.238
2	Preparatory Phase 10%	-	8.532
3	Watershed Work Phase	-	-
	A- Watershed Development Works 50%	711.00	42.66
	B- Livelihood Programme (Community Base) 10%	-	8.532
	C- Production System & Micro Enterprises 13%	-	11.091
4	Consolidation Phase 5%	-	4.267
	Total	711.00	85.32

Executive Summary of the Project

Identified selected micro watershed project Chhatari Dehat is coded as 2B3E3c2a has been proposed from cluster of I.W.M.P. Bulandshahar – III project in Pahasu Block district Bulandshahar four villages namely Chhatari Dehat, Teyore buzurg, Sidhpur, Padraval, Dharau, Baram Nagar, Bachhatari is comprised in the micro watershed which is located in the east of district Bulandshahar on the east bank of River GANGA and border of district Badaun area is known as Khadar. It lies between $28^{\circ} -5'$ and $28^{\circ} -15'$ N Latitudes and $78^{\circ} -0'$ and $78^{\circ} -10'$ W Longitudes Covering area. Its altitudes ranges from 181 meter to 208 meter above the mean sea level. Dewai Railway Station 184.11 m, Bulandshahar Railway station is 201.46 m above mean sea level is displayed. Project area of I.W.M.P. BSR-II is lied in the Pahasu Block of Bulandshahar District which is come in the western plan zone under semi arid area. The annual average rainfall is near to 397 mm which an average of 35 rainy days. Out of which about 85% is received during the mansoon season from July to September and very less rainfall is received in the winter season.

Temperature ranges from as high as 43°C in the May-June to as $3^{\circ} -4^{\circ}\text{C}$ during December – January. The Trend of rain fall is highly eratic and maximum water goes as runoff.

Main occupation of the dwellers is agriculture in the watershed. Some part of the lands are shown during the Kharif season. Cane sugar are preferred crops in the project area. The main Crops raised are Wheat, Pea & Mustered and maze.

The topmost portion of the watershed is sloppy flat land. Other than topmost portion of the watershed is under soil erotic portion and depreciative. The soil of the land are sandy loam Soil. The middle agricultural position of watershed relatively smooth sloppy flat land with sandy loam soil texture. These soil is yellow in colour and are inherently good in fertility status.

Natural vegetation of the watershed is very poor. Somewhere forest vegetation is seen which are predominant with Vilayati Babool (*Prosopis Juliflora*), followed by Babool (*Accasia nilotica*), somewhere Neem Plants (*Azadirachta Indica*), Shisham (*Dolbergia Sisson*) and Karanj (*Pongamia Glabra*) are seen in occasional occurrence. There is no grass land in the watershed. Somewhere grass patches are seen only on the bunds, road sides and other such places. Coverage of massive green belt is in poor percentage for environment which is envisaged. That watershed is very poor climate area.

There is normal condition of animal physics and for their fodder arrangement is the watershed and creative possibility would be expected by the implementations of the project.

Due to Aerial soil erosion poor harvesting managements, cropping pattern, non treated watershed etc. are very anti effective causes for the watershed. Problem of the watershed is to be tackled by harvesting structures which have last most of their capacity new water bodies for the prevention of erosion and conservation of soil and moistures various type of earthen bunds in the watershed field, necessity has been observed. Wasteland will be treated with staggered Trenches, afforestation and bunding for the changing of characteristics.

The detail project report has been prepared by the applying of nine process steps for the micro watershed code no. 2B3E3c2a brief is as follows.

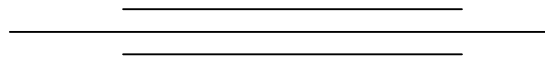
- STEP-1 Secondary data collection:-** During the five days visit programme in the micro watershed project with of all available documents of village label by approaching the Gram panchayat collected secondary data.
- STEP-2 Village meeting & conducting PRA exercise:-** Community meeting conducted on fix days for the consultation with villagers for the PRA Exercise. Participatory mode of the villages was positive indicated for the success of programm. With good in testing participation has been drawn social & resource map on ground & paper & discussed un various topics of problematic thoughts in the micro watershed.
- STEP-3 Socio economic survey:-** The resource organization of village label volunteers identified to conduct house hold socio economic survey/states.
- STEP-4 Probel typology analysis:-** Thoroughly analyzed the data & identified problem type as soil & moisture conservation, crop rotation, crop coverage, productivity, livelihoods, social issues & capacity building gaps etc. Problems discussed with the watershed committee & came up with alternative solution.
- STEP-5 Conduct of net participatory planning (NPP):-** The planning team visited together in the planning blocks on the scheduled date along with the beneficiaries of the villages & data gathered as for the participatory net planning.
- STEP-6 Productivity & livelihood planning exercise:-** For the product livelihood exercise, group discussion on various livelihood as Agriculture, Animal husbandry enterprise development held discussion with the villagers in the micro watershed.
- STEP-7 Institutional & capacity building :-** This plan is prepared based on the data available in the field and auscultations with the watershed committee.
- STEP-8 Data consolidation & documentation of DPR :-** After gathering all required information compiled collected data. Thoroughly discussed and finalized the expected outcomes and benefits specially in the respect of livelihood for different segments. These are the target and performers indicators for the micro watershed.

STEP-9 Conduct of Gram Sabha obtaining approvals submissions of DPR:-After preparation of the draft DPR convened to Gram sabha and activities proposed expected outcomes benefits of implementing the programm are explained in case of any changes are proposed in the Gram sabha approval obtained by the Gram sabha and already singed of Mau paper.

STEP-9A Attachment of detail estimate, cost and design:-Estimating, Costing and design prepared technically According to plan in the micro watershed project. And attached with the DPR.

STEP-9B Various type of mapping :- DPR prepared in the support of micro watershed project using various type of maps is as follows :

- | | |
|---------------------------------------|-----------------------------|
| 1. Index Map of Watershed | 2. Watershed Map |
| 3. Relief/ Drainage Map | 4. Slop Map |
| 5. Soil and Land Capability class map | 6. Land use/ Land Cover Map |
| 7. Cadastral map | 8. Proposed Action Plan map |
| 9. Social Map | |



Project Report

Table – 1 : Micro watershed project brief : -

1	State	U.P.
2	District	Bulandshahar
3	Block	Pahasu
4	Comprised Villages (Nos.)	06
5	Name of Watershed	Chatari Dehat
6	Name of MWS Project	Chatari Dehat
7	MWS Code No.	2B3E3c2a
8	Geographical Area of MWS	781.000
9	Treatable Area	711.000

1- Project Objectives :- The aim and objectives of the Project are :

- jj- Conservation, development and sustainable management of natural resources including their users.
- kk- Enhancement of agriculture production and productivity in a sustainable manner.
- ll- Restoration of ecological balance in the degraded and fragile rain fed ecosystem.
- mm- Reduction in regional disparity between rains fed and irrigated area.
- nn- Creation of sustainable employment opportunities for the rural community for livelihood security.
- oo- Generation of massive employment.
- pp- Reduce migration from rural employment.

2- Major Problem of Project Area :

- ee- Actual shortage of drinking water.
- ff- Near to nil activated water bodies and water harvesting structures.
- gg- Low depth of ground water table.
- hh- Undulated and generally sloppy rainfed area.
- ii- Large number of Small, Marginal and S.C. farmer land holding.
- jj- Lower wages of agriculture labour and also migration of labour due to shortage of employment in the watershed.

3- General Description :

(3.1) Location :-

Nagla Dalpatpur Watershed has been taken with MWS Code No. 2B3E3c2c in Pahasu Block of Distt. Bulandshahar is located on Bulandshahar via Diwai to Narau Via Pahasu road about 30 Km. between 28⁰15' and 28⁰ 15' N Latitudes and 78⁰0' and 78⁰ 10' w Longitudes. Location and delineation of watershed has been located on watershed map **Fig. 2** and on top sheet **Fig. 3**.

(3.2) Area and Elevation :

Elevation ranges from 181 to 208 mtr. above the mean sea level(MSL) altogether comprised villages and their's area is described as follows. (Comprises village map Fig. 3)

Table – 2 : Area and Elevation

Sl. No.	MWS Code	Block	Name of Village	Geographical Area	Treatable Area
1	2	3	4	5	6
1	2B3E3c2a	Pahasu	Chhatari	307.00	286.269
			Teyore Buzurg	30.00	28.000
			Sidhpur	190.210	180.101
			Pandraval	11.000	8.105
			Dhouraw	159.00	151.000
			Baram Nagar	84.790	57.525
				781.00	711.000

(3.3) Shape of the Micro Watershed:

The shape of watershed is Elongated and as Rectangular. The maximum length and width of the watershed are 5000 Mtr. and 1814 Mtr. respectively with the Length: Width ratio of 2.76:1.

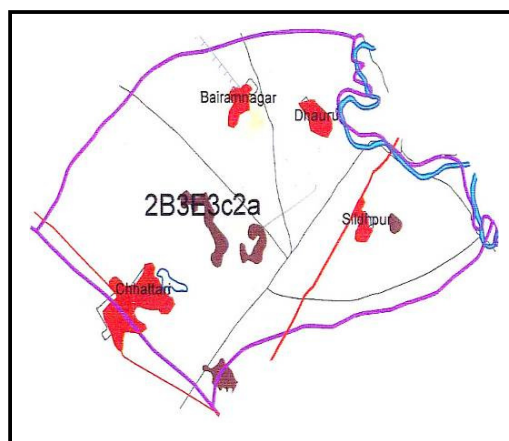


Fig. 1 (Shape of Micro Watershed)

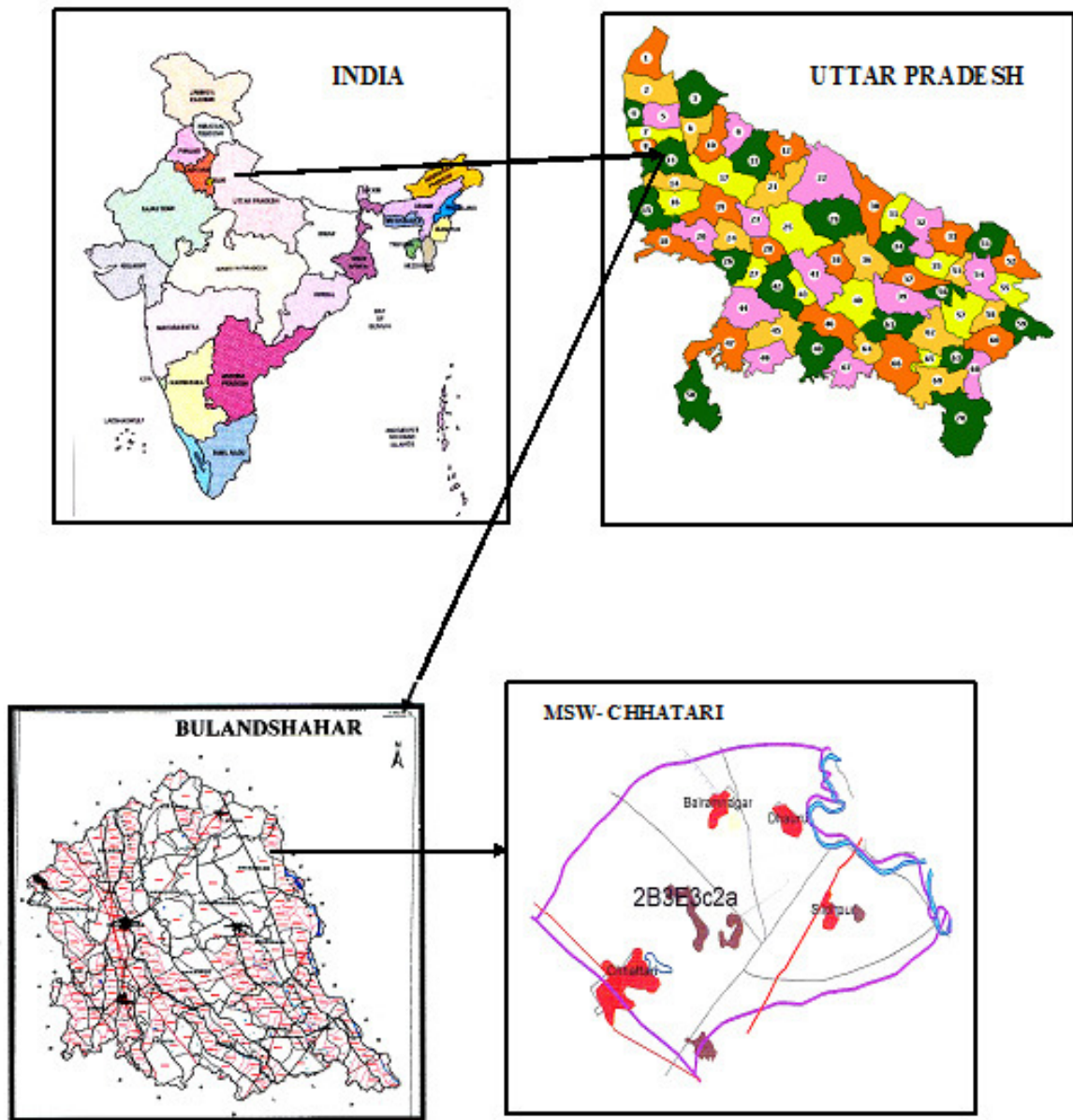
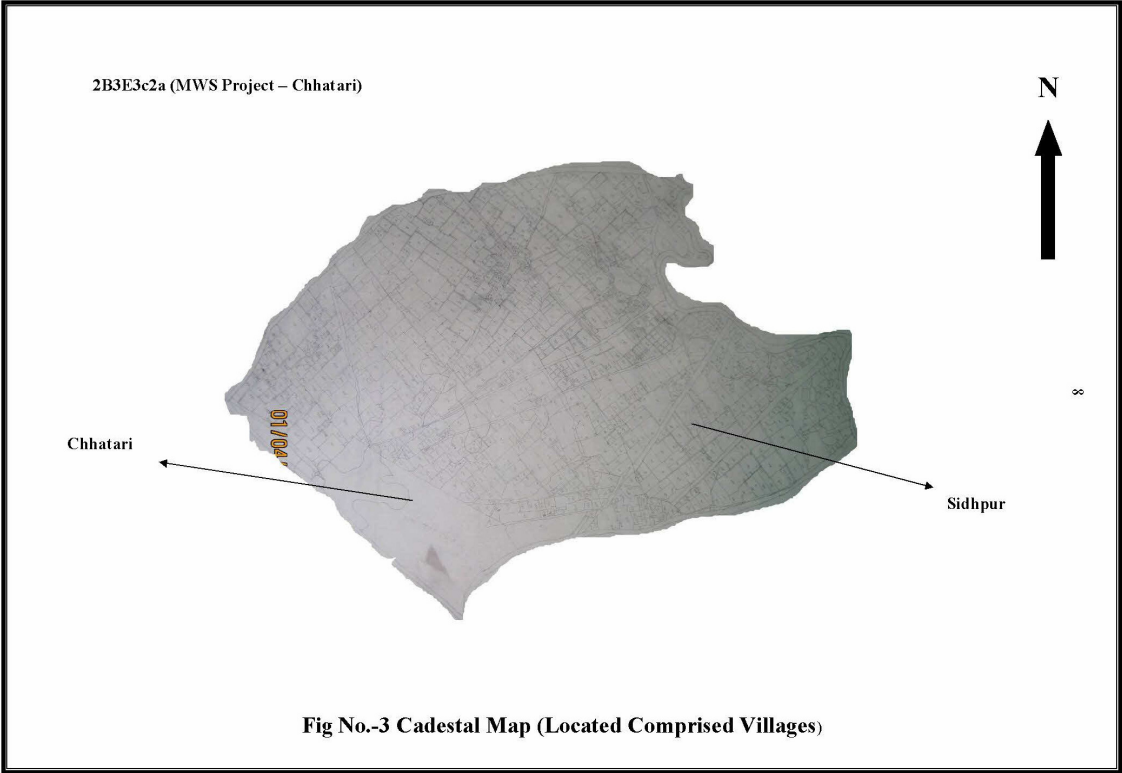


Fig.- 2 Location of the Micro Watershed



Sl. No.	Name of Project	Name of Village	Geographical Area (in ha.)	Raifed Area (in ha.)	Treatable Area	Agri. Land
1	2	3	4	5	6	7
1	Chhatari Dehat	Chhatari	307.00	280.00	286.269	305.00
2		Teyore Buzurg	30.00	20.00	28.00	29.105
3		Sidhpur	190.00	180.00	180.101	185.108
4		Pandraval	11.00	10.00	8.105	10.220
5		Dhouraw	159.00	101.00	151.00	148.800
6		Baram Nagar	84.790	35.00	57.525	80.220
Total			781.00	626.00	711.00	758.453

(3.4) Climate :

The Watershed falls under semi arid region of tropical climate inclined in Western Plan Zone. The average annual precipitation is about approx. is 397 mm. spreading over 35 rainy days. Most of the rain fall (about 85%) is received during July to September. The rain fall of moderate intensity. Nothing the area receives of scarcity rainfall in the winter season. The temperator variation ranges from as high as 43⁰c in the month of May-June to as low as 4⁰c in December-January.

(3.5) Geomorphology and Soils :

Geomorphology :

The entire watershed is topographically divided into major landforms. Accordingly the soils of watershed can be grouped into various categories such plane land, undulated land, sloppy land and erosic ravenous land.

Soil :

(a) Fine textured soil :

The soil are the most extensive soil group found in the watershed. Some portion of the watershed is relatively sloppy flat land with fine soil texture as sandy sandy loam. The soils are in color and are inherently good high in fertility status. Soil texture is sandy lome loam particularly in depressions and loam in the elevated portion. The soil characteristic texture is dispersive and smooth. Therefore without impede the downward movement of water productive layer of soil are easily by high runoff.

a- Coarse Textured Soil :

These soil are lying mostly in downward portion, along with erosic gully and drainage line upto end of watershed outlet. These soils are coarser in texture and are relatively poor in fertility status. The soils are lomy sand in texture. Rill and gully formation in same parts particularly near the outlet of watershed can be seen.

(3.6) Drainage and Slope:

Due to prevalence of mild steep slope and presence of a number of drainage lines in the watershed the drainage system is adequate. The watershed from part of Ganga Basin and watershed. Under mild to steep topographical slope of MWS as divided as follow : (Drainage and slope map fig.-4)

Table - 4 : Drainage and Slope

S. No.	Grade	Slope Percent	Area in Ha.	Remark
1	A	0.5-1	203	-
2	B	1-2	175	-
3	C	2-3	128	-
4	D	3-4	96	-
5	E	4-5	41	-
6	F	5-6	28	-

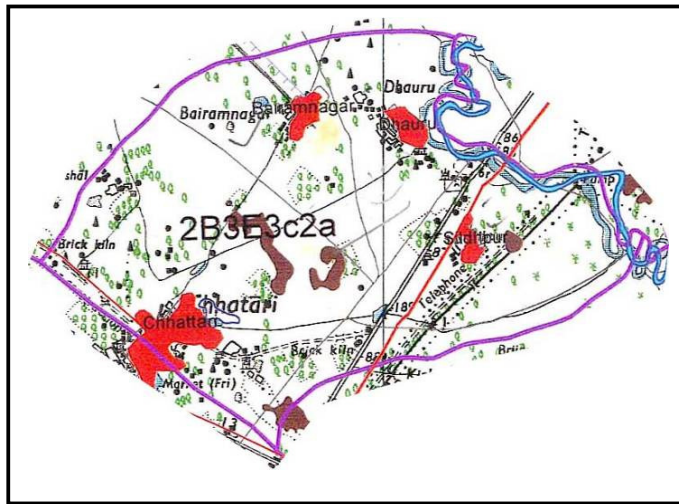


Fig-4 (Drainage & Scrub Map)

(3.7) Vegetation :

a- Natural Vegetation :

Natural vegetation is very poor in the watershed. The forest vegetation is predominant with Vilayti Babool (*Prosopis Juliflora*). There are occasional occurrence of Neem Plants (*Azadirochta Indica*), Shisham (*Dalbergia Sissoo*) and Karanj (*Pangamia Glabra*) and anywhere some scrubs are seen. There are no grass land in the watershed. Somewhere grass patches are seen only on the bunds, roadside and other such places. Poor percentage of massive green trees has been not seen in the watershed except Horticulture backyard.

b- Horticulture :

There is no backyards or commercial horticulture plantation in villages are been in some part of watershed.

c- Agroforestry :

The agriculture fields of the villages have some horticulture plantation at places isolated trees whose frequency is seen as under agroforestry and some where in where in backyards.

(3.8) Human Population:

a- Human Population:

Total Population of involved villages in watershed is 8936 with average family size of six persons as detailed as follows

Table – 5 : Human Population

S. No.	Name of village	Nos. of families	Human Population			Total
			Male	Female	Children	
1	Dhourau	515	1330	1191	1200	3721
2	Sidhpur	200	379	326	400	1105
3	Baram Nagar	440	615	565	1211	2391
4	Chhatari Dehat	400	415	420	390	1225
5	Pandraval	515	605	580	1208	2393
6	Teyore Buzurg	2034	3036	2091	2297	7424
	Total					18259

g- Categorization of Human Population :

In the total population of watershed villages, categories are defined as below :

Table – 6 : Population Categories

S. No.	Particulars	Unit	Number of families in population in the villages		
			Population	Family	Remark
1	2	3	4	5	6
1	Agri Farmer	No.	1000	400	
2	Landless	No.	50	25	
3	Agri. Labour	No.	300	125	
4	Land less Labour	No.	50	25	
5	BPL Family	No.	80	40	
6	SC Family	No.	200	100	
7	ST Family	No.	-	-	

(3.9) Land Holding :

All the categories of farmers as small, marginal, medium and large are involved in land holding average of about 1-18 ha. Small land holding farmers are further scattered at different places which makes cultivation very difficult. Distribution of term families according to the size of the land holdings are given as below :

Table – 7 : Distribution of farm families according to their size of land holdings

S. No.	Name of Village	Total Agri. Land in MWS	Land Holding Family (Nos.)					Percentage
			Marginal (< - 1Ha.)	Small (1-2 Ha.)	Medium (2-4 Ha.)	Large (4-7 Ha.)	Total	
1	Dhourau	148.800	105	20	12	8	145	
2	Sidhpur	185.48	115	24	16	6	161	
3	Baram Nagar	80.220	60	10	5	4	79	
4	Chhatari Dehat	305.00	170	40	12	6	228	
5	Pandraval	10.220	6	2	2	1	11	
6	Teyore Buzurg	29.105	16	6	2	1	24	
	Total	758.453	472.00	102	49	26	648	

(3.10) Live Stock Population :

Total live stock population of the watershed is 2911 Nos. Buffalos is preferred as much animal compared to Cow. But milk yield is poor. Goats are also kept for milk as well as for meat purpose. The breakup of livestock population is as follows :

Table – 8 : Live Stock Position

S. No.	Name of Village	Unit	Live Stock Position				Total
			Buffaloes	Cows	Bullocks	Goats	
1	Dhourau	No.	380	175	13	400	968
2	Sidhpur	No.	250	350	2	55	657
3	Baram Nagar	No.	500	150	25	40	715
4	Chhatari Dehat	No.	300	115	16	120	551
5	Pandraval	No.	500	200	18	30	748
6	Teyore Buzurg	No.	2082	2385	1431	180	6078
	Total		4012	3375	1505	825	9717

(3.11) Infrastructure Social Feature :

- a- Comprised villages in the micro watershed has moderate communication facilities. Watershed linked with metaled road and approachable through motarable road.
- q- All the villages are electrified and have T.V. and Telephone connection.
- r- Literacy rate in the watershed is very low all villages are having education upto Junior High School.
- s- Nearest small market is at Sayana 13 Km. Nearest big market Bulandshahar is about 55 Km. from watershed. Religious and ritual features are almost common as in other parts af U.P. small land holding with large family size and more than 25% of the labour force of the total population living below poverty line indicate poor socio economic status of the watershed community.

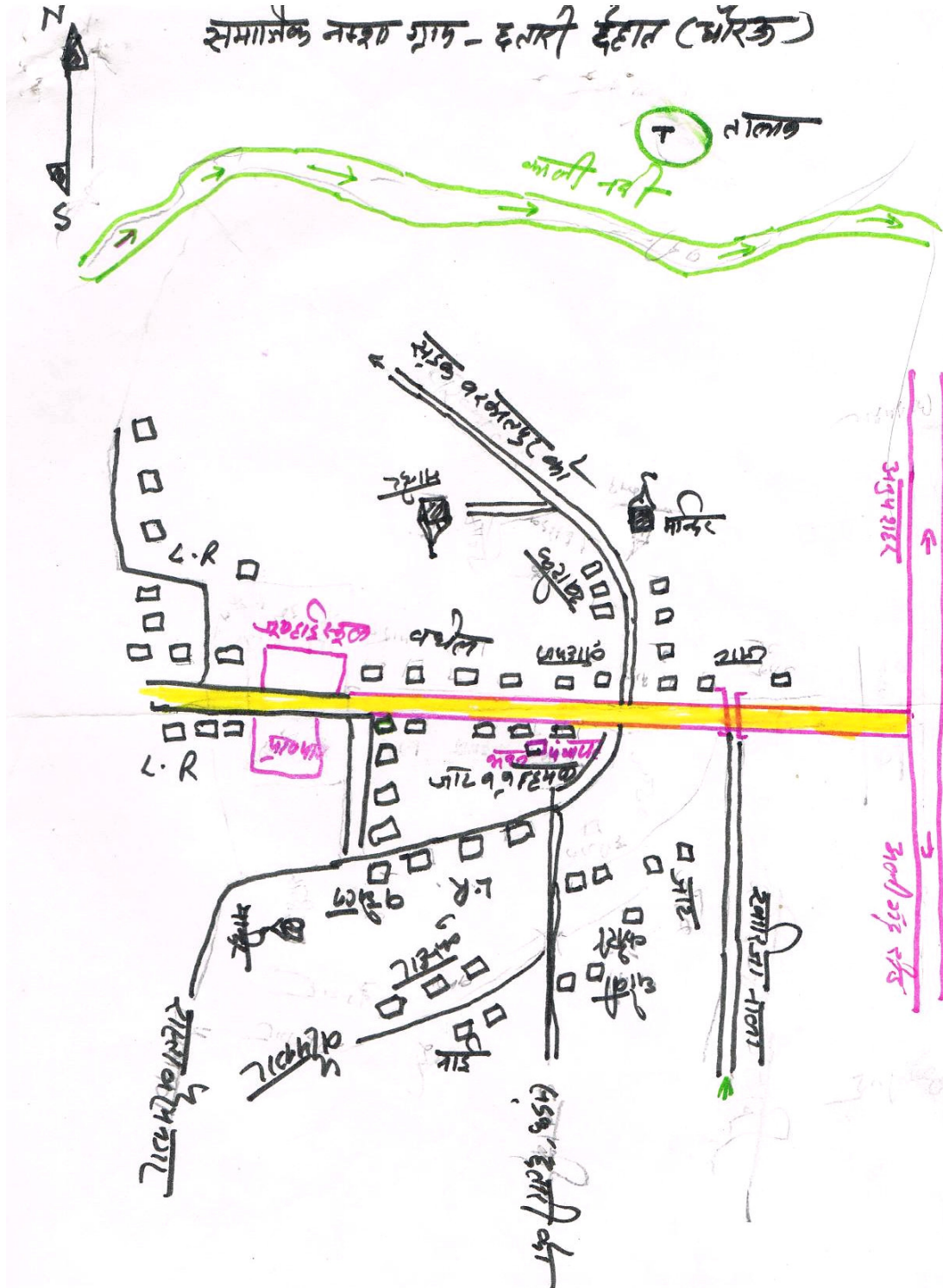
Participatory Rural Appraisal

Participatory mode of the villagers shows positive indication for the success of the programme. Traditionally the entire village community participate in the individual works. Social map of one of the watershed village drawn by villagers themselves, depicting various village figures is shown in sketched map in Fig.-4 & 5. Infrastructures position of the village recorded as follows :

Table – 9 : MW.S. Project – Surjawali.

S. No.	Infrastructure	Unit	Qty.
1	2	3	4
1	Primary School	No.	2
2	Junior High School	No.	1
3	Kanya Pathshala	No.	-
4	Public Health Center	No.	-
5	Vet nary Hospital	No.	-
6	Panchayat Ghar	No.	1
7	Post Office	No.	-
8	Agan Bari Center	No.	-
9	Electricity	-	Yes
10	Road	-	Yes
11	Pond	No.	1
12	Hand Pump	No.	29
13	Irrigation Well	No.	20
14	Canal	No.	1
15	Temple	No.	3
16	Well (Drinking Water)	No.	No
17	Pumping Set	No.	25
18	Toilet	No.	15
19	Market	No.	-

SOCIAL MAP



Recorded importance of development institution

Farmers perception recorded for importance and role of different development institution in relation to infrastructure. Importance has been depicted with size of circle and role with distance from village circle. (Fig 8)

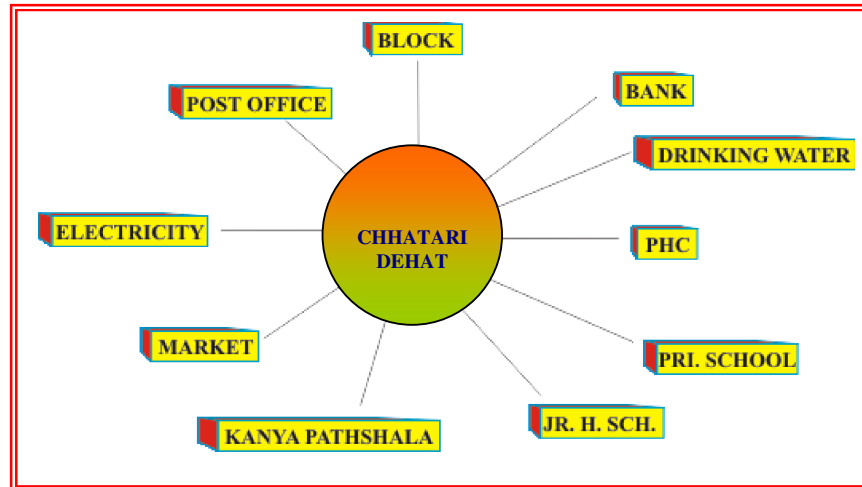


Fig. -8 (Venn diagram of Micro watershed)

(3.12) Communication :

Watershed can be approached from District Headquarter Bulandshahar to Project area 35 km. by Road.

(3.13) Natural Resource Base :

Transact of watershed showed typical land use profile consisting of plain agriculture land, erodic area and medium ravenous ridge. Main source of the irrigation are the canal for pre showing irrigation only. The total geographical area of the watershed is 711.00 Ha. classification.

Approach roads for the micro watershed is shown for the communication is shown on topo sheet map Fig 9 as next page.

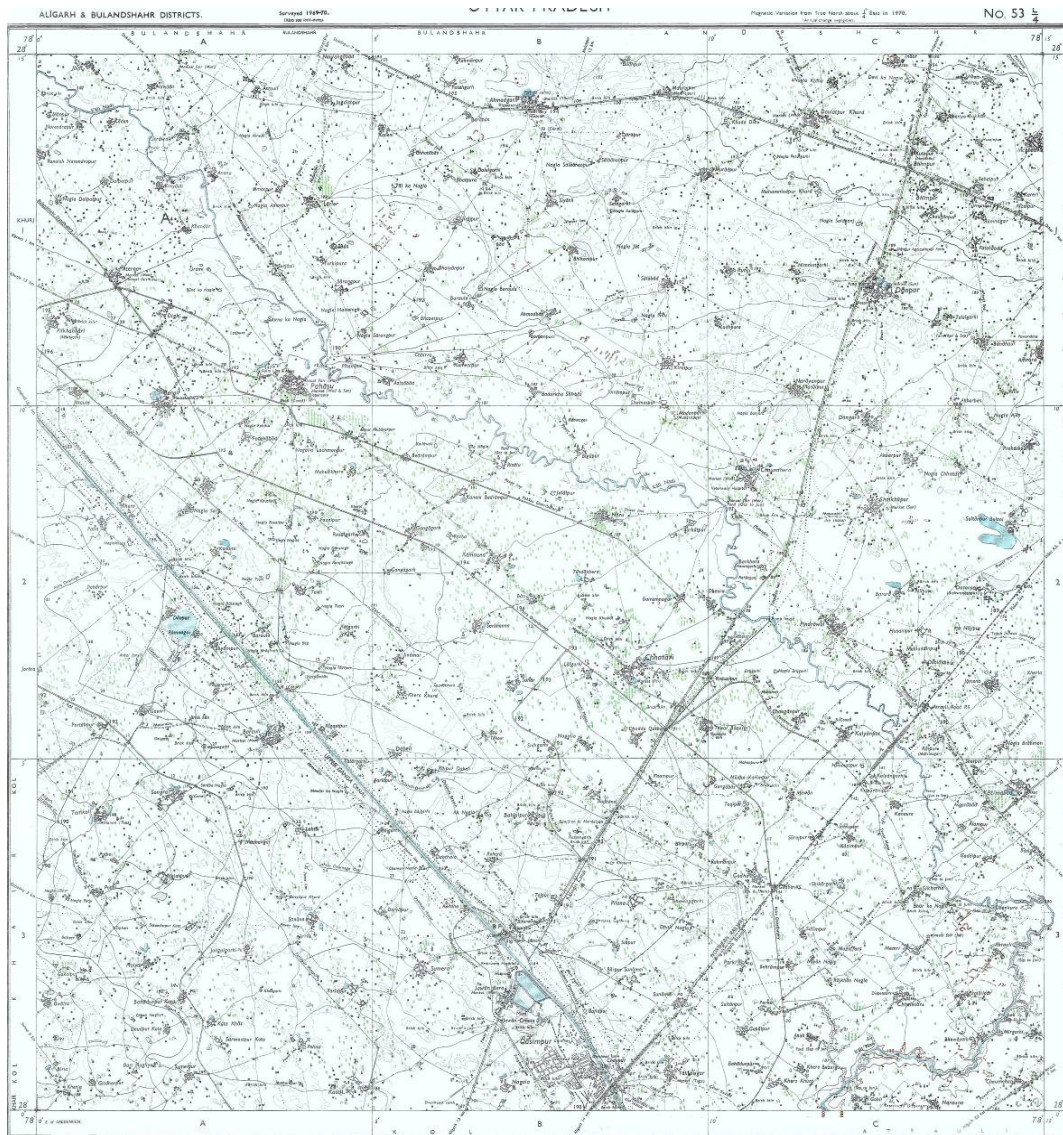


Fig.- 7 Communication Map on Toposheet

Table – 10 : Classification of area(Hect.)

S.No	Name of Village	Unit	Total Geographical Area	Rainfed Area	Wasteland	Village Land and Road	Irrigation Resource	
							Water Bodies	Borewell
1	2	3	4	5	6	7	8	9
1	Dhourau	Ha.	159.00	101.00	2.525	1.575	1.608	80.00
2	Sidhpur	Ha.	190.210	180.00	4.225	2.101	14.605	105.00
3	Baram Nagar	Ha.	84.790	35.00	0.975	0.390	10.101	12.00
4	Chhatari Dehat	Ha.	307.00	280.00	4.275	4.275	15.200	150.00
5	Pandraval	Ha.	11.00	10.00	0.875	0.625	-	-
6	Teyore Buzurg	Ha.	30.00	20.00	0.565	0.115	-	-
	Total		781.00	626.00				

(3.14) Livelihood :

Total Population of the watershed is 8936 and out of the total population a majority more than 80% has farming as their major source of livelihood followed by labours, serviceman and small business class. Classified livelihood given in form as follows :

Table – 11 : Livelihood Classification in population :

S. No.	Name of Village	Farmer	Labour	In Service	In Local small business	Others
1	2	3	4	5	6	7
1.	Dhourau	515	300	80	120	-
2.	Sidhpur	412	220	15	10	-
3.	Baram Nagar	440	320	80	40	-
4.	Chhatari Dehat	400	280	20	100	-
5	Pandraval	400	150	80	60	-
6	Teyore Buzurg	700	215	60	40	-
	Total					

(3.15) Dependency of forest fuel wood and fodder :

- a. Fuel wood :-** The main source of fuel is from cow dung cake, woody stem of crops. About 70% of the climactic energy requirement is met from the agriculture by product and cow dung cake. Rest is met out from the forest outside the village and watershed boundary, most preferred fuel wood is Juliflora fuel wood Juliflora obtained from standing along and between watershed.
- g- Fodder :-** Villages have not any sufficient signified dependency on forest based fodder as these resource are nothing availability in the forest.

(3.16) Labour requirement :

Labour requirements was found to be maximum at the time of October, November and December when the sowing of Rabi crops are done. The crucial periods are March and April coinciding harvesting and threshing of Rabi crops and July/August is sowing Kharif Crops take a little place. Other income generating enterprises having potential during the remaining.

(3.17) Crop Rotation :

Present Crop rotation in the watershed comprise of :

Kharif	-	Bajra	-	Rare
		Maize	-	Rare
		Jwar	-	Rare
Rabi	-	Fallow Wheat	-	Major
		Fallow Barly	-	Major
		Fallow Sugarcane	-	Major
		Fallow Mustard	-	Major
Zayad	-	Urad, Moong, Makka		

The above said Rabi Crops is the most prevailing crop rotation on the agriculture lands both in the rainfed and irrigated conditions.

Organized vegetable cultivation fruit plantation and traditional agro forestry systems are lacking as per requirement in the watershed the limited vegetable cultivation in the watershed is confined as kitchen gardens and field to the irrigated condition in a scattered manner. The cultivation of cash crops other than the sugarcane, wheat and mustard also in the watershed.

(3.18) Historical Events :

Chronological record of important events of the watershed village is prepared through participatory rural appraisal (PRA) which is very useful in understanding of its background and chronology is given as follows :

Table – 12 : Historical Events

S. No.	Events/Activities	Year	Rem.
1	2	3	4
1	Established	1857	
2	Opening of Primary School	2000-01	
3	Opening of Junior School	2005-06	
4	Opening of Kanya Pathshala	-	
5	Opening of PHC	-	
6	Opening of Vet. Hospital	-	
7	Panchayat Ghar	2000-01	
8	Introduction of Tractor	1995	
9	Gobar Gas Plant	-	
10	Thresher	1996	
11	First Tube well/Pumpset	1975	
12	First Motorcycle	1980	
13	T.V. & D.V.D. Players	2000-01	
14	Electricity in Village	2003-04	
15	Bituminous Road	2002-03	
16	First Hand Pump	1968-69	
17	Templo Renovation	1950-51	
18	First Land Line Telephone	2000-01	
19	Planning for Watershed Project	2011-12	

(3.19) Present Land Use in the Watershed :-

The watershed has diversified land uses. The varied present land use under different use in the watershed. The mixed land use followed in the watershed is almost similar in other parts of U.P. During P.R.A. Exercise prepared land has been shown in Table No. 13, 14 & 15.

Table – 13 : (Ownership)

S. No.	Name of Village	Pvt. Agri. Land		Govt. Revenu Land	Forest Land	Other Land
		S.C./S.T.	Others			
1	2	3	4	5	6	7
1	Dhourau	12.40	136.40	-	-	-
2	Sidhpur	14.50	171.58	-	-	-
3	Baram Nagar	-	80.220	-	-	-
4	Chhatari Dehat	2.15	277.85	-	-	-
5	Pandraval	3.200	7.020	-	-	-
6	Teyore Buzurg	2.20	27.85	-	-	-
	Total					

Table –14 : (Present Land under different categories)

S. No.	Name of Village	Land Use (Ha.)				Total
		Agricultural	Wasteland (All Types)	Seasonal waterbodies	Village/Raod Etc.	
1	2	3	4	5	6	7
1	Dhourau	148.800	2.525	-	1.575	
2	Sidhpur	185.108	4.225	-	2.101	
3	Baram Nagar	80.220	0.975	-	0.390	
4	Chhatari Dehat	305.00	4.225	-	15.200	
5	Pandraval	10.220	0.825	-	0.625	
6	Teyore Buzurg	29.105	0.565	-	0.115	
	Total					

Table – 15 : (Present land use classified)

S. No.	Land Use Under	Unit (ha.)	Area (Ha.)	Percentage
1	Under Agriculture			
	A- Rainfed-			
	I- Crops		491.85	70%
	II- Agro forestry		51.75	80%
	B- Irrigated-			
	I- Assured			
	II- Portial		120.55	18%
2	Wasteland			
	A- Aforestation			
	B- Pasture			
	C- Untreatable			
	D- Treatable		148.52	100%

n given on Page No. 32

4- Focus on Present Land Use :

(4.1) Agriculture :

The total area under agriculture in the watershed is about 487.89 ha. out of which 574.00 ha. is under rainfed agriculture. Agriculture land uses in the watershed extended to diversified land capabilities starting marginal to good class II land. The irrigated and drinking water is most scarce natural resource in the watershed. The operation of tube well for irrigation of agricultural crops frequently leads to the drinking water. Problem to the farmers of watershed forcing them to carry drinking water from outside of the watershed area. The agricultural field bund are common in the watersheds however they frequently breach on heavy rains.

Various mixed texture of soils are located in patches through out the watershed. The heavy soils are almost kept fallow during rainy season. the agricultural soils also have some as share calcium pan at variable depths. The irrigation water is conveyed by the earthen channels. Surface irrigation methods following mainly border method of flood method by the formers in the watershed. These factors reduce the water use efficiency of limited and valuable irrigation water.

Drought hardy species like Juliflora suitable multi purpose trees is suitable for rehabilitation of the wasteland. Rehabilitation of waste lands promoting agro forestry with appropriate fruit and forest species suitable vegetative barriers on sloppy lands can be high future value and by these adoption would be meet out many demands of fire wood and fodder in the wasteland. Except above but also for soil and water conservation, rehabilitation of wasteland and sustainable income generation for socio-economic upliftment of farmers.

Crop Productivity :

The farmers also do not have suitable cropping system to deal aberrant weather. Weeds impose considerable constraint in productivity of both Karif and Rabi crops under irrigated as well as rainfed production system farmer undertake normally one manual weeding in mustard and other valuable crops however, practices is energy and time consuming. Use of we decide is rare in the watershed.

In the watershed area, limited cropping in the Kharif with mixed cropping practices is not only irrigational but also unscientific and best for low productivity. Subsequent Rabi crops in general. Sugarcane & Mustard crop in particular are raised on residual soil moisture under rainfed production system during post mansoon season.

(4.2) Indigenous Technological Knowledge (ITK) :

Under process of PRA tracked out rural applying technology in various field of local technology and some technology is very popular in village. In which the agriculture is an old traditional practices of farmers who have improved themselves with passage of the time according to their domestic needs and technological reforms in the nearby areas. The villages have their traditional village ponds, practice of field bunding which typically constitute agricultural related ITKs in the watershed. The Mustard & sugarcane being a cash and firewood crop of the watershed and also sugarcane crop is being. Cultivated in self designed manner by the farmers. Its carried

out that the area is totally depend on rain and under the rainfed area technology is applied by the farmers. However limited fertilizer application specifically the DAP came in the practices since about 15-20 years.

(4.3) Forest and Other Vegetation :

Forest :

The watershed have a tract of wasteland area which are under uncultivable position is liesed in the watershed. These wasteland have not any tree vegetation or very less than real requirement for the wasteland use.

Horticulture/Agro forestry :

Horticulture and agro forestry practices were observed in the watershed.

(4.4) Agro forestry :

Agro forestry practices are lacking in the watershed. Though it has good potential under existing disposition and may a role particularly with respect to minimization of cropping risk, built up soil fertility and productivity, protection of soil erosion, soil conservation partly meeting out the fire wood demand of rural community and more over optimizing the economical return from system as whole under typical semi arid climate in the watershed. Bund and boundary plantation also have good potential to care the fire wood and fodder demands of the rural community in the watershed. The existing area under agro forestry is almost negligible. Prosopis Jhliiflora may be planted as block or sole plantation specifically on marginal and degraded land in the watershed.

The agro forestry interventions comprising of ber, bail, aonla, guava, papular etc. may be applied for benefit of the farmers under rainfed to irrigation production system on leveled to slopping and marginal agricultural using proper planting techniques and term it control measures.

The multipurpose trees may be also help in supplementing fire wood and fodder demands of the rural community in the watershed and my be planted as hedge rows on rainfed, marginal and degraded lands.

(4.5) Horticulture :

Fruits and vegetables practices are lacking in the watershed area. Its practices may be sustainable very good potential for the formers of watershed. There are a limited lack fruit trees in number like mango, guava, lime, ber, aonla and papaya fruit trees well as vegetables like radish, okra, tomato, cabbage, garlic, onion, chilly, bringer and cucurbits but they are found surviving well in the watershed villages. Organized orchards (vatika) commercial vegetable cultivation horti-agri and other systems of agro forestry etc. are lacking but have good agriculture.

5. Soil and land capability classification :

(5.1) Soil Morphology :

Watershed is located North East corner of Bulandshahr Distt. near about 55 Km. away. The entire terrain of watershed is topographically divided into various land forms. Accordingly the soils of watershed have been grouped major categories is given as follow :

Hill Terrain	Plane Land Sloppy	Undulated Land	Rill Erosic Land	Moderate ravenous
-	25%	20%	15%	6%

Given categories in the blocks is located the soil morphology in the watershed areas. Representation of soil characteristics by soil profile is represented as follows :

Soil Profile :



Fig. – 9 (Soil Profile)

Table – 16 : (Morphology of a Typical Soil Profile) :

Horizone	Depth in Cm.	Morphology
1	2	3
A V & H	0-150	Silky when moist, Hard when dry quick soluble, high elasticity, fissures, and cracks, occasional occurrence of free calcium carbonate granules black in colour, clay content 29%, PH- 8 to 8.7
B V & H	150-160	Whitish yellow in colour, very fine mixed with free cacaos and gravels, Hard when dry compact and indurate hard pan restricting development of root and down ward water transmission.
C V & H	7600	Red and white sand stone

(5.2) Soil and Characteristic and Fertility Status :

Soil characteristic pertaining to soil fertility of various classes accruing around villages in the watershed are given as follows :

Table – 17 : Soil Characteristic & Fertility Status :

Sl. No.	Soil Properties	LCC-II	LCC-III & IV
1	2	3	4
1	Sand %	47.05	77.05
2	Silt %	24.52	19.04
3	Clay %	28.30	6:3:6
4	Texture	Sandy Clay	Lomy Sand
5	PH (1:2)	8.58	9.02
6	Organic Carbon %	0.44	0.14
7	Available N Kg ha ⁻¹	315	175
8	Available P Kg ha ⁻¹	28	15
9	Available K Kg ha ⁻¹	192	328
10	EC (dS m ⁻¹)	0.48	0.12

(5.3) Land Capability Classification (LCC) :

Land capability classification (LCC) was done to classification the soils in different groups based upon the limitations and to emphasize the hazards prevailing in the watershed in order to find out the different topo-sequences, landforms, soil depth and erosion hazards. This was followed by the detailed investigation of selected landforms to bring out the LCC classes of the Watershed. Classes of land capability namely II, III, IV and V are demarcated in the watershed. The areas under different classes are shown as follows :

Table – 18 : Land Capability Classification (LCC) :

S. No.	Land capability class	Area in Ha.	Colour
1	2	3	4
1	I Class	-	-
2	II Class	110.353	-
3	III Class	427.400	-
4	IV Class	128.150	-
5	V Class	92.55	-
6	VI Class	-	-
7	VII Class	-	-
8	VIII Class	-	-

Land capability classification of various agricultural practices under land use can be classified as groups, class, sub class and units. Utilization of various land class is given as follows :

Table – 19 : Utilization of various land uses

S. N.	LCC	Forestry	Ltd. Grazing	Light Grazing	Dense Grazing	Limited Agriculture	Light Agriculture	Dense Agriculture	More Dense Agriculture
1	I								
2	II								
3	III								
4	IV								
5	V								
6	VI								
7	VII								
8	VIII								

(5.4) Land Capability Class II & III :

This group is one of the most extensive LCC watershed. and also near to class III for the agricultural practices. The soils are sandy & sandy loam in texture. The land under this class is nearly level to mild sloping (1-3%). The soils are deep and erosion hazard is slight. Most of the productive agriculture land comes under class II & III. These lands potentially very productive but due to rainfed a single cropping pattern is in habitation.

(5.5) Land Capability Class IV :

This class is found in lower portion near the outlets of watershed. The soils are coarser in texture, deep, erosion hazard and undulating in topography. Rill and initiation of gully can be seen near the outlet of the watershed.

(5.6) Land Capability Class VII & VIII :

This class of land is not found in watershed. Somewhere lack of soil are found with admixture gravels fragments in these classes of lands.

(5.7) Conclusions :

The majority of land form is coming under class II, which give an insight of good agriculture production potential of the watershed.

The land capability classification provides reasonable good information with regard to capability of soil, that could be used for agriculture, agrihorticulture, silviculture and posture development.

The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like bunding practices.

The reasonable area is under watershed of wasteland and other wasteland including grater potential of this watershed for forestry and pasture development. Rare places namely water body of low portion of land area under seasonally works as water harvesting structures and these harvested water is used or can use for some other beneficial activities during the crop season also.

6. Problems and needs of the watershed indentified during the PRA

(6.1) Problem Identification and prioritization :

z- The are has undulating topography, steep unstable slopes, gradient of excessive branches of rills and hence highly prone to soil erosion.

aa- Major issues addressed to food sufficiency economic growth and environmental security in the watershed area.

- bb- Effective soil depth is limited and highly variable hampering good crop growth.
- cc- The watershed have low productive cropping due to tradition single cropping pattern and over all average crop production percentage not sufficient against requirement.
- dd- Identified that there is no assured irrigation system has been development capacity of water bodies are reduced due to silt ration which are utilized to store of rainy water and they are renovatable.

(6.7) Transact walk during the PRA :

Problems identified and prioritized during the transact walk and PRA exercises in all comprised villages of watershed. There were pooled and a list of problems representing the whole watershed was prepared. Problems were ranked as per their total weight age in the watershed village.

Table – 20 : Ranking of Problem identification and prioritization of watershed

S.No.	Problem	Rank
1	2	3
1	Lack of irrigation	4
2	Lack of drinking water	7
3	Low production of field crops	6
4	Lack of fodder availability and low productivity	3
5	Lack of availability of fuel wood	2
6	Lack of market facility	6
7	Lack of quality seeds, fertilizer, pesticides etc.	4
8.	Medical and Health care facilities for milching animals and low productivity.	8
9	Lack of medical, educational and transportation facilities	9
10	Lack of water bodies renovation	7
11	Lack of run of earthen check bunds	2
12	Lack of water harvesting structures	2
13	Lack of livelihoods opportunity	3

Prioritized ranking (Upto four Numbers) :-

- 16- Lack of earthen check bunds.
- 17- Lack of livelihood opportunities.
- 18- Lack of irrigation water was the greatest problem. Lack of irrigation water problem experienced by the people followed by low crop production.

(6.3) Analysis of SWOT of the watershed :

Strength (S), Weakness (W), Opportunity (O) and Threat (T) analysis is a useful decision support tool. A SWOT analysis of watershed is presented as follows :

SWOT analysis of the watershed

<p style="text-align: center;">Strengths (S)</p> <ul style="list-style-type: none"> li. Cooperative work culture in traditional activities lii. Close ethnic ties liii. Road at the top as well as outlet of the watershed liv. Hard working lv. Resource pool of crop genetics diversity lvi. Awareness of farmers about watershed management programme lvii. Well established CPR maintaining and sharing system lviii. Stall feeding of animals lix. Well maintained seasonal water bodies lx. Social outlook of the community towards land less 	<p style="text-align: center;">Weakness (W)</p> <ul style="list-style-type: none"> xlvi. Poor water management xlvii. Resource poor farmers xlviii. Out migration of youth xliv. Low and erratic rainfall l. Fragile geology li. Fragmented land holding lii. Heavy infestation of wild animals liii. Problem of fuel and fodder liv. Shallow soil depth and with high percentage of gravel
<p style="text-align: center;">Opportunities (O)</p> <ul style="list-style-type: none"> xxxii. Wide range of annual and perennial crops xxxiii. Scope of regular employment opportunities to check out migration xxxiiii. Strengthening of existing irrigation system xxxv. Conducive climate for rainfed crop diversification xxxvi. Good scope for Agro forestry and dry land horticulture xxxvii. Potential for collective action and management of CPR 	<p style="text-align: center;">Threats (T)</p> <ul style="list-style-type: none"> xxvi. Prone to adverse climate like drought xxvii. High market risk xxviii. Social conflicts owing to PRI and WSM policies and local politics xxix. Weak coordination among line departments xxx. Lack of expertise of implementing agency in different aspects of WSM

7. Proposed land use for the watershed :

Watershed management plan preparation due importance is given to topographic, land suitability, irrigation potentially, prevailing farming systems, micro farming situation, farming, farmers preferences and priorities along with economic and environment securities.

Crop and tree selection and area distribution was done as per farmers priorities revealed through PRA exercise.

The watershed management plan for watershed is prepared with specific objectives of food sufficiency, income and employment generation with environment security.

Technical options were with the ITK based on the latest available experiment findings. Due attention was given to the resource of the farmers and adjustments were made in capital intensive resource demanding technological outputs while making them adoptable to the resource poor farmers. Emphasis was given on maximum use of farm yard manure. The proposed land use plan of the watershed is shown as follow as in table

Table – 21 : Present and proposed land use plan of the watershed

S.No.	Land use	Present (ha)	Proposed area (ha)
1	2	3	4
1	Agriculture		
a	Rainfed		
	I Crops	482.425	540.105
	II Agro-forestry	82.25	95.107
b	Irrigated	-	-
	I Assured	-	-
	II Partial	125.605	145.165
2	Waste land	-	-
a	Aforestation	-	-
b	Pasture	-	-
c	Untreatable	75.00	-
d	Treatable	711.00	711.00
3	Village land	781.00	781.00

(7.1) Status of Present Water Resources Utilization :

Watershed is having some canal system. Management and maintenance of these canal are required. Before sowing of Rabi crops, water from these canal is issued as supplementary irrigation for Rabi sowing ar allowed to go as waste. After releasing water from canal, submergence area also put under cultivation.

Some where bore well irrigation applied by the farmers in the watershed.

(7.2) Proposed Plan for Irrigation Development :

- a- Present system of irrigation and wastage of water during October–November need to be made more efficient from water management point of view by minimizing conveyance losses in the existing water courses.
- b- Present irrigation canal capacity have to build up by the reform. Which are lack capacity of water.
- c- Construction of new water harvesting earthen structures, Pucca Check Dem, Series Gully Plugging, etc. has been sloppy portion to increase irrigation potential and for recharging of ground water, soil and moisture conservation maximum field irrigation, best production and expected change of crop rotation.
- d- The up gradation of the exciting system of irrigation will result in :
 - i- Minimization of conveyance losses.
 - ii- Increase in frequency of irrigation.
 - iii- Adoption of high yielding varieties of crops.
 - iv- Assured cultivation of cash crops.
 - v- Capacity buildup by the planning of new water harvesting structures.

(7.3) Ground Water Recharge :

For the purpose of ground water recharge, the area of the upper side of watershed is recommended for Field Bunds, Contour Bunds, Peripheral Bunds and Submergence Bunds and in the lower portion Contour Staggered Trenches, Gully Plugs, Earthen Check Dem and Pacca Outlets. In the undulated sloppy portion of the watershed recommended water harvesting structure for dual purpose as ground water storage and under ground water recharge.

(7.4) Crop Production :

Practices proposed in the watershed is given as follows :-

- a- Mulching and crop residue management.
- b- Application of green manuring.
- c- Vermi Composting.
- d- Crop rotation and inter cropping.
- e- Biofertilizers.

(7.5) Tillage Operation :

Deep tillage technology is proposed to apply to be demonstrated for benefit of farmers in the watershed.

(7.6) Improved Seeds of High Yielding Verities (H.Y.V.) :

Recommendation of improved varieties is necessary for improving the productivity and farm income. Through replacement of low yielding traditional varieties of seeds in villages of watershed.

(7.7) Balanced Fertilizer Use :-

Demonstration of use of fertilizer in various crops of watershed recommended balance fertilizer use in different crops will be benefited of forming community.

(7.8) Control of insects and diseases :

Aphid in the mustard 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 pest and diseased will also be demonstrated in the watershed for benefit of the growers.

(7.9) Dry Land Horticulture :

Such portion of dry land in which proposed horticulture development planning recommended species like Ber, Bel and Aonla will be planted at suitable spacing in the watershed.

(7.10) Agri Horticulture :

Aonla and Sahjan would be suitable horticultural crops to the locality. Therefore, a part of land in the farmer field shall be selected and brought under Agri-horticulture system. The cropping system followed will be Jwar and Wheat.

(7.11) Plantation (Fuel wood) :

Such a portion which are under wasteland will be taken falling in the class-IV category in the watershed. These lands will be planted with species like Vilayati Babool (Prosopis Juliflora), Babool (Acacia Nilotica), Karanj (Pangamia Glabra).

9. Socio Economic Analysis of the of the Project :

(9.1) Sustainability and environment security :

The proposed land use plan will improve the land utilization index and crop diversification index significantly as compared to the existing one. in the proposed watershed management plan proper blending of the bio engineering measures will be applied on above 80% of the total area of watershed. It is estimated that more than above 70% of the watershed area will be treated and consequently the soil loss and runoff from the area is expected to be reduced by 70% respectively.

It will help in maintaining ecosystem integrity on sustained basis along with improving the livelihood security of the farming community.

(9.2) Economic Analysis :

Economic analysis of the project was carried by taking direct benefits and costs considering 10 years for project life at 10% discount rate. Whole watershed development plan was divided into three sector as agriculture, horticulture and forest/Fuel wood plantation. Net Present Value (NPV) and Benefit Cost ratio criteria were applied judge the economic efficiency of each enterprises and sector. Net present value (NPV) of the project life is considered to be 10 years and discount rate for NPV estimation is 10% is given NPV and benefits as follows :-

Table – 22 : Present productivity income analysis :

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	3.00	4300.00	12900.00	6450.00	6450.00	1:1
		Moong	3.00	4500.00	13500.00	6075.00	7425.00	1.22:1
		Jwar	4.80	600.00	2880.00	1584.00	1296.00	0.82:1
		Wheat	18.50	850.00	15725.00	8650.00	7075.00	0.82:1
		Pea	7.50	2250.00	16875.00	10970.00	5905.00	0.54:1
		Mustard	3.50	1850.00	6475.00	3235.00	3240.00	1:1
Total		-			105105.00	54105.00	51000.00	0.94:1
Average		-			13138.00	6763.00	6375.00	0.94:1
B	Forestry	Vilayati				15000.00	-	Nil
		Babool						
C	Horticulture	Ber				20000.00	-	Nil
		Aonla				20000.00	-	Nil
		Bel				20000.00	-	Nil
Total		-				60000.00	-	Nil
Average		-				20000.00	-	Nil
Grand Total								

Table –23 : Post productivity and income analysis for Post Productivity**Value and B.C.:**

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	4.00	5000.00	20000.00	8325.00	11615.00	1.39:1
		Moong	4.00	5000.00	20000.00	8200.00	11800.00	1.44:1
		Jwar	5.50	800.00	4400.00	1900.00	2500.00	1.32:1
		Wheat	25.00	1000.00	25000.00	11680.00	13320.00	1.14:1
		Pea	1.00	3300.00	31350.00	14810.00	18540.00	1.12:1
		Mustard	5.00	2500.00	12500.00	4370.00	8130.00	1.86:1
Total		-	-	-	172250.00	72845.00	99765.00	1.38:1
Average		-	-	-	21531.00	9061.00	12471.00	1.38:1
B	Forestry	Vilayati Babool	80.00	500.00	40000.00	15000.00	25000.00	1.67:1
C	Horticulture	Ber	35.00	1500.00	52500.00	20000.00	32500.00	1.63:1
		Aonla	35.00	2000.00	70000.00	20000.00	50000.00	2.50:1
		Bel	40.00	1500.00	80000.00	20000.00	40000.00	2:1
Total		-	-	-	182500.00	60000.00	122500.00	2.04:1
Average		-	-	-	60833.00	20000.00	40833.00	2.04:1
Grand Total		-	-	-	1394750.00	147485.00	247265.00	1.68:1

Table –24 : Summary of NPV, PPV and B.C. Ratio (Sector wise) :

S. No.	Name of Sector	NPV		PPV		B.C. Ratio
		Expend.	Net Income	Expend.	Net Income	
1	2	3	4	5	6	7
1	Rain fed Agriculture	54105	51000	72485.00	99765.00	1.38:1
2	Forest/Fuel wood Plantation	15000	-	15000	25000	1.67:1
3	Horticulture	60000	-	60000	122500	2.04:1
Total		129105	51000	147485.00	247265	1.68:1

(9.3) Economics of Agriculture Sector :

The development cost can be recovered by the adoption of plan in present rain fed agriculture is being done on well maintained field, therefore does not require much investment. In rain fed agriculture, investment of Rs. 44.50 lacs is proposed to made is given as follows :

Table – 25 : Economics of Agriculture Sector :

S. No.	Name of sector	Name of Activities / Plan	Treatble Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Rainfed	Soil, moisture and water cons works	711	405.736	965.643	559.906	1:38:1

(9.4) Economics of forest fuel wood plantation :

Economic analysis of fuel wood plantation in the watershed. Project life is considered to be 20 years and discount rate for NPV estimation is 10 % is followed and as is given follows :

Table –26 : Economics of forest fuel wood Plantation :

S. No.	Name of sector	Comman Name of Plant	Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Forest Fuel wood sector	Vilayati Babool (Prasopis Juliflora)	25	2.50	6.675	4.175	1.67:1

(9.5) Economics of Horticulture Sector :

Economic analysis of Horticulture Plantation in agri-horti system and on wasteland patches of watershed project, life is considered about 15-20 years and discount factor rate for NPV estimation is 10% is follows :

Table – 27 : Economics of Horticulture system :

S. No.	Name of Sector	Common name of Plants	Area (Ha.)	NPV (Lacs)	Post Productive Value (Lacs)	Benefit Lacs	B.C. Ratio
1	2	3	4	5	6	7	8
1	Horticulture	Ber (zyziphus mouritana)	4.00	0.80	2.104	1.304	1.63:1
		Aonla (Embelica officianalis)	3.80	0.76	2.660	1.90	2.5:1
		Bel (Aegle marmelos)	2.20	0.44	1.320	0.88	2:1
Total			10	2.00	6.084	4.084	2.04:1

(9.6) Food requirement and sufficiency :

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

Table – 28 : Status of food requirement and availability of per annual :

S. No.	Name of Foods	Requirement Q./Yr.	Present Status		Expected Post Status	
			Availability Q./Yr.	Deficit or surplus Q./Yr.	Availability Q./Yr.	Deficit or surplus Q./Yr.
1	2	3	4	5	6	7
1	Cereals 110 Kg.	20085	17072	3013	36153	16068
2	Pulses 36.50	6665	3665	3000	11997	5332
3	Oil Seeds 29.20	5331	2132	3199	3198	8529
4	Vegetable 71 kg	16615	3323	13292	29907	13292

(9.7) Employment generation :

One of the major problem of the labour migration in watershed project. By the implementation of the project activities employment opportunities will be generated. However the changes in land use pattern and adoption of other subsidiary enterprise will generate employment opportunities in the watershed as given in table follows :

Table – 29 : Employment generation under proposed works :

S. No.	Employment activities/works	Area under work	Cost	Mandays generation (Nos.)			
				Unskilled	Skill	Total	Person
1	2	3	4	5	6	7	8
2	Graded Contour Bund	81	2.43	2430		2430	80
3	Gully Plug, C.D.	135	10.125	7087	165	7252	242
4	Submergence Bund	115	4.60	4600		4600	153
1	Peripheral Bund	115	4.025	4025		4025	134
5	W.H.B.	142	12.78	7668	434	8102	270
6	Renovation of Bund	88	2.64	2640		2640	87
7	Reno. of W.H.B.	-	-	-	-	-	-
8	Community Pond	-	-	-	-	-	-
9	Afforestation	25	4.06	812	-	812	27
10	Horticulture	10	2.00	400	-	400	13
Total		711.00	42.66	29662	599	30267	1006

10. Formation of watershed committee :

Under compliance of common guideline Para (6.3) is followed and by the help of watershed development team, watershed committee is organized in the micro watershed village Ranayach Narendrapur with 10 members as prescribed in common guide line. List for organization of W.C. village details given as follows :

Table – 30 : Details of comprised village W.C. organization in M.W.S. :

S. No.	Particulars	Details	Block	Geographical Area
1	2	3	4	5
1	Micro watershed code	3B3E3c2a	Pahasu	781.00
2	Name of Gram Panchayat in M.W.S.	Chhatari Dehat		

Table – 31 : List of organized W.C. for the Gram Panchyat Chhatari Dehat in watershed.

S. No.	Name of selected members	Age	Representation Members from	Post	Qualificati on	Village
1	2	3	4	5	6	7
1	Shri Sushil Kumar	38	Pradhan Gram Sabha	President	M.A.	Chhatari Dehat
2	Shri Purushotam	25	Gram Dhorau	Secretary	M.Com.	Dhorau
3	Dr. Mohal Lal	54	From W.D.T.	Member	Ph.D. Agra	Samaspur
4	Shri Maniram	39	S.H.G.	Member	Sakshar	Baram Nagar
5	Shri Arani Singh	45	U.G.	Member	Sakshar	Baram Nagar
6	Shri Than Singh	65	U.G.	Member	Sakshar	Baram Nagar
7	Shri Dharampal	40	S.H.G.	Member	Sakshar	Dhorau
8	Shri Mahendra	70	U.G.	Member	Sakshar	Dhorau
9	Smt. Mayawati	50	S.C. Female	Member	Sakshar	Dhorau
10	Shri Lakhan	50	S.C. Male	Member	Sakshar	Baram Nagar
11	Shri Chotelal	50	S.C. Male	Member	Sakshar	Baram Nagar

(10.1) Formation of Self Help Groups in M.W.S.

By the help of watershed committee and watershed development team self help group are formatted / organized. Families and persons are selected from poor, small and marginal farmers families, landless poor families, agriculture labour families, women, herdsman and shepherd and S.C. families in the formatted self help groups are given as follow :

Table – 32 : Ganga Ji Self help group – Chhatari Dehat.

S. No.	Name of member in formatted SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Shri Babu Singh	50	B-C	Livestock	New
2	Shri Nathu	45	B-C	Livestock	New
3	Shri Devi Sharma	42	B-C	Livestock	New
4	Shri Babulal	48	B-C	Livestock	New
5	Shri Ram Singh	55	B-C	Livestock	New
6	Shri Meghraj	58	B-C	Livestock	New
7	Shri Ram Bhole	60	B-C	Livestock	New
8	Shri Ramesh chand	35	B-C	Livestock	New
9	Shri Manoj	60	B-C	Livestock	New
10	Shri Roshan Lal	65	B-C	Livestock	New

Table – 33 : Mahima self help group Baram Nagar – Buffaloes.

S. No.	Name of member in formed SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Shri Kashiram	45	L.R	Livestock	New
2	Shri Jaswant	46	L.R	Livestock	New
3	Shri Maniram	39	L.R	Livestock	New
4	Shri Rakesh	40	L.R	Livestock	New
5	Shri Omprakash	42	L.R	Livestock	New
6	Shri Giriraj	35	L.R	Livestock	New
7	Shri Mangal	35	L.R	Livestock	New
8	Shr. Ramesh Chand	45	L.R	Livestock	New
9	Shri Umesh	40	L.R	Livestock	New
10	Shri Dinesh	35	L.R	Livestock	New

Table – 34 : Self help group in Chhatari Dehat of watershed. Dhorau (Cow).

S. No.	Name of member in farmated SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Shri Dharampal	40	Brahma.	Livestock	New
2	Shri Kalu	30	Brahma.	Livestock	New
3	Shri Rajendra	60	Brahma.	Livestock	New
4	Shri Secretary	30	B.C	Livestock	New
5	Shri Raju	50	B.C	Livestock	New
6	Shri Suresh	20	B.C	Livestock	New
7	Shri Kumarpal	55	B.C	Livestock	New
8	Shri Totaram	40	B.C	Livestock	New
9	Shri Bedram	40	S.C	Livestock	New
10	Shri Ram Kumar	35	S.C.	Livestock	New

Formation of User's Groups :

User's groups are formed by the help of watershed committee and watershed development team in the micro watershed comprised villages. Farmers which have land village are involved in the User's groups and they will be directly benefited as expected by the implementation of watershed project. Easy and convenient conditions are made to resource use between user's groups and they will be responsible to operate and maintenance for the created assets in the watershed. Nos. of formed user's groups details are given as follows :

Table – 35 : Village wise user's groups

S. No.	Name of village	No. of groups	No. of farmers	Total Agri. Land	Area under treatment	Cost of assets
1	2	3	4	5	6	7
1	Chhatari Dehat	1	10	305.00	286.269	-
2	Baram Nagar	1	10	80.220	57.525	-
3	Dhorau	1	10	148.800	151.00	-
		-	-	-	-	-

10. Estimation and Costing of Proposed activities of the watershed Project Year 2009-10.

Proposed works / activities for the Project Period (Year 2009-10) under proposed treatable area 635.00 Ha. Out of total Geographical area 906.61 Ha.

(10.1) Financial and Physical Outlets :**Table – 36 : Financial and Physical Outlets for the Year 2009-10 :**

Sl. No.	Components	Unit cost per ha.	Physical ha.	Financial (Lacs)			Man-days Generation
				Labour Component	Material Component	Total	
1	2	3	4	5	6	7	8
A	Management Cost 10%						
1	Administrative Cost – TA & DA Hiring of Vehicles, Official Expenditure Electricity & Phone bill Computer, Stationery and office consumable materials & contingency	1200	-	-	8.532	8.532	-
2	Monitoring	120	-	-	0.8532	0.8532	-
3	Evaluation	120	-	-	0.8532	0.8532	-
	Sub Total	1440		-	10.2384	10.2384	-
B	Preparatory Phase 10%						
1	Entry Point Activities 4%	480	-	0.6826	2.7302	3.4128	683
2	Institutional & Capacity Building 5%	600	-	-	4.266	4.266	-
3	Detailed Project Report 1%	120	-	-	0.8532	0.8532	-
	Sub Total	6000	-	0.6826	7.8494	8.532	683
C	Watershed Work Phase						
a	Watershed Development Works						
1	Graded, Contour & Field Bunds	3000	81	2.43	-	2.43	2430
2	Gully Plug, Earthen Checkdam /WHS	7500	135	7.0875	3.0375	10.125	2252
3	Submergence bunds	4000	115	4.60	-	4.60	4600
4	Peripheral Bund	3500	115	4.025	-	4.025	4025
5	Earthen Water Harvesting Bund	9000	142	7.668	5.112	12.78	8102
6	Renovation of existing Bunds	3000	88	2.64	-	2.64	2640
7	Renovation of existing W.H.B	-	-	-	-	-	-
8	Aforestation and Development of silvi postural system		25	0.812	3.248	4.06	812
9	Dry Land Horticulture	20000	10	0.40	1.60	2.00	400
10	Community Pound (Renovation)	-	-	-	-	-	-
	Sub Total	6000	711	29.6625	12.9975	42.66	30267
B	Livelihood Programme (Community Based) 7.620						
	Income generating activities through SHG's for landless and marginal farmers 10%						
1	Live stock development activities	200	-	-	1.4222	1.4222	-
2	Bee Keeping	100	-	-	0.71070	0.7107	-
3	Poultry Farming	200	-	-	1.4222	1.4222	-
4	Nursery Development	300	-	-	2.1333	2.1333	-
5	Vegetable Production	100	-	-	0.7107	0.7107	-
6	Milk Dairy Promotion Unit	200	-	-	1.4222	1.4222	-
7	Establishment of Vermi compost Unit	100	-	-	0.7107	0.7107	-
8	Sub Total	1200	-	-	8.532	8.532	-
C	Production System and micro Enterprises						
1	Crop production, diversification of agriculture and introduction of agro forestry	1170	-	-	8.2662	8.2662	-
2	Demonstration of improved composting system	390	-	-	2.7554	2.7554	-
	Sub Total	1560	-	-	11.0916	11.0916	-
D	Consolidation Phase 5% Sub Total	600	-	-	4.266	4.266	-
Grand Total		12000	711	30.3451	54.9749	85.32	30950

:- संकल्प पत्र :-

ग्राम पंचायत:- छतारी देहात, कोड सं०- 2B3E3c2a विकास खण्ड- पहासू जिला- बुलन्दशहर

यह कि आई०डब्लू०एम०पी० परियोजना में तैयार की गयी निर्माण की नयी सुजित परिसम्पत्तियों को ग्राम पंचायत चौडेरा एवं माइक्रोवाटरशेड के अन्तर्गत सम्मिलित ग्रामों में योजना क्रियान्वयन कराने एवं योजना उपरान्त चालू रखने तथा सुजित परिसम्पत्तियों के अनुरक्षण हेतु कृत संकल्प एवं इच्छुक है।

छतारी देहात ग्राम पंचायत के सभी स्रोत स्थल जैसे तालाब ग्राम सभा गोचर (चारागाह) जल संसाधन, जंगल आदि में भूमि विकास परियोजना के अन्तर्गत किये जायेंगे। उन कार्यों को समाज के कमजोर वर्ग जैसे अनुसूचित जाति/जनजाति, महिला वर्ग एवं अल्प भूमिहीन गरीबी रेखा के नीचे के लाभार्थियों को लाभ पहुंचाने हेतु इच्छुक होंगे।

हम योजना संचालन हेतु प्रस्तावित करते हैं एवं सहमति देते हैं कि भारत सरकार के समस्त मार्गदर्शी सिद्धान्तों के अनुपालन में कार्य सम्पन्न करायेगे। यह भी घोषित करते हैं कि चयनित क्षेत्र जिसको मेरे द्वारा भलीभाँति देखा गया है, और प्रस्तावित योजना में प्रस्तावित समस्त कार्य 15 सालों से नही कराया गया है। जिसकी मुझे पूर्णरूप से जानकारी है और अनुमोदन करते हैं।

श्री २६ नरसिंह (वरकालसु)

जैश कुमार (शौरऊ)

शैलेन्द्र कुमार " "

शक्ति चानसिंह " "

ताजेंद्रसिंह " "

ब्रह्मसिंह " "

राजवीर " "

जयलालसिंह " "

जयलालसिंह " "

शोबन सिंह " "

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शोबन सिंह " "



श्रीमती आशा देवी

प्रधान

ग्राम पंचायत चौडेरा-सिद्धपुर

वि०क्ष०-पहासू (बुलन्दशहर)



PROJECT AT A GLANCE

IWMP-III (Bulandshahar)

1	State	Uttar Pradesh
2	Distt.	Bulandshahar
3	Block	Pahasu
4	M.W.S. Code	2B3E3c1f
5	Name of M.W.S. Project	Tyore Bujurg
6	Involved Village	Tyore Bujurg, Chauganpur, Pandaraval
7	Geographical Area of M.W.S.	497.00
8	Rainfed Area	398.00
9	Treatable Area	472.00
10	Weightage	
11	Cost of Project	
12	For the year	2010-11

Budget Components

S. No.	Components	Area (Ha.)	Cost (in Lacs)
1	2	3	4
1	Management Cost 12%	-	6.796
2	Preparatory Phase 10%	-	5.664
3	Watershed Work Phase	-	-
	A- Watershed Development Works 50%	472.00	28.32
	B- Livelihood Programme (Community Base) 10%	-	5.664
	C- Production System & Micro Enterprises 13%	-	7.363
4	Consolidation Phase 5%	-	2.833
	Total	472.00	56.64

Executive Summary of the Project

Identified selected micro watershed project Tyore Bujurg is coded as **2B3E3c1f** has been proposed from cluster of I.W.M.P. Bulandshahar –III project in Pahasu Block district Bulandshahar four villages namely Tyore Bujurg, Chauganpur and Padaraval is comprised in the micro watershed which is located in the east of district Bulandshahar on the east bank of River Kali Nadi and border of district Badaun area is known as Khadar. It lies between $28^{\circ} -5'$ S and $28^{\circ} -15'$ N Latitudes and $78^{\circ} -0'$ E and $78^{\circ} -10'$ W Longitudes Covering area. Its altitudes ranges from 187 meter to 190 meter above the mean sea level. Dewai Railway Station 201.18 m, Khurja Jh. Railway station is 201.46 m above mean sea level is displayed. Project area of I.W.M.P. BSR-III is lied in the Pahasu Block of Bulandshahar District which is come in the western plan zone under semi arid area. The annual average rainfall is near to 397 mm which an average of 35 rainy days. Out of which about 85% is received during the mansoon season from July to September and very less rainfall is received in the winter season.

Temperature ranges from as high as 43°C in the May-June to as $3^{\circ} -4^{\circ}\text{C}$ during December – January. The Trend of rain fall is highly erratic and maximum water goes as runoff.

Main occupation of the dwellers is agriculture in the watershed. Some part of the lands are shown during the Kharif season. Cane sugar are preferred crops in the project area. The main Crops raised are Wheat, Pea & Mustered and maze.

The topmost portion of the watershed is sloppy flat land. Other than topmost portion of the watershed is under soil erotic portion and depreciative. The soil of the land are sandy loam Soil. The middle agricultural position of watershed relatively smooth sloppy flat land with sandy loam soil texture. These soil is yellow in colour and are inherently good in fertility status.

Natural vegetation of the watershed is very poor. Somewhere forest vegetation is seen which are predominant with Vilayati Babool (*Prosopis Juliflora*), followed by Babool (*Accasia nilotica*), somewhere Neem Plants (*Azadirachta Indica*), Shisham (*Dolbergia Sisson*) and Karanj (*Pongamia Glabra*) are seen in occasional occurrence. There is no grass land in the watershed. Somewhere grass patches are seen only on the bunds, road sides and other such places. Coverage of massive green belt is in poor percentage for environment which is envisaged. That watershed is very poor climate area.

There is normal condition of animal physics and for their fodder arrangement is the watershed and creative possibility would be expected by the implementations of the project.

Due to Aerial soil erosion poor harvesting managements, cropping pattern, non treated watershed etc. are very anti effective causes for the watershed. Problem of the watershed is to be tackled by harvesting structures which have last most of their capacity new water bodies for the prevention of erosion and conservation of soil and moistures various type of earthen bunds in the watershed field, necessity has been observed. Wasteland will be treated with staggered Trenches, afforestation and bunding for the changing of characteristics.

The detail project report has been prepared by the applying of nine process steps for the micro watershed code no. **2B3E3c1f** brief is as follows.

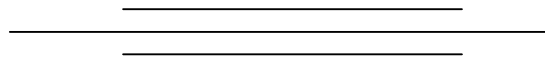
- STEP-1 Secondary data collection:-** During the five days visit programme in the micro watershed project with of all available documents of village label by approaching the Gram panchayat collected secondary data.
- STEP-2 Village meeting & conducting PRA exercise:-** Community meeting conducted on fix days for the consultation with villagers for the PRA Exercise. Participatory mode of the villages was positive indicated for the success of programm. With good in testing participation has been drawn social & resource map on ground & paper & discussed un various topics of problematic thoughts in the micro watershed.
- STEP-3 Socio economic survey:-** The resource organization of village label volunteers identified to conduct house hold socio economic survey/states.
- STEP-4 Probel typology analysis:-** Thoroughly analyzed the data & identified problem type as soil & moisture conservation, crop rotation, crop coverage, productivity, livelihoods, social issues & capacity building gaps etc. Problems discussed with the watershed committee & came up with alternative solution.
- STEP-5 Conduct of net participatory planning (NPP):-** The planning team visited together in the planning blocks on the scheduled date along with the beneficiaries of the villages & data gathered as for the participatory net planning.
- STEP-6 Productivity & livelihood planning exercise:-** For the product livelihood exercise, group discussion on various livelihood as Agriculture, Animal husbandry enterprise development held discussion with the villagers in the micro watershed.
- STEP-7 Institutional & capacity building :-** This plan is prepared based on the data available in the field and auscultations with the watershed committee.
- STEP-8 Data consolidation & documentation of DPR :-** After gathering all required information compiled collected data. Thoroughly discussed and finalized the expected outcomes and benefits specially in the respect of livelihood for different segments. These are the target and performers indicators for the micro watershed.

STEP-9 Conduct of Gram Sabha obtaining approvals submissions of DPR:-After preparation of the draft DPR convened to Gram sabha and activities proposed expected outcomes benefits of implementing the programm are explained in case of any changes are proposed in the Gram sabha approval obtained by the Gram sabha and already singed of Mau paper.

STEP-9A Attachment of detail estimate, cost and design:-Estimating, Costing and design prepared technically According to plan in the micro watershed project. And attached with the DPR.

STEP-9B Various type of mapping :- DPR prepared in the support of micro watershed project using various type of maps is as follows :

- | | |
|---------------------------------------|-----------------------------|
| 1. Index Map of Watershed | 2. Watershed Map |
| 3. Relief/ Drainage Map | 4. Slop Map |
| 5. Soil and Land Capability class map | 6. Land use/ Land Cover Map |
| 7. Cadastral map | 8. Proposed Action Plan map |
| 9. Social Map | |



Project Report

Table – 1 : Micro watershed project brief : -

1	State	U.P.
2	District	Bulandshahar
3	Block	Pahasu
4	Comprised Villages (Nos.)	03
5	Name of Watershed	Teyore Bujurg
6	Name of MWS Project	Teyore Bujurg
7	MWS Code No.	2B3E3c1f
8	Geographical Area of MWS	497.00
9	Treatable Area	472.00 Hact.

1- Project Objectives :- The aim and objectives of the Project are :

- qq- Conservation, development and sustainable management of natural resources including their users.
- rr- Enhancement of agriculture production and productivity in a sustainable manner.
- ss- Restoration of ecological balance in the degraded and fragile rain fed ecosystem.
- tt- Reduction in regional disparity between rains fed and irrigated area.
- uu- Creation of sustainable employment opportunities for the rural community for livelihood security.
- vv- Generation of massive employment.
- ww- Reduce migration from rural employment.

2- Major Problem of Project Area :

- kk- Actual shortage of drinking water.
- ll- Near to nil activated water bodies and water harvesting structures.
- mm- Low depth of ground water table.
- nn- Undulated and generally sloppy rainfed area.
- oo- Large number of Small, Marginal and S.C. farmer land holding.
- pp- Lower wages of agriculture labour and also migration of labour due to shortage of employment in the watershed.

3- General Description :

(3.1) Location :-

Tyore Bujurg Watershed has been taken with MWS Code No. 2B3E3c1f in Pahasu Block of Distt. Bulandshahar is located on Bulandshahar via Diwai to Tyore Bujurg Via Pahasu road about 57 Km. between 28⁰35' and 28⁰43' N Latitudes and 78⁰0' and 78⁰5' N Longitudes. Location and delineation of watershed has been located on watershed map **Fig. 2** and on top sheet **Fig. 3**.

(3.2) Area and Elevation :

Elevation ranges from 187 to 190 mtr. above the mean sea level(MSL) altogether comprised villages and their's area is described as follows. (Comprises village map Fig. 3)

Table – 2 : Area and Elevation

Sl. No.	MWS Code	Block	Name of Village	Geographical Area	Treatable Area
1	2	3	4	5	6
1	2B3E3c1f	Pahasu	Teyore Bujurg	474.09	453.152
			Chauganpur	16.687	16.318
			Pandaraval	6.223	2.53
			-	-	-
Total				497.00	472.00

(3.3) Shape of the Micro Watershed:

The shape of watershed is Elongated and as Rectangular. The maximum length and width of the watershed are 5000 Mtr. and 1814 Mtr. respectively with the Length: Width ratio of 2.76:1.

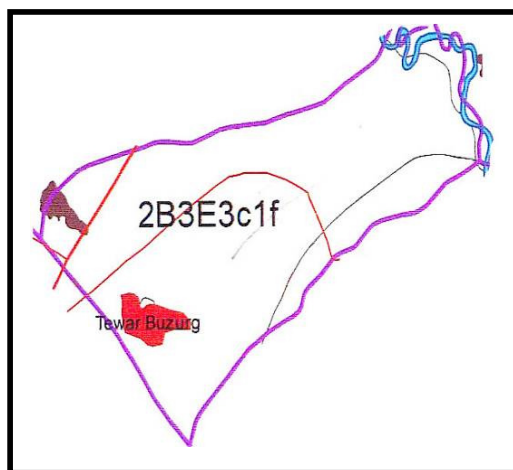


Fig. 1 (Shape of Micro Watershed)

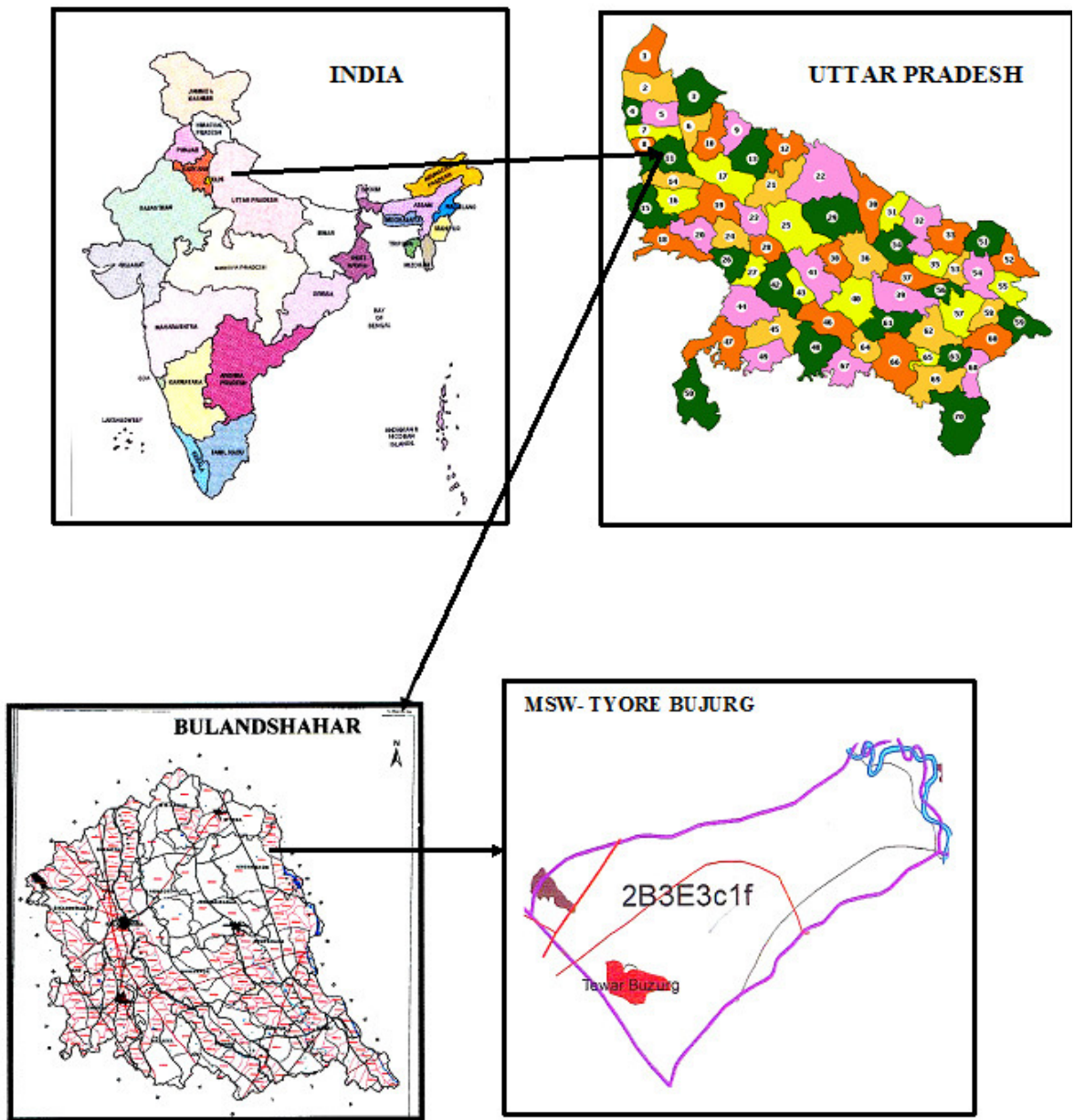
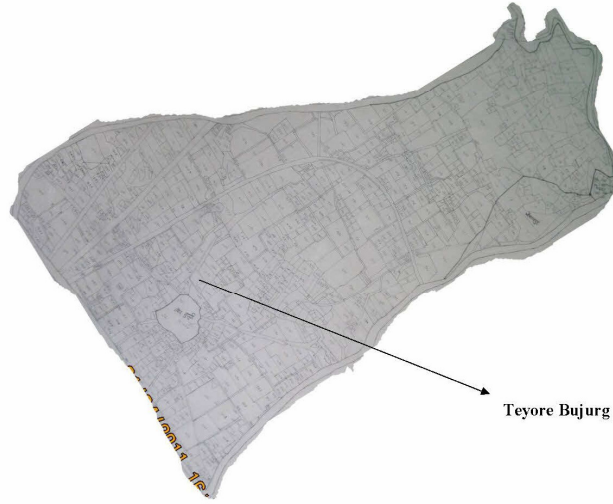


Fig.- 2 Location of the Micro Watershed

2B3E3c1f (MWS Project – Teyore Bujurg)



Teyore Bujurg

Fig No.-3 Cadastral Map (Located Comprised Villages)

Sl. No.	Name of Project	Name of Village	Geographical Area (in ha.)	Raifed Area (in ha.)	Treatable Area	Agri. Land
1	2	3	4	5	6	7
1	Teyore Bujurg	Tyore Bujurg	474.00	382.175	453.152	456.848
2		Chauganpur	16.687	13.30	16.318	16.50
3		Pandaraval	6.223	2.125	2.53	2.652
Total			497.00	398.00	472.00	476.00

(3.4) Climate :

The Watershed falls under semi arid region of tropical climate inclined in Western Plan Zone. The average annual precipitation is about approx. is 397 mm. spreading over 35 rainy days. Most of the rain fall (about 85%) is received during July to September. The rain fall of moderate intensity. Nothing the area receives of scarcity rainfall in the winter season. The temperator variation ranges from as high as 43⁰c in the month of May-June to as low as 4⁰c in December-January.

(3.5) Geomorphology and Soils :

Geomorphology :

The entire watershed is topographically divided into major landforms. Accordingly the soils of watershed can be grouped into various categories such plane land, undulated land, sloppy land and erosic ravenous land.

Soil :

(a) Fine textured soil :

The soil are the most extensive soil group found in the watershed. Some portion of the watershed is relatively sloppy flat land with fine soil texture as sandy sandy loam. The soils are in color and are inherently good high in fertility status. Soil texture is sandy lome loam particularly in depressions and loam in the elevated portion. The soil characteristic texture is dispersive and smooth. Therefore without impede the downward movement of water productive layer of soil are easily by high runoff.

a- Coarse Textured Soil :

These soil are lying mostly in downward portion, along with erosic gully and drainage line upto end of watershed outlet. These soils are coarser in texture and are relatively poor in fertility status. The soils are lomy sand in texture. Rill and gully formation in same parts particularly near the outlet of watershed can be seen.

(3.6) Drainage and Slope:

Due to prevalence of mild steep slope and presence of a number of drainage lines in the watershed the drainage system is adequate. The watershed from part of Ganga Basin and watershed. Under mild to steep topographical slope of MWS as divided as follow : (Drainage and slope map fig.-4)

Table - 4 : Drainage and Slope

S. No.	Grade	Slope Percent	Area in Ha.	Remark
1	A	0.5-1	142	30%
2	B	1-2	118	25%
3	C	2-3	94	20%
4	D	3-4	70	15%
5	E	4-5	28	6%
6	F	5-6	20	4%

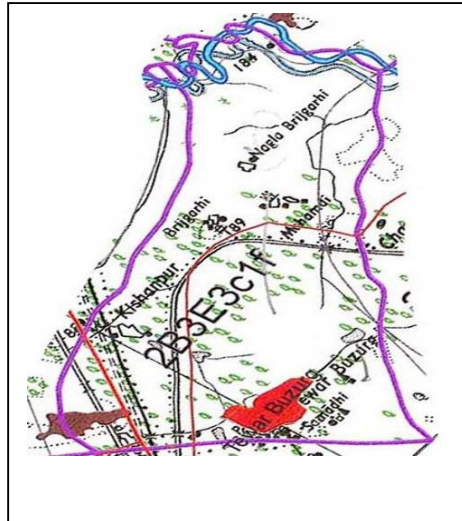


Fig-4 (Drainage & Scrub Map)

(3.7) Vegetation :

a- Natural Vegetation :

Natural vegetation is very poor in the watershed. The forest vegetation is predominant with Vilayti Babool (*Prosopis Juliflora*). There are occasional occurrence of Neem Plants (*Azadirochta Indica*), Shisham (*Dalbergia Sissoo*) and Karanj (*Pangamia Glabra*) and anywhere some scrubs are seen. There are no grass land in the watershed. Somewhere grass patches are seen only on the bunds, roadside and other such places. Poor percentage of massive green trees has been not seen in the watershed except Horticulture backyard.

b- Horticulture :

There is no backyards or commercial horticulture plantation in villages are been in some part of watershed.

c- Agroforestry :

The agriculture fields of the villages have some horticulture plantation at places isolated trees whose frequency is seen as under agroforestry and some where in where in backyards.

(3.8) Human Population:

a- Human Population:

Total Population of involved villages in watershed is 8936 with average family size of six persons as detailed as follows

Table – 5 : Human Population

S. No.	Name of village	Nos. of families	Human Population			Total
			Male	Female	Children	
1	Teyore Nujurg	2034	3036	2091	2297	7424
2	Chauganpur	515	605	580	1208	2393
3	Pandaraval	105	150	125	350	625
	Total	2654	3791	2796	3855	10442

h- Categorization of Human Population :

In the total population of watershed villages, categories are defined as below :

Table – 6 : Population Categories

S. No.	Particulars	Unit	Number of families in population in the villages		
			Population	Family	Remark
1	2	3	4	5	6
1	Agri Farmer	No.	3640	910	
2	Landless	No.	600	100	
3	Agri. Labour	No.	1920	320	
4	Land less Labour	No.	932	233	
5	BPL Family	No.	380	76	
6	SC Family	No.	2800	467	
7	ST Family	No.	-	-	

(3.9) Land Holding :

All the categories of farmers as small, marginal, medium and large are involved in land holding average of about 1-18 ha. Small land holding farmers 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 as below :

Table – 7 : Distribution of farm families according to their size of land holdings

S. No.	Name of Village	Total Agri. Land in MWS	Land Holding Family (Nos.)					Percentage
			Marginal (< - 1Ha.)	Small (1-2 Ha.)	Medium (2-4 Ha.)	Large (4-7 Ha.)	Total	
1	Teyore Nujurg	456.848	746	69	25	2	2	842
2	Chauganpur	16.50	35	3	-	-	-	38
3	Pandaraval	2.652	4	-	-	-	-	4
	Total	476.00	785	72	25	2	2	884

(3.10) Live Stock Population :

Total live stock population of the watershed is 7016. Buffalos is preferred as much animal compared to Cow. But milk yield is poor. Goats are also kept for milk as well as for meat purpose. The breakup of livestock population is as follows :

Table – 8 : Live Stock Position

S. No.	Name of Village	Unit	Live Stock Position				Total
			Buffaloes	Cows	Bullocks	Goats	
1	Teyore Nujurg		2082	2385	1431	180	6078
2	Chauganpur		500	200	18	20	738
3	Pandaraval		100	75	10	15	200
	Total		2682	2660	1459	215	7016

(3.11) Infrastructure Social Feature :

- a- Comprised villages in the micro watershed has moderate communication facilities. Watershed linked with metaled road and approachable through motarable road.
- t- All the villages are electrified and have T.V. and Telephone connection.
- u- Literacy rate in the watershed is very low all villages are having education upto Junior High School.
- v- Nearest small market is at Pahasu 13 Km. Nearest big market Bulandshahar is about 60 Km. from watershed. Religious and ritual features are almost common as in other parts af U.P. small land holding with large family size and more than 25% of the labour force of the total population living below poverty line indicate poor socio economic status of the watershed community.

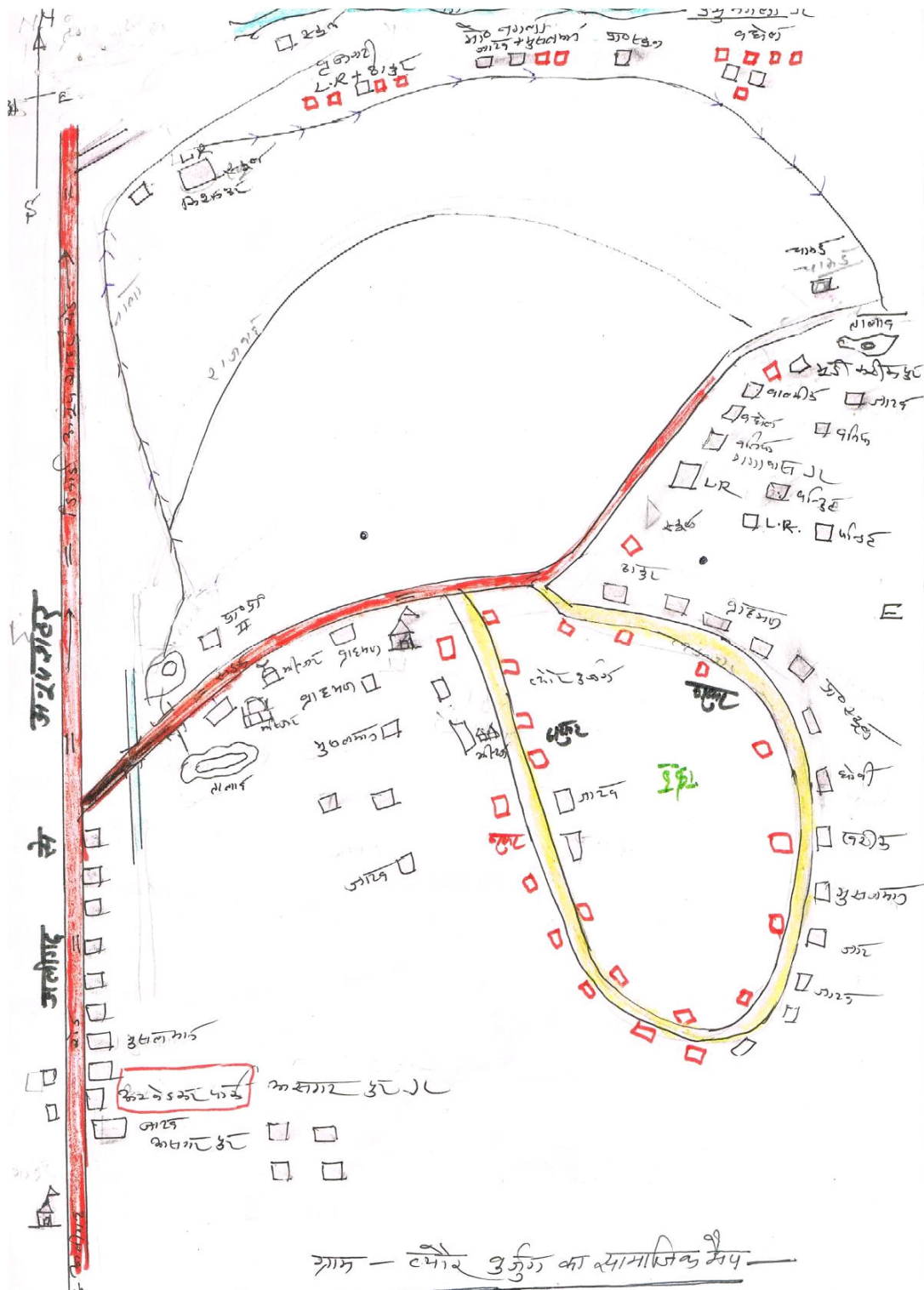
Participatory Rural Appraisal

Participatory mode of the villagers shows positive indication for the success of the programme. Traditionally the entire village community participate in the individual works. Social map of one of the watershed village drawn by villagers themselves, depicting various village figures is shown in sketched map in Fig.-4 & 5. Infrastructures position of the village recorded as follows :

Table – 9 : MW.S. Project – Teyore Bujurg.

S. No.	Infrastructure	Unit	Qty.
1	2	3	4
1	Primary School	No.	
2	Junior High School	No.	7
3	Kanya Pathshala	No.	2
4	Public Health Center	No.	-
5	Vet nary Hospital	No.	-
6	Panchayat Ghar	No.	1
7	Post Office	No.	-
8	Agan Bari Center	No.	-
9	Electricity	-	Yes
10	Road	-	Yes
11	Pond	No.	4
12	Hand Pump	No.	16
13	Irrigation Well	No.	-
14	Canal	No.	1
15	Temple	No.	1
16	Well (Drinking Water)	No.	2
17	Pumping Set	No.	92
18	Toilet	No.	15
19	Market	No.	1

SOCIAL MAP



Recorded importance of development institution

Farmers perception recorded for importance and role of different development institution in relation to infrastructure. Importance has been depicted with size of circle and role with distance from village circle. (Fig 8)

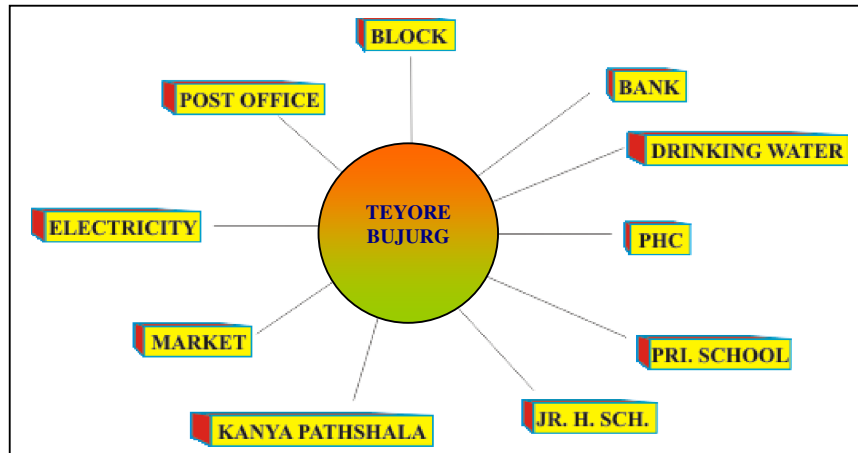


Fig. -8 (Venn diagram of Micro watershed)

(3.12) Communication :

Watershed can be approached from Distt Headquarter Bulandshahar to Project area 57 km. by Road.

(3.13) Natural Resource Base :

Transact of watershed showed typical land use profile consisting of plain agriculture land, erodic area and medium ravenous ridge. Main source of the irrigation are the canal for pre showing irrigation only. The total geographical area of the watershed is 472.00 Ha. classification.

Approach roads for the micro watershed is shown for the communication is shown on topo sheet map Fig 9 as next page.

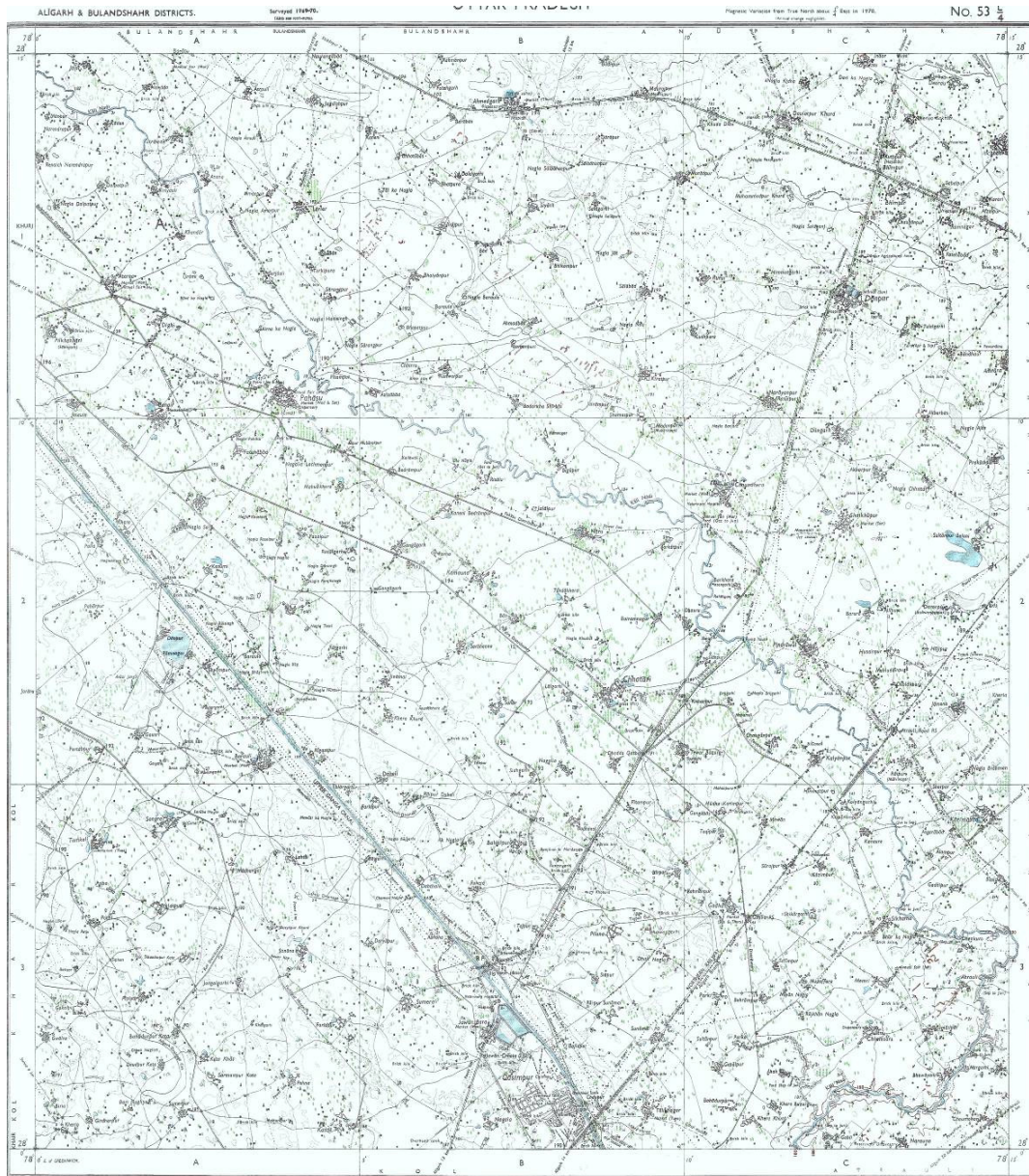


Fig.- 7 Communication Map on Toposheet

Table – 10 : Classification of area(Hect.)

S.No	Name of Village	Unit	Total Geographical Area	Rainfed Area	Wasteland	Village Land and Road	Irrigation Resource	
							Water Bodies	Borewell
1	2	3	4	5	6	7	8	9
1	Teyore Bujurg	Ha.	451.327	361.60	36.72	18.871	-	22.56
2	Chauganpur	Ha.	16.687	13.30	2.61	10.094	-	1.00
3	Pandaraval	Ha.	28.986	23.10	4.036	19.374	-	1.449
	Total		497.00	398.00	43.366	48.339	-	25.009

(3.14) Livelihood :

Total Population of the watershed is 8936 and out of the total population a majority more than 80% has farming as their major source of livelihood followed by labours, serviceman and small business class. Classified livelihood given in form as fallows :

Table – 11 : Livelihood Classification in population :

S. No.	Name of Village	Farmer	Labour	In Service	In Local small business	Others
1	2	3	4	5	6	7
1.	Teyore Bujurg	842	320	105	130	25
2.	Chauganpur	38	20	3	10	5
3.	Pandaraval	4	2	-	-	-
	Total	884	342	108	140	30

(3.15) Dependency of forest fuel wood and fodder :

- a. Fuel wood :-** The main source of fuel is from cow dung cake, woody stem of crops. About 70% of the climactic energy requirement is met from the agriculture by product and cow dung cake. Rest is met out from the forest outside the village and watershed boundary, most preferred fuel wood is Juliflora fuel wood Juliflora obtained from standing along and between watershed.
- h- Fodder :-** Villages have not any sufficient signified dependency on forest based fodder as these resource are nothing availability in the forest.

(3.16) Labour requirement :

Labour requirements was found to be maximum at the time of October, November and December when the sowing of Rabi crops are done. The crucial periods are March and April coinciding harvesting and threshing of Rabi crops and July/August is sowing Kharif Crops take a little place. Other income generating enterprises having potential during the remaining.

(3.17) Crop Rotation :

Present Crop rotation in the watershed comprise of :

Kharif	-	Bajra	-	Rare
		Maize	-	Rare
		Jwar	-	Rare
Rabi	-	Fallow Wheat	-	Major
		Fallow Barly	-	Major
		Fallow Sugarcane	-	Major
		Fallow Mustard	-	Major
Zayad	-	Urad, Moong, Makka, Arahar		

The above said Rabi Crops is the most prevailing crop rotation on the agriculture lands both in the rainfed and irrigated conditions.

Organized vegetable cultivation fruit plantation and traditional agro forestry systems are lacking as per requirement in the watershed the limited vegetable cultivation in the watershed is confined as kitchen gardens and field to the irrigated condition in a scattered manner. The cultivation of cash crops other than the sugarcane, wheat and mustard also in the watershed.

(3.18) Historical Events :

Chronological record of important events of the watershed village is prepared through participatory rural appraisal (PRA) which is very useful in understanding of its background and chronology is given as follows :

Table – 12 : Historical Events

S. No.	Events/Activities	Year	Rem.
1	2	3	4
1	Established	1975	
2	Opening of Primary School	1957	
3	Opening of Junior School	2005	
4	Opening of Kanya Pathshala	-	
5	Opening of PHC	1	
6	Opening of Vet. Hospital	-	
7	Panchayat Ghar	1973	
8	Introduction of Tractor	1967	
9	Gobar Gas Plant	-	
10	Thresher	1970	
11	First Tube well/Pumpset	1975	
12	First Motorcycle	1978	
13	T.V. & D.V.D. Players	1990	
14	Electricity in Village	1989	
15	Bituminous Road	1986	
16	First Hand Pump	1950	
17	Templo Renovation	-	
18	First Land Line Telephone	2004	
19	Planning for Watershed Project	2010-11	

(3.19) Present Land Use in the Watershed :-

The watershed has diversified land uses. The varied present land use under different use in the watershed. The mixed land use followed in the watershed is almost similar in other parts of U.P. During P.R.A. Exercise prepared land has been shown in Table No. 13, 14 & 15.

Table – 13 : (Ownership)

S. No.	Name of Village	Pvt. Agri. Land		Govt. Revenu Land	Forest Land	Other Land
		S.C./S.T.	Others			
1	2	3	4	5	6	7
1	Teyore Bujurg	25.05	405.777	-	-	20.500
2	Chauganpur	2.546	13.772	-	-	0.369
3	Pandaraval	2.00	0.500	-	-	-
	Total	29.596	420.049	-	-	20.869

Table –14 : (Present Land under different categories)

S. No.	Name of Village	Land Use (Ha.)				
		Agricultural	Wasteland (All Types)	Seasonal waterbodies	Village/Road Etc.	Total
1	2	3	4	5	6	7
1	Teyore Bujurg	456.848	37.063	-	18.821	512.732
2	Chauganpur	16.50	2.61	-	10.094	29.204
3	Pandaraval	2.652	3.693	-	19.374	25.719
	Total	476.00	43.366	-	48.339	567.655

Table – 15 : (Present land use classified)

S. No.	Land Use Under	Unit (ha.)	Area (Ha.)	Percentage	
					1
Proposed Post Land Use has been	1	Under Agriculture	Ha	476	
		A- Rainfed-	Ha	398	
		I- Crops	Hact	371.28	78%
		II- Agro forestry	Hact	71.4	1.5%
		B- Irrigated-	-	-	-
		I- Assured	Hact	42.84	9%
		II- Portial	Hact	52.36	11%
	2	Wasteland	-	-	-
		A- Aforestation	-	-	-
		B- Pasture	-	-	-
		C- Untreatable	Hact	19.51	45%
		D- Treatable	Hact	23.85	55%

n given on Page No. 32

4- Focus on Present Land Use :

(4.1) Agriculture :

The total area under agriculture in the watershed is about 487.89 ha. out of which 574.00 ha. is under rainfed agriculture. Agriculture land uses in the watershed extended to diversified land capabilities starting marginal to good class II land. The irrigated and drinking water is most scarce natural resource in the watershed. The operation of tube well for irrigation of agricultural crops frequently leads to the drinking water. Problem to the farmers of watershed forcing them to carry drinking water from outside of the watershed area. The agricultural field bund are common in the watersheds however they frequently breach on heavy rains.

Various mixed texture of soils are located in patches through out the watershed. The heavy soils are almost kept fallow during rainy season. the agricultural soils also have some as share calcium pan at variable depths. The irrigation water is conveyed by

the earthen channels. Surface irrigation methods following mainly border method of flood method by the formers in the watershed. These factors reduce the water use efficiency of limited and valuable irrigation water.

Drought hardy species like Juliflora suitable multi purpose trees is suitable for rehabilitation of the wasteland. Rehabilitation of waste lands promoting agro forestry with appropriate fruit and forest species suitable vegetative barriers on sloppy lands can be high future value and by these adoption would be meet out many demands of fire wood and fodder in the wasteland. Except above but also for soil and water conservation, rehabilitation of wasteland and sustainable income generation for socio-economic upliftment of farmers.

Crop Productivity :

The farmers also do not have suitable cropping system to deal aberrant weather. Weeds impose considerable constraint in productivity of both Karif and Rabi crops under irrigated as well as rainfed production system farmer undertake normally one manual weeding in mustard and other valuable crops however, practices is energy and time consuming. Use of we decide is rare in the watershed.

In the watershed area, limited cropping in the Kharif with mixed cropping practices is not only irrigational but also unscientific and best for low productivity. Subsequent Rabi crops in general. Sugarcane & Mustard crop in particular are raised on residual soil moisture under rainfed production system during post monsoon season.

(4.2) Indigenous Technological Knowledge (ITK) :

Under process of PRA tracked out rural applying technology in various field of local technology and some technology is very popular in village. In which the agriculture is an old traditional practices of farmers who have improved themselves with passage of the time according to their domestic needs and technological reforms in the nearby areas. The villages have their traditional village ponds, practice of field bunding which typically constitute agricultural related ITKs in the watershed. The Mustard & sugarcane being a cash and firewood crop of the watershed and also sugarcane crop is being. Cultivated in self designed manner by the farmers. Its carried out that the area is totally depend on rain and under the rainfed area technology is applied by the farmers. However limited fertilizer application specifically the DAP came in the practices since about 15-20 years.

(4.3) Forest and Other Vegetation :

Forest :

The watershed have a tract of wasteland area which are under uncultivable position is liesed in the watershed. These wasteland have not any tree vegetation or very less than real requirement for the wasteland use.

Horticulture/Agro forestry :

Horticulture and agro forestry practices were observed in the watershed.

(4.4) Agro forestry :

Agro forestry practices are lacking in the watershed. Though it has good potential under existing disposition and may a role particularly with respect to minimization of cropping risk, built up soil fertility and productivity, protection of soil erosion, soil conservation partly meeting out the fire wood demand of rural community and more over optimizing the economical return from system as whole under typical semi arid climate in the watershed. Bund and boundary plantation also have good potential to care the fire wood and fodder demands of the rural community in the watershed. The existing area under agro forestry is almost negligible. Prosopis Jhli flora may be planted as block or sole plantation specifically on marginal and degraded land in the watershed.

The agro forestry interventions comprising of ber, bail, aonla, guava, papular etc. may be applied for benefit of the farmers under rainfed to irrigation production system on leveled to slopping and marginal agricultural using proper planting techniques and term it control measures.

The multipurpose trees may be also help in supplementing fire wood and fodder demands of the rural community in the watershed and my be planted as hedge rows on rainfed, marginal and degraded lands.

(4.5) Horticulture :

Fruits and vegetables practices are lacking in the watershed area. Its practices may be sustainable very good potential for the formers of watershed. There are a limited lack fruit trees in number like mango, guava, lime, ber, aonla and papaya fruit trees well as vegetables like radish, okra, tomato, cabbage, garlic, onion, chilly, bringer and cucurbits but they are found surviving well in the watershed villages. Organized orchards (vatika) commercial vegetable cultivation horti-agri and other systems of agro forestry etc. are lacking but have good agriculture.

5. Soil and land capability classification :

(5.1) Soil Morphology :

Watershed is located North East corner of Bulandshahr Distt. near about 55 Km. away. The entire terrain of watershed is topographically divided into various land forms. Accordingly the soils of watershed have been grouped major categories is given as follow :

Hill Terrain	Plane Land Sloppy	Undulated Land	Rill Erosic Land	Moderate ravenous
-	25%	20%	15%	7%

Given categories in the blocks is located the soil morphology in the watershed areas. Representation of soil characteristics by soil profile is represented as follows :

Soil Profile :

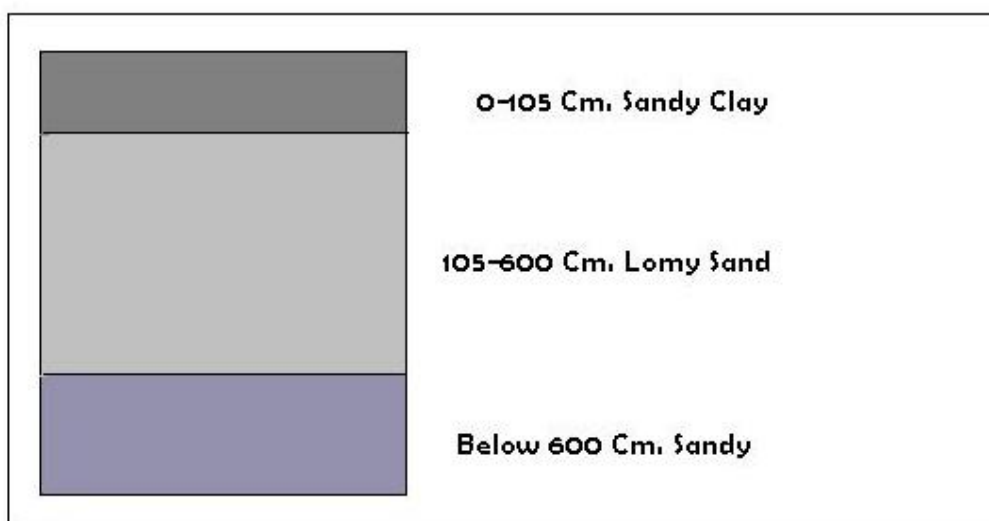


Fig. – 9 (Soil Profile)

Table – 16 : (Morphology of a Typical Soil Profile) :

Horizone	Depth in Cm.	Morphology
1	2	3
A V & H	0-150	Silky when moist, Hard when dry quick soluble, high elasticity, fissures, and cracks, occasional occurrence of free calcium carbonate granules black in colour, clay content 29%, PH- 8 to 8.7
B V & H	150-160	Whitish yellow in colour, very fine mixed with free cacaos and gravels, Hard when dry compact and indurate hard pan restricting development of root and down ward water transmission.
C V & H	7600	Red and white sand stone

(5.2) Soil and Characteristic and Fertility Status :

Soil characteristic pertaining to soil fertility of various classes accruing around villages in the watershed are given as follows :

Table – 17 : Soil Characteristic & Fertility Status :

Sl. No.	Soil Properties	LCC-II	LCC-III & IV
1	2	3	4
1	Sand %	47.04	75.04
2	Silt %	24.40	18.60
3	Clay %	28.36	6:4:6
4	Texture	Sandy Clay	Lomy Sand
5	PH (1:2)	7.05	7.55
6	Organic Carbon %	37	0.12
7	Available N Kg ha ⁻¹	316	173
8	Available P Kg ha ⁻¹	29	15
9	Available K Kg ha ⁻¹	189	326
10	EC (dS m ⁻¹)	0.47	0.12

(5.3) Land Capability Classification (LCC) :

Land capability classification (LCC) was done to classification the soils in different groups based upon the limitations and to emphasize the hazards prevailing in the watershed in order to find out the different topo-sequences, landforms, soil depth and erosion hazards. This was followed by the detailed investigation of selected landforms to bring out the LCC classes of the Watershed. Classes of land capability namely II, III, IV and V are demarcated in the watershed. The areas under different classes are sown as follows :

Table – 18 : Land Capability Classification (LCC) :

S. No.	Land capability class	Area in Ha.	Colour
1	2	3	4
1	I Class	-	-
2	II Class	70.8	15%
3	III Class	330.4	70%
4	IV Class	47.20	10%
5	V Class	23.60	5%
6	VI Class	-	-
7	VII Class	-	-
8	VIII Class	-	-

Land capability classification of various agricultural practices under land use can be classified as groups, class, sub class and units. Utilization of various land class is given as follows :

Table – 19 : Utilization of various land uses

S. N.	LCC	Forestry	Ltd. Grazing	Light Grazing	Dense Grazing	Limited Agriculture	Light Agriculture	Dense Agriculture	More Dense Agriculture
1	I								
2	II								
3	III								
4	IV								
5	V								
6	VI								
7	VII								
8	VIII								

(5.4) Land Capability Class II & III :

This group is one of the most extensive LCC watershed. and also near to class III for the agricultural practices. The soils are sandy & sandy loam in texture. The land under this class is nearly level to mild sloping (1-3%). The soils are deep and erosion hazard is slight. Most of the productive agriculture land comes under class II & III. These lands potentially very productive but due to rainfed a single cropping pattern is in habitation.

(5.5) Land Capability Class IV :

This class is found in lower portion near the outlets of watershed. The soils are coarser in texture, deep, erosion hazard and undulating in topography. Rill and initiation of gully can be seen near the outlet of the watershed.

(5.6) Land Capability Class VII & VIII :

This class of land is not found in watershed. Somewhere lack of soil are found with admixture gravels fragments in these classes of lands.

(5.7) Conclusions :

The majority of land form is coming under class II, which give an insight of good agriculture production potential of the watershed.

The land capability classification provides reasonable good information with regard to capability of soil, that could be used for agriculture, agrihorticulture, silviculture and posture development.

The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like bunding practices.

The reasonable area is under watershed of wasteland and other wasteland including grater potential of this watershed for forestry and pasture development. Rare places namely water body of low portion of land area under seasonally works as water harvesting structures and these harvested water is used or can use for some other beneficial activities during the crop season also.

6. Problems and needs of the watershed indentified during the PRA

(6.1) Problem Identification and prioritization :

ee- The are has undulating topography, steep unstable slopes, gradient of excessive branches of rills and hence highly prone to soil erosion.

ff- Major issues addressed to food sufficiency economic growth and environmental security in the watershed area.

- gg- Effective soil depth is limited and highly variable hampering good crop growth.
- hh- The watershed have low productive cropping due to tradition single cropping pattern and over all average crop production percentage not sufficient against requirement.
- ii- Identified that there is no assured irrigation system has been development capacity of water bodies are reduced due to silt ration which are utilized to store of rainy water and they are renovatable.

(6.8) Transact walk during the PRA :

Problems identified and prioritized during the transact walk and PRA exercises in all comprised villages of watershed. There were pooled and a list of problems representing the whole watershed was prepared. Problems were ranked as per their total weight age in the watershed village.

Table – 20 : Ranking of Problem identification and prioritization of watershed

S.No.	Problem	Rank
1	2	3
1	Lack of irrigation	4
2	Lack of drinking water	8
3	Low production of field crops	5
4	Lack of fodder availability and low productivity	4
5	Lack of availability of fuel wood	5
6	Lack of market facility	7
7	Lack of quality seeds, fertilizer, pesticides etc.	6
8.	Medical and Health care facilities for milching animals and low productivity.	8
9	Lack of medical, educational and transportation facilities	9
10	Lack of water bodies renovation	4
11	Lack of run of earthen check bunds	3
12	Lack of water harvesting structures	4
13	Lack of livelihoods opportunity	4

Prioritized ranking (Upto four Numbers) :-

- 19- Lack of earthen check bunds.
- 20- Lack of livelihood opportunities.
- 21- Lack of irrigation water was the greatest problem. Lack of irrigation water problem experienced by the people followed by low crop production.

(6.3) Analysis of SWOT of the watershed :

Strength (S), Weakness (W), Opportunity (O) and Threat (T) analysis is a useful decision support tool. A SWOT analysis of watershed is presented as follows :

SWOT analysis of the watershed

<p style="text-align: center;">Strengths (S)</p> <p>lxi. Cooperative work culture in traditional activities lxii. Close ethnic ties lxiii. Road at the top as well as outlet of the watershed lxiv. Hard working lxv. Resource pool of crop genetics diversity lxvi. Awareness of farmers about watershed management programme lxvii. Well established CPR maintaining and sharing system lxviii. Stall feeding of animals lxix. Well maintained seasonal water bodies lxx. Social outlook of the community towards land less</p>	<p style="text-align: center;">Weakness (W)</p> <p>lv. Poor water management lvi. Resource poor farmers lvii. Out migration of youth lviii. Low and erratic rainfall lix. Fragile geology lx. Fragmented land holding lxi. Heavy infestation of wild animals lxii. Problem of fuel and fodder lxiii. Shallow soil depth and with high percentage of gravel</p>
<p style="text-align: center;">Opportunities (O)</p> <p>xxxvii. Wide range of annual and perennial crops xxxviii. Scope of regular employment opportunities to check out migration xxxix. Strengthening of existing irrigation system xl. Conducive climate for rainfed crop diversification xli. Good scope for Agro forestry and dry land horticulture xlii. Potential for collective action and management of CPR</p>	<p style="text-align: center;">Threats (T)</p> <p>xxxi. Prone to adverse climate like drought xxxii. High market risk xxxiii. Social conflicts owing to PRI and WSM polices and local politics xxxiv. Weak coordination among line departments xxxv. Lack of expertise of implementing agency in different aspects of WSM</p>

7. Proposed land use for the watershed :

Watershed management plan preparation due importance is given to topographic, land suitability, irrigation potentially, prevailing farming systems, micro farming situation, farming, farmers preferences and priorities along with economic and environment securities.

Crop and tree selection and area distribution was done as per farmers priorities revealed through PRA exercise.

The watershed management plan for watershed is prepared with specific objectives of food sufficiency, income and employment generation with environment security.

Technical options were with the ITK based on the latest available experiment findings. Due attention was given to the resource of the farmers and adjustments were made in capital intensive resource demanding technological outputs while making them adoptable to the resource poor farmers. Emphasis was given on maximum use of farm yard manure. The proposed land use plan of the watershed is shown as follow as in table

Table – 21 : Present and proposed land use plan of the watershed

S.No.	Land use	Present (ha)	Proposed area (ha)
1	2	3	4
1	Agriculture	476.00	
a	Rainfed		
	I Crops	371.00	476.00
	II Agro-forestry	9.00	27.00
b	Irrigated		
	I Assured	54.00	54.00
	II Partial	42.00	57.00
2	Waste land		
a	Aforestation		25.00
b	Pasture		
c	Untreatable	19.61	11.00
d	Treatable	23.85	19.00
3	Village land	48.339	-

(7.1) Status of Present Water Resources Utilization :

Watershed is having some canal system. Management and maintenance of these canal are required. Before sowing of Rabi crops, water from these canal is issued as supplementary irrigation for Rabi sowing ar allowed to go as waste. After releasing water from canal, submergence area also put under cultivation.

Some where bore well irrigation applied by the farmers in the watershed.

(7.2) Proposed Plan for Irrigation Development :

- a- Present system of irrigation and wastage of water during October–November need to be made more efficient from water management point of view by minimizing conveyance losses in the existing water courses.
- b- Present irrigation canal capacity have to build up by the reform. Which are lack capacity of water.
- c- Construction of new water harvesting earthen structures, Pucca Check Dem, Series Gully Plugging, etc. has been sloppy portion to increase irrigation potential and for recharging of ground water, soil and moisture conservation maximum field irrigation, best production and expected change of crop rotation.
- d- The up gradation of the exciting system of irrigation will result in :
 - i- Minimization of conveyance losses.
 - ii- Increase in frequency of irrigation.
 - iii- Adoption of high yielding varieties of crops.
 - iv- Assured cultivation of cash crops.
 - v- Capacity buildup by the planning of new water harvesting structures.

(7.3) Ground Water Recharge :

For the purpose of ground water recharge, the area of the upper side of watershed is recommended for Field Bunds, Contour Bunds, Peripheral Bunds and Submergence Bunds and in the lower portion Contour Staggered Trenches, Gully Plugs, Earthen Check Dem and Pacca Outlets. In the undulated sloppy portion of the watershed recommended water harvesting structure for dual purpose as ground water storage and under ground water recharge.

(7.4) Crop Production :

Practices proposed in the watershed is given as follows :-

- a- Mulching and crop residue management.
- b- Application of green manuring.
- c- Vermi Composting.
- d- Crop rotation and inter cropping.
- e- Biofertilizers.

(7.5) Tillage Operation :

Deep tillage technology is proposed to apply to be demonstrated for benefit of farmers in the watershed.

(7.6) Improved Seeds of High Yielding Verities (H.Y.V.) :

Recommendation of improved varieties is necessary for improving the productivity and farm income. Through replacement of low yielding traditional verities of seeds in villages of watershed.

(7.7) Balanced Fertilizer Use :-

Demonstration of use of fertilizer in various crops of watershed recommended balance fertilizer use in different crops will be benefited of forming community.

(7.8) Control of insects and diseases :

Aphid in the mustard 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 pest and diseased will also be demonstrated in the watershed for benefit of the growers.

(7.9) Dry Land Horticulture :

Such portion of dry land in which proposed horticulture development planning recommended species like Ber, Bel and Aonla will be planted at suitable spacing in the watershed.

(7.10) Agri Horticulture :

Aonla and Sahjan would be suitable horticultural crops to the locality. Therefore, a part of land in the farmer field shall be selected and brought under Agri-horticulture system. The cropping system followed will be Jwar and Wheat.

(7.11) Plantation (Fuel wood) :

Such a portion which are under wasteland will be taken falling in the class-IV category in the watershed. These lands will be planted with species like Vilayati Babool (Prosopis Juliflora), Babool (Acacia Nilotica), Karanj (Pangamia Glabra).

9. Socio Economic Analysis of the of the Project :

(9.1) Sustainability and environment security :

The proposed land use plan will improve the land utilization index and crop diversification index significantly as compared to the existing one. in the proposed watershed management plan proper blending of the bio engineering measures will be applied on above 80% of the total area of watershed. It is estimated that more than above 70% of the watershed area will be treated and consequently the soil loss and runoff from the area is expected to be reduced by 70% respectively.

It will help in maintaining ecosystem integrity on sustained basis along with improving the livelihood security of the farming community.

(9.2) Economic Analysis :

Economic analysis of the project was carried by taking direct benefits and costs considering 10 years for project life at 10% discount rate. Whole watershed development plan was divided into three sector as agriculture, horticulture and forest/Fuel wood plantation. Net Present Value (NPV) and Benefit Cost ratio criteria were applied judge the economic efficiency of each enterprises and sector. Net present value (NPV) of the project life is considered to be 10 years and discount rate for NPV estimation is 10% is given NPV and benefits as follows :-

Table – 22 : Present productivity income analysis :

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	3.00	4300.00	12900.00	6450.00	6450.00	1:1
		Moong	3.00	4500.00	13500.00	6075.00	7425.00	1.12:1
		Jwar	4.80	600.00	2880.00	1584.00	1296.00	0.82:1
		Wheat	18.50	850.00	15725.00	8650.00	7075.00	0.82:1
		Pea	7.50	2250.00	16875.00	10970.00	5905.00	0.54:1
		Mustard	3.50	1850.00	6475.00	3235.00	3240.00	1:1
Total		-			105105.00	54105.00	51000.00	0.94:1
Average		-			13138.00	6763.00	6375.00	0.94:1
B	Forestry	Vilayati				15000.00	-	Nil
		Babool						
C	Horticulture	Ber				20000.00	-	Nil
		Aonla				20000.00	-	Nil
		Bel				20000.00	-	Nil
Total		-				60000.00	-	Nil
Average		-				20000.00	-	Nil
Grand Total						-		

Table –23 : Post productivity and income analysis for Post Productivity**Value and B.C.:**

S. No.	Name of Sector	Name of Crops	Produ ction/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	4.00	5000.00	20000.00	8325.00	11615.00	1.39:1
		Moong	4.00	5000.00	20000.00	8200.00	11800.00	1.44:1
		Jwar	5.50	800.00	4400.00	1900.00	2500.00	1.32:1
		Wheat	25.00	1000.00	25000.00	11680.00	13320.00	1.14:1
		Pea	9.50	3300.00	31350.00	14810.00	18540.00	1.12:1
		Mustard	5.00	2500.00	12500.00	4370.00	8130.00	1.86:1
Total		-	-	-	172250.00	72845.00	99765.00	1.38:1
Average		-	-	-	21531.00	9061.00	12471.00	1.38:1
B	Forestry	Vilayati Babool	80.00	500.00	40000.00	15000.00	25000.00	1.67:1
C	Horticulture	Ber	35.00	1500.00	52500.00	20000.00	32500.00	1.63:1
		Aonla	35.00	2000.00	70000.00	20000.00	50000.00	2.50:1
		Bel	40.00	1500.00	80000.00	20000.00	40000.00	2:1
Total		-	-	-	182500.00	7000.00	122500.00	2.04:1
Average		-	-	-	60833.00	20000.00	40833.00	2.04:1
Grand Total		-	-	-	1394750.00	147485.00	247265.00	1.68:1

Table –24 : Summary of NPV, PPV and B.C. Ratio (Sector wise) :

S. No.	Name of Sector	NPV		PPV		B.C. Ratio
		Expend.	Net Income	Expend.	Net Income	
1	2	3	4	5	6	7
1	Rain fed Agriculture	54105	51000	72485.00	99765.00	1.38:1
2	Forest/Fuel wood Plantation	15000	-	15000	25000	1.67:1
3	Horticulture	60000	-	60000	122500	2.04:1
Total		129105	51000	147485.00	247265	1.68:1

(9.3) Economics of Agriculture Sector :

The development cost can be recovered by the adoption of plan in present rain fed agriculture is being done on well maintained field, therefore does not require much investment. In rain fed agriculture, investment of Rs. 44.50 lacs is proposed to made is given as follows :

Table – 25 : Economics of Agriculture Sector :

S. No.	Name of sector	Name of Activities / Plan	Treatble Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Rainfed	Soil, moisture and water cons works	472	269.34	640.87	371.69	1:38:1

(9.4) Economics of forest fuel wood plantation :

Economic analysis of fuel wood plantation in the watershed. Project life is considered to be 20 years and discount rate for NPV estimation is 10 % is followed and as is given follows :

Table –26 : Economics of forest fuel wood Plantation :

S. No.	Name of sector	Comman Name of Plant	Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Forest Fuel wood sector	Vilayati Babool (Prasopis Juliflora)	25	2.50	6.675	4.175	1.67:1

(9.5) Economics of Horticulture Sector :

Economic analysis of Horticulture Plantation in agri-horti system and on wasteland patches of watershed project, life is considered about 15-20 years and discount factor rate for NPV estimation is 10% is follows :

Table – 27 : Economics of Horticulture system :

S. No.	Name of Sector	Common name of Plants	Area (Ha.)	NPV (Lacs)	Post Productive Value (Lacs)	Benefit Lacs	B.C. Ratio
1	2	3	4	5	6	7	8
1	Horticulture	Ber (zyziphus mouritana)	4.00	0.80	2.104	1.304	1.63:1
		Aonla (Embelica officianalis)	3.80	0.76	2.660	1.90	2.5:1
		Bel (Aegle marmelos)	2.20	0.44	1.320	0.88	2:1
Total			10.00	2.00	6.084	4.084	2.04:1

(9.6) Food requirement and sufficiency :

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

Table – 28 : Status of food requirement and availability of per annual :

S. No.	Name of Foods	Requirement Q./Yr.	Present Status		Expected Post Status	
			Availability Q./Yr.	Deficit or surplus Q./Yr.	Availability Q./Yr.	Deficit or surplus Q./Yr.
1	2	3	4	5	6	7
1	Cereals 110 Kg.	11486	9763	1723	19526	8040
2	Pulses 36.50	3811	2096	1715	6860	3049
3	Oil Seeds 29.20	3049	1219	1830	4878	1829
4	Vegetable 71 kg	9502	1900	7602	17103	7601

(9.7) Employment generation :

One of the major problem of the labour migration in watershed project. By the implementation of the project activities employment opportunities will be generated. However the changes in land use pattern and adoption of other subsidiary enterprise will generate employment opportunities in the watershed as given in table follows :

Table – 29 : Employment generation under proposed works :

S. No.	Employment activities/works	Area under work	Cost	Mandays generation (Nos.)			
				Unskilled	Skill	Total	Person
1	2	3	4	5	6	7	8
2	Graded Contour Bund	52	1.56	1560	-	1560	52
3	Gully Plug, C.D.	88	6.60	4620	154	4774	159
4	Submergence Bund	74	2.96	2960	-	2960	99
1	Peripheral Bund	74	2.590	2590	-	2590	86
5	W.H.B.	92	8.28	4968	281	5249	175
6	Renovation of Bund	57	1.71	1718	-	1710	57
7	Reno. of W.H.B.	-	-	-	-	-	-
8	Community Pond	-	-	-	-	-	-
9	Afforestation	25	2.62	524	-	524	17
10	Horticulture	10	2.00	400	-	400	13
Total		472.00	28.32	19332	435	19767	658

10. Formation of watershed committee :

Under compliance of common guideline Para (6.3) is followed and by the help of watershed development team, watershed committee is organized in the micro watershed village Teyore Bujurg with 10 members as prescribed in common guide line. List for organization of W.C. village details given as follows :

Table – 30 : Details of comprised village W.C. organization in M.W.S. :

S. No.	Particulars	Details	Block	Geographical Area
1	2	3	4	5
1	Micro watershed code	3B3E3c1f	Pahasu	497.00
2	Name of Gram Panchayat in M.W.S.	Teyore Bujurg	Pahasu	474.09
		Chauganpur	Pahasu	16.687
		Pandaraval	Pahasu	6.223
		Total		497.00

Table – 31 : List of organized W.C. for the Gram Panchyat Teyore Bujurg in watershed.

S. No.	Name of selected members	Age	Representation Members from	Post	Qualification	Village
1	2	3	4	5	6	7
1	Smt. Phulwati devi		Gram Pradhan	President	Marit	Teyore Bujurg
2	Ravendra Kumar	27		Secretary	M.A.	Teyore Bujurg
3	S.K. Sharma	53	From W.D.T.	Member	Ag. Engineer Diploma	
4	Shri Anil	35	W.D.T.	Member		
5	Shri Harveli		U.G.	Member		
6	Shri Narendra	25	S.C.	Member	B.A.	Teyore Bujurg
7	Shri Dinesh Kumar		S.H.G.	Member		Teyore Bujurg
8	Shri Gopal	55	S.C.	Member	M.A.	Teyore Bujurg
9	Smt. Divya Devi	45	Female	Member	8	Teyore Bujurg
10	Shri Ramniwas	40	Land Lags	Member	High School	Teyore Bujurg
11	Shri Satyaprakash		P.A.	Member	Graduation	I.W.D.T. Khurja

(10.1) Formation of Self Help Groups in M.W.S.

By the help of watershed committee and watershed development team self help group are formatted / organized. Families and persons are selected from poor, small and marginal farmers families, landless poor families, agriculture labour families, women, herdsman and shepherd and S.C. families in the formatted self help groups are given as follow :

Table – 32 : Ganga Ji Self help group – Teyore Bujurg.

S. No.	Name of member in formatted SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Shri Pop Singh	50	B-C	8	New
2	Shri Girish	35	Baghel	Sakshar	New
3	Shri Bhura	30	Baghel	Sakshar	New
4	Shri Phul Singh	55	Baghel	''	New
5	Shri Kanti Prasad	30	Baghel	''	New
6	Shri Ramesh	30	Baghel	8	New
7	Shri Saudan Singh	90	Baghel	5	New
8	Shri Pradeep	28	SC	8	New
9	Shri Devkaran	50	-	M.A.	New
10	Shri Indra Singh	35	SC	High School	New

Table – 33 : Self help group Teyore Bujurg – Buffaloes.

S. No.	Name of member in formed SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Shri Gopal	65	SC	Livestock	New
2	Shri Ram Khilani	65	SC	Livestock	New
3	Shri Narendra	25	SC	Livestock	New
4	Shri Pintu	26	SC	Livestock	New
5	Shri Sphan Lal	65	SC	Livestock	New
6	Shri Khamani	40	SC	Livestock	New
7	Shri Prem	50	SC	Livestock	New
8	Shri Dinesh	40	SC	Livestock	New
9	Shri Satish	30	SC	Livestock	New
10	Shri Gopal	50	BC	Livestock	New

Table – 34 : Self help group in Teyore Bujurg of watershed.

S. No.	Name of member in farmated SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Shri Rohtash	35	SC	Pashupalan	New
2	Shri Ganda lal	50	SC	Pashupalan	New
3	Shri Bhikam	45	BC	Pashupalan	New
4	Shri Himmat Singh	30	BC	Pashupalan	New
5	Shri Bhagwandas	40	BC	Pashupalan	New
6	Shri Raj Kumar	40	BC	Pashupalan	New
7	Shri Rambabu	47	SC	Pashupalan	New
8	Shri Anvesh	28	SC	Pashupalan	New
9	Shri Gajraj	45	SC	Pashupalan	New
10	Shri Mahaveer Singh	55	BC	Pashupalan	New

Formation of User's Groups :

User's groups are formed by the help of watershed committee and watershed development team in the micro watershed comprised villages. Farmers which have land village are involved in the User's groups and they will be directly benefited as expected by the implementation of watershed project. Easy and convenient conditions are made to resource use between user's groups and they will be responsible to operate and maintenance for the created assets in the watershed. Nos. of formed user's groups details are given as follows :

Table – 35 : Village wise user's groups

S. No.	Name of village	No. of groups	No. of farmers	Total Agri. Land	Area under treatment	Cost of assets
1	2	3	4	5	6	7
1	Teyore Bujurg	10	842	434	430.827	-
2	Chauganpur	2	38	16.50	16.318	-
3	Pandaraval	2	30	25.50	24.855	-
		14	910	476	472.00	-

10. Estimation and Costing of Proposed activities of the watershed Project Year 2009-10.

Proposed works / activities for the Project Period (Year 2010-11) under proposed treatable area 472.00 Ha. Out of total Geographical area 497.00 Ha.

(10.1) Financial and Physical Outlets :**Table – 36 : Financial and Physical Outlets for the Year 2009-10 :**

Sl. No.	Components	Unit cost per ha.	Physical ha.	Financial (Lacs)			Man-days Generation
				Labour Component	Material Component	Total	
1	2	3	4	5	6	7	8
A	Management Cost 10%						
1	Administrative Cost – TA & DA Hiring of Vehicles, Official Expenditure Electricity & Phone bill Computer, Stationery and office consumable materials & contingency	1200	-	-	5.664	5.664	-
2	Monitoring	120	-	-	0.5664	0.5664	-
3	Evaluation	120	-	-	0.5664	0.5664	-
	Sub Total	1440		-	6.7968	6.7968	-
B	Preparatory Phase 10%						
1	Entry Point Activities 4%	480	-	0.4531	1.8125	2.2656	453
2	Institutional & Capacity Building 5%	600	-	-	3.832	2.832	-
3	Detailed Project Report 1%	120	-	-	0.5664	0.5664	-
	Sub Total	1200	-	0.4531	5.2109	5.664	453
C	Watershed Work Phase						
a	Watershed Development Works						
1	Graded, Contour & Field Bunds	3000	52	1.56	-	1.56	1560
2	Gully Plug, Earthen Checkdam /WHS	7500	88	4.62	1.98	6.60	4774
3	Submergence bunds	4000	74	2.96	-	2.76	2960
4	Peripheral Bund	3500	74	2.590	-	2.590	2590
5	Earthen Water Harvesting Bund	9000	92	4.968	3.312	8.28	5249
6	Renovation of existing Bunds	3000	57	1.71	-	1.71	1710
7	Renovation of existing W.H.B	-	-	-	-	-	-
8	Aforestation and Development of silvi postural system	10480	25	0.524	2.096	2.62	524
9	Dry Land Horticulture	20000	10	0.400	1.60	2.00	400
10	Community Pound (Renovation)	-	-	-	-	-	-
	Sub Total	6000	472	19.332	8.988	28.32	19767
B	Livelihood Programme (Community Based) 7.620						
	Income generating activities through SHG's for landless and marginal farmers 10%						
1	Live stock development activities	200	-	-	0.9441	0.9441	-
2	Bee Keeping	100	-	-	0.4718	0.4718	-
3	Poultry Farming	200	-	-	0.9441	0.9441	-
4	Nursery Development	300	-	-	1.4163	1.4163	-
5	Vegetable Production	100	-	-	0.4718	0.4718	-
6	Milk Dairy Promotion Unit	200	-	-	0.9441	0.9441	-
7	Establishment of Vermi compost Unit	100	-	-	0.4718	0.4718	-
8	Sub Total	1200	-	-	5.664	5.664	-
C	Production System and micro Enterprises						
1	Crop production, diversification of agriculture and introduction of agro forestry	1170	-	-	5.5224	5.5224	-
2	Demonstration of improved composting system	390	-	-	1.8408	1.8408	-
	Sub Total	1560	-	-	7.3632	7.3632	-
D	Consolidation Phase 5% Sub Total	600	-	-	2.832	2.832	-
Grand Total		12000	472	19.7851	36.8549	56.640	20220

—: संकल्प पत्र :-

ग्राम पंचायत:- त्योंर बुर्जुग, कोड सं०- 2B3E3c1f विकास खण्ड- पहासू जिला- बुलन्दशहर

यह कि आई०डब्लू०एम०पी० परियोजना में तैयार की गयी निर्माण की नयी सृजित परिसम्पत्तियों को ग्राम पंचायत चौडेरा एवं माइकोवाटरशेड के अन्तर्गत सम्मिलित ग्रामों में योजना क्रियान्वयन कराने एवं योजना उपरान्त चालू रखने तथा सुजित परिसम्पत्तियों के अनुरक्षण हेतु कृत संकल्प एवं इच्छुक है।

त्योंर बुर्जुग ग्राम पंचायत के सभी स्रोत स्थल जैसे तालाब ग्राम सभा गोचर (चारागाह) जल संसाधन, जंगल आदि में भूमि विकास परियोजना के अन्तर्गत किये जायेंगे। उन कार्यों को समाज के कमजोर वर्ग जैसे अनुसूचित जाति/जनजाति, महिला वर्ग एवं अल्प भूमिहीन गरीबी रेखा के नीचे के लाभार्थियों को लाभ पहुंचाने हेतु इच्छुक होंगे।

हम योजना संचालन हेतु प्रस्तावित करते हैं एवं सहमति देते हैं कि भारत सरकार के समस्त मार्गदर्शी सिद्धान्तों के अनुपालन में कार्य सम्पन्न करायेगे। यह भी घोषित करते हैं कि चयनित क्षेत्र जिसको मेरे द्वारा भलीभाँति देखा गया है, और प्रस्तावित योजना में प्रस्तावित समस्त कार्य 15 सालो से नही कराया गया है। जिसकी मुझे पूर्ण रूप से जानकारी है और अनुमोदन करते हैं।

पुलवती
फूलवती (प्रधान)
ग्राम पंचायत त्योंर बुर्जुग
विकास खण्ड-पहासू (बु० शहर)

व कर्ण

विमलेश
शुभदी

दिवा देवी

रात्रिका

जीगीषा

PROJECT AT A GLANCE

IWMP-III (Bulandshahar)

1	State	Uttar Pradesh
2	Distt.	Bulandshahar
3	Block	Pahasu
4	M.W.S. Code	2B3E4d1d
5	Name of M.W.S. Project	Chaundhera
6	Involved Village	Barkhera, Madanpur, Dangara
7	Geographical Area of M.W.S.	712.00
8	Rainfed Area	569.58
9	Treatable Area	648.00
10	Weight age	
11	Cost of Project	
12	For the year	2011-12

Budget Components

S. No.	Components	Area (Ha.)	Cost (in Lacs)
1	2	3	4
1	Management Cost 12%	-	9.331
2	Preparatory Phase 10%	-	7.776
3	Watershed Work Phase	-	
	A- Watershed Development Works 50%	648.00	38.88
	B- Livelihood Programme (Community Base) 10%	-	7.776
	C- Production System & Micro Enterprises 13%	-	10.10
4	Consolidation Phase 5%	-	3.897
	Total	648.00	77.76

Executive Summary of the Project

Identified selected micro watershed project Chaundhera is coded as **2B3E4d1d** has been proposed from cluster of I.W.M.P. Bulandshahar –III project in Pahasu Block district Bulandshahar four villages namely Chandra, Barkhera, and Dangra is comprised in the micro watershed which is located in the east of district Bulandshahar on the east bank of River Kali Nadi and border of district Badaun area is known as Khadar. It lies between $28^{\circ} -5'$ S and $28^{\circ} -15'$ N Latitudes and $78^{\circ} -0'$ E and $78^{\circ} -10'$ W Longitudes Covering area. Its altitudes ranges from 181 meter to 208 meter above the mean sea level. Khurja Railway Station 184.11 m, Khurja Jh. Railway station is 201.18 m above mean sea level is displayed. Project area of I.W.M.P. BSR-III is lied in the Pahasu Block of Bulandshahar District which is come in the western plan zone under semi arid area. The annual average rainfall is near to 397 mm which an average of 35 rainy days. Out of which about 85% is received during the mansoon season from July to September and very less rainfall is received in the winter season.

Temperature ranges from as high as 43°C in the May-June to as $3^{\circ}-4^{\circ}\text{C}$ during December – January. The Trend of rain fall is highly eratic and maximum water goes as runoff.

Main occupation of the dwellers is agriculture in the watershed. Some part of the lands are shown during the Kharif season. Cane sugar are preferred crops in the project area. The main Crops raised are Wheat, Pea & Mustered and maze.

The topmost portion of the watershed is sloppy flat land. Other than topmost portion of the watershed is under soil erotic portion and depreciative. The soil of the land are sandy loam Soil. The middle agricultural position of watershed relatively smooth sloppy flat land with sandy loam soil texture. These soil is yellow in colour and are inherently good in fertility status.

Natural vegetation of the watershed is very poor. Somewhere forest vegetation is seen which are predominant with Vilayati Babool (*Prosopis Juliflora*), followed by Babool (*Accasia nilotica*), somewhere Neem Plants (*Azadirachta Indica*), Shisham (*Dolbergia Sisson*) and Karanj (*Pongamia Glabra*) are seen in occasional occurrence. There is no grass land in the watershed. Somewhere grass patches are seen only on the bunds, road sides and other such places. Coverage of massive green belt is in poor percentage for environment which is envisaged. That watershed is very poor climate area.

There is normal condition of animal physics and for their fodder arrangement is the watershed and creative possibility would be expected by the implementations of the project.

Due to Aerial soil erosion poor harvesting managements, cropping pattern, non treated watershed etc. are very anti effective causes for the watershed. Problem of the watershed is to be tackled by harvesting structures which have last most of their capacity new water bodies for the prevention of erosion and conservation of soil and moistures various type of earthen bunds in the watershed field, necessity has been observed. Wasteland will be treated with staggered Trenches, afforestation and bunding for the changing of characteristics.

The detail project report has been prepared by the applying of nine process steps for the micro watershed code no. **2B3E4d1d** brief is as follows.

- STEP-1 Secondary data collection:-** During the five days visit programme in the micro watershed project with of all available documents of village label by approaching the Gram panchayat collected secondary data.
- STEP-2 Village meeting & conducting PRA exercise:-** Community meeting conducted on fix days for the consultation with villagers for the PRA Exercise. Participatory mode of the villages was positive indicated for the success of programm. With good in testing participation has been drawn social & resource map on ground & paper & discussed un various topics of problematic thoughts in the micro watershed.
- STEP-3 Socio economic survey:-** The resource organization of village label volunteers identified to conduct house hold socio economic survey/states.
- STEP-4 Probrel typology analysis:-** Thoroughly analyzed the data & identified problem type as soil & moisture conservation, crop rotation, crop coverage, productivity, livelihoods, social issues & capacity building gaps etc. Problems discussed with the watershed committee & came up with alternative solution.
- STEP-5 Conduct of net participatory planning (NPP):-** The planning team visited together in the planning blocks on the scheduled date along with the beneficiaries of the villages & data gathered as for the participatory net planning.
- STEP-6 Productivity & livelihood planning exercise:-** For the product livelihood exercise, group discussion on various livelihood as Agriculture, Animal husbandry enterprise development held discussion with the villagers in the micro watershed.
- STEP-7 Institutional & capacity building :-** This plan is prepared based on the data available in the field and auscultations with the watershed committee.
- STEP-8 Data consolidation & documentation of DPR :-** After gathering all required information compiled collected data. Thoroughly discussed and finalized the

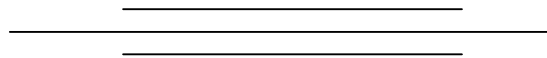
expected outcomes and benefits specially in the respect of livelihood for different segments. These are the target and performers indicators for the micro watershed.

STEP-9 Conduct of Gram Sabha obtaining approvals submissions of DPR:-After preparation of the draft DPR convened to Gram sabha and activities proposed expected outcomes benefits of implementing the programm are explained in case of any changes are proposed in the Gram sabha approval obtained by the Gram sabha and already singed of Mau paper.

STEP-9A Attachment of detail estimate, cost and design:-Estimating, Costing and design prepared technically According to plan in the micro watershed project. And attached with the DPR.

STEP-9B Various type of mapping :- DPR prepared in the support of micro watershed project using various type of maps is as follows :

- | | |
|---------------------------------------|-----------------------------|
| 1. Index Map of Watershed | 2. Watershed Map |
| 3. Relief/ Drainage Map | 4. Slop Map |
| 5. Soil and Land Capability class map | 6. Land use/ Land Cover Map |
| 7. Cadastral map | 8. Proposed Action Plan map |
| 9. Social Map | |



Project Report

Table – 1 : Micro watershed project brief : -

1	State	U.P.
2	District	Bulandshahar
3	Block	Pahasu
4	Comprised Villages (Nos.)	03
5	Name of Watershed	Chaundhera
6	Name of MWS Project	Chaundhera
7	MWS Code No.	2B3E4d1d
8	Geographical Area of MWS	712.00
9	Treatable Area	648.00

1- Project Objectives :- The aim and objectives of the Project are :

- xx- Conservation, development and sustainable management of natural resources including their users.
- yy- Enhancement of agriculture production and productivity in a sustainable manner.
- zz- Restoration of ecological balance in the degraded and fragile rain fed ecosystem.
- aaa- Reduction in regional disparity between rains fed and irrigated area.
- bbb- Creation of sustainable employment opportunities for the rural community for livelihood security.
- ccc- Generation of massive employment.
- ddd- Reduce migration from rural employment.

2- Major Problem of Project Area :

- qq- Actual shortage of drinking water.
- rr- Near to nil activated water bodies and water harvesting structures.
- ss- Low depth of ground water table.
- tt- Undulated and generally sloppy rainfed area.
- uu- Large number of Small, Marginal and S.C. farmer land holding.
- vv- Lower wages of agriculture labour and also migration of labour due to shortage of employment in the watershed.

3- General Description :

(3.1) Location :-

Chaundhera Watershed has been taken with MWS Code No. 2B3E4d1d in Pahasu Block of Distt. Bulandshahar is located on Bulandshahar via Diwai to Chaundhera Via Anup Shahr Aligarh road about 57 Km. between 28⁰5' S and 28⁰15' N Latitudes and 78⁰0' and 78⁰10' N Longitudes. Location and delineation of watershed has been located on watershed map **Fig. 2** and on top sheet **Fig. 3**.

(3.2) Area and Elevation :

Elevation ranges from 181 to 208 mtr. above the mean sea level(MSL) altogether comprised villages and their's area is described as follows. (Comprises village map Fig. 3)

Table – 2 : Area and Elevation

Sl. No.	MWS Code	Block	Name of Village	Geographical Area	Treatable Area
1	2	3	4	5	6
1	2B3E4d1d	Pahasu	Chaundhera	671.735	609.181
			Barkhera	32.265	31.478
			Danga	8.00	7.341
		Total	03	712.00	648.00

(3.3) Shape of the Micro Watershed:

The shape of watershed is Elongated and as Rectangular. The maximum length and width of the watershed are 5000 Mtr. and 1814 Mtr. respectively with the Length: Width ratio of 2.76:1.

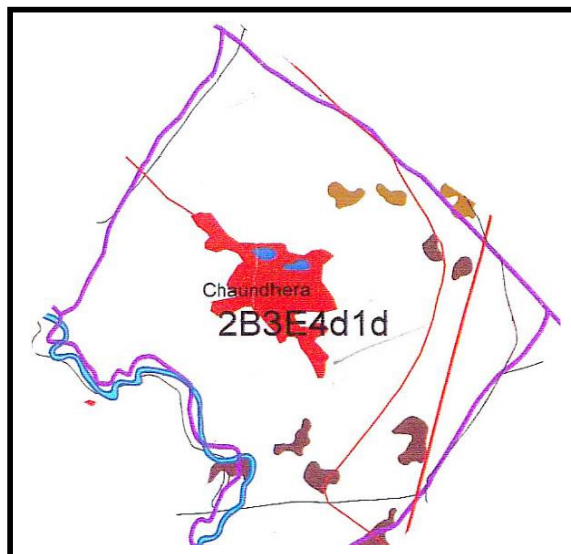


Fig. 1 (Shape of Micro Watershed)

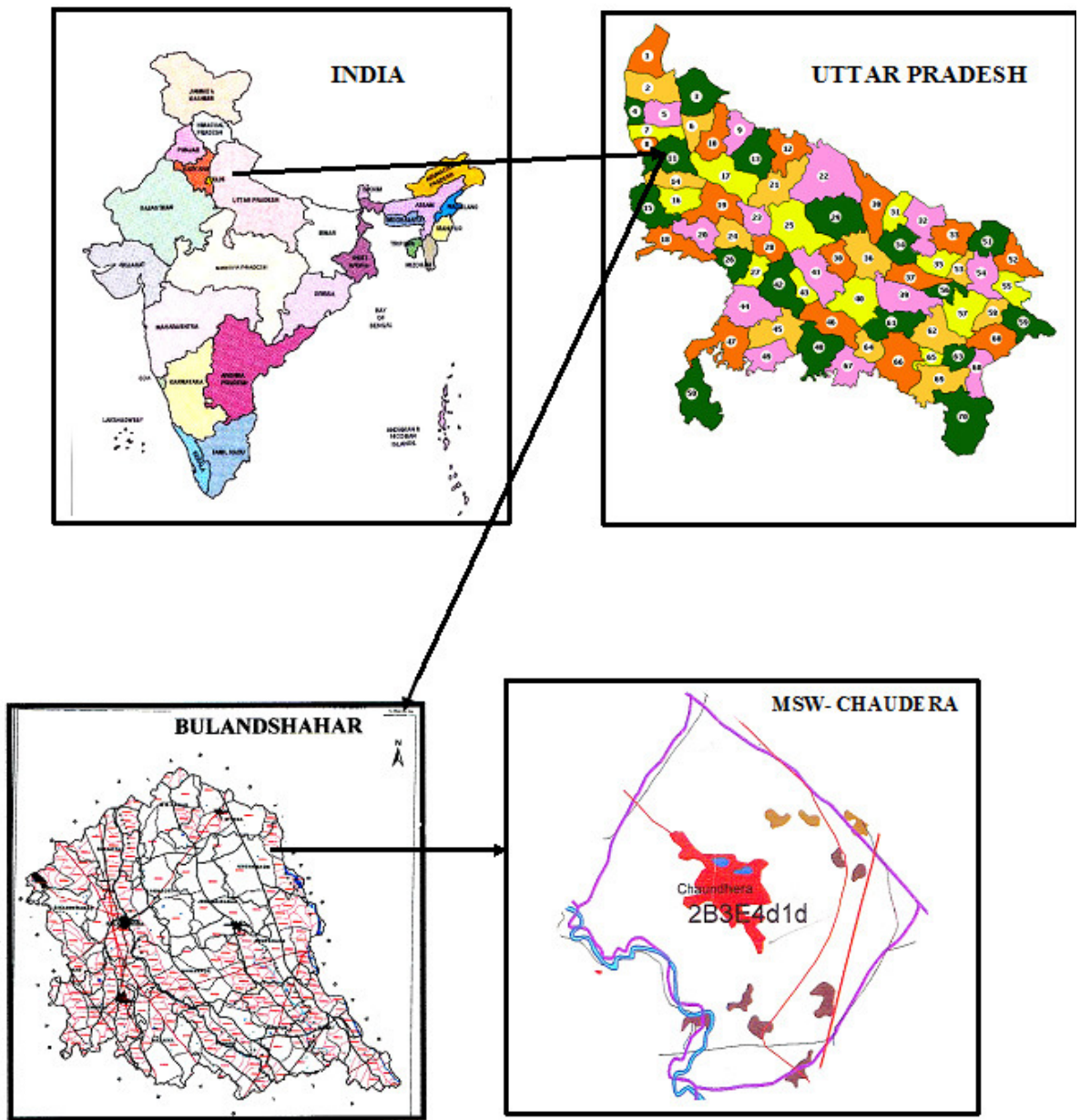


Fig.- 2 Location of the Micro Watershed

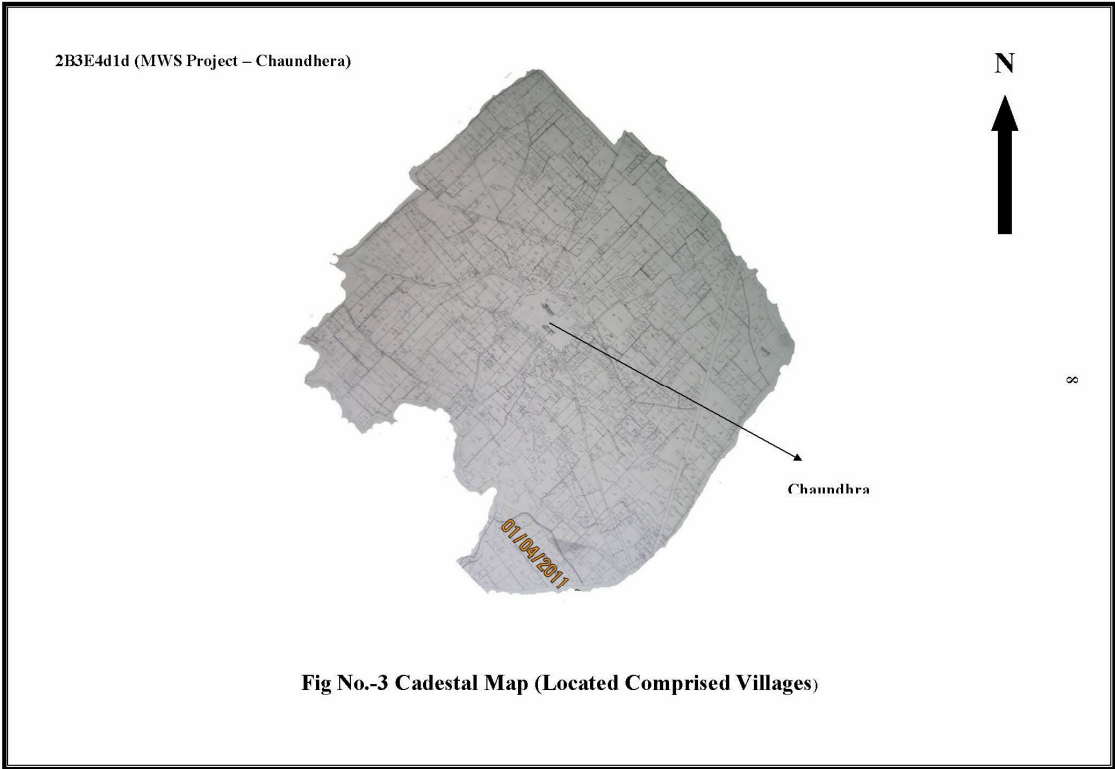


Fig No.-3 Cadastral Map (Located Comprised Villages)

Sl. No.	Name of Project	Name of Village	Geographical Area (in ha.)	Raifed Area (in ha.)	Treatable Area	Agri. Land
1	2	3	4	5	6	7
1	Chaundhera	Chaundhera	671.735	537.38	609.181	620.50
2		Barkhera	32.265	25.80	31.478	32.00
		Dangara	8.00	6.40	7.341	7.50
Total			770.00	616.00	693.00	707.00

(3.4) Climate :

The Watershed falls under semi arid region of tropical climate inclined in Western Plan Zone. The average annual precipitation is about approx. is 397 mm. spreading over 35 rainy days. Most of the rain fall (about 85%) is received during July to September. The rain fall of moderate intensity. Nothing the area receives of scarcity rainfall in the winter season. The temperator variation ranges from as high as 43⁰c in the month of May-June to as low as 4⁰c in December-January.

(3.5) Geomorphology and Soils :

Geomorphology :

The entire watershed is topographically divided into major landforms. Accordingly the soils of watershed can be grouped into various categories such plane land, undulated land, sloppy land and erosic ravenous land.

Soil :

(a) Fine textured soil :

The soil are the most extensive soil group found in the watershed. Some portion of the watershed is relatively sloppy flat land with fine soil texture as sandy sandy loam. The soils are in color and are inherently good high in fertility status. Soil texture is sandy lome loam particularly in depressions and loam in the elevated portion. The soil characteristic texture is dispersive and smooth. Therefore without impede the downward movement of water productive layer of soil are easily by high runoff.

a- Coarse Textured Soil :

These soil are lying mostly in downward portion, along with erosic gully and drainage line upto end of watershed outlet. These soils are coarser in texture and are relatively poor in fertility status. The soils are lomy sand in texture. Rill and gully formation in same parts particularly near the outlet of watershed can be seen.

(3.6) Drainage and Slope:

Due to prevalence of mild steep slope and presence of a number of drainage lines in the watershed the drainage system is adequate. The watershed from part of Ganga Basin and watershed. Under mild to steep topographical slope of MWS as divided as follow : (Drainage and slope map fig.-4)

Table - 4 : Drainage and Slope

S. No.	Grade	Slope Percent	Area in Ha.	Remark
1	A	0.5 – 1	194.00	30%
2	B	1 – 2	162.00	25%
3	C	2 – 3	130.00	20%
4	D	3 – 4	97.00	15%
5	E	4 – 5	39.00	6%
6	F	5 - 6	26.00	4%

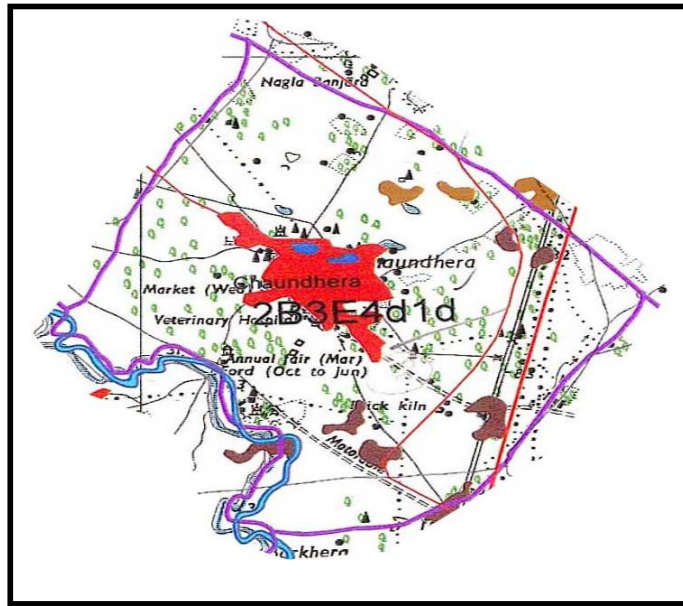


Fig-4 (Drainage & Scrub Map)

(3.7) Vegetation :

a- Natural Vegetation :

Natural vegetation is very poor in the watershed. The forest vegetation is predominant with Vilayti Babool (*Prosopis Juliflora*). There are occasional occurrence of Neem Plants (*Azadirochta Indica*), Shisham (*Dalbergia Sissoo*) and Karanj (*Pangamia Glabra*) and anywhere some scrubs are seen. There are no grass land in the watershed. Somewhere grass patches are seen only on the bunds, roadside and other such places. Poor percentage of massive green trees has been not seen in the watershed except Horticulture backyard.

b- Horticulture :

There is no backyards or commercial horticulture plantation in villages are been in some part of watershed.

c- Agroforestry :

The agriculture fields of the villages have some horticulture plantation at places isolated trees whose frequency is seen as under agroforestry and some where in where in backyards.

(3.8) Human Population:

a- Human Population:

Total Population of involved villages in watershed is 8936 with average family size of six persons as detailed as follows

Table – 5 : Human Population

S. No.	Name of village	Nos. of families	Human Population			Total
			Male	Female	Children	
1	Chaundhera	1323	3012	2941	1985	7938
2	Barkhera	295	581	522	370	1473
3	Dangara	304	410	305	724	1439
	Total	1922	4003	3768	3079	10850

i- Categorization of Human Population :

In the total population of watershed villages, categories are defined as below :

Table – 6 : Population Categories

S. No.	Particulars	Unit	Number of families in population in the villages		
			Population	Family	Remark
1	2	3	4	5	6
1	Agri Farmer	No.	784	130	
2	Landless	No.	92	33	
3	Agri. Labour	No.	705	232	
4	Land less Labour	No.	199	79	
5	BPL Family	No.	2094	349	
6	SC Family	No.	2730	459	
7	ST Family	No.	-	-	

(3.9) Land Holding :

All the categories of farmers as small, marginal, medium and large are involved in land holding average of about 1-18 ha. Small land holding farmers are further scattered at different places which makes cultivation very difficult. Distribution of term families according to the size of the land holdings are given as below :

Table – 7 : Distribution of farm families according to their size of land holdings

S. No.	Name of Village	Total Agri. Land in MWS	Land Holding Family (Nos.)					Percentage
			Marginal (< - 1Ha.)	Small (1-2 Ha.)	Medium (2-4 Ha.)	Large (4-7 Ha.)	Total	
1	Chaundhera	620.50	640	61	25	11	737	
2	Barkhera	32.00	33	6	3	-	42	
3	Dangara	7.50	2	1	2	-	05	
	Total	660	675	68	30	11	784	

(3.10) Live Stock Population :

Total live stock population of the watershed is 4582 Nos. Buffalos is preferred as mulch animal compared to Cow. But milk yield is poor. Goats are also kept for milk as well as for meat purpose. The breakup of livestock population is as follows :

Table – 8 : Live Stock Position

S. No.	Name of Village	Unit	Live Stock Position				Total
			Buffaloes	Cows	Bullocks	Goats	
1	Chaundhera		4070	552	171	151	4944
2	Barkhera		470	30	38	-	538
3	Dangara		42	14	4	21	81
	Total		4582	596	213	172	5563

(3.11) Infrastructure Social Feature :

- a- Comprised villages in the micro watershed has moderate communication facilities. Watershed linked with metaled road and approachable through motarable road.
- w- All the villages are electrified and have T.V. and Telephone connection.
- x- Literacy rate in the watershed is very low all villages are having education upto Junior High School.
- y- Nearest small market is at Pahasu 15 Km. Nearest big market Bulandshahar is about 57 Km. from watershed. Religious and ritual features are almost common as in other parts of U.P. small land holding with large family size and more than 25% of the labour force of the total population living below poverty line indicate poor socio economic status of the watershed community.

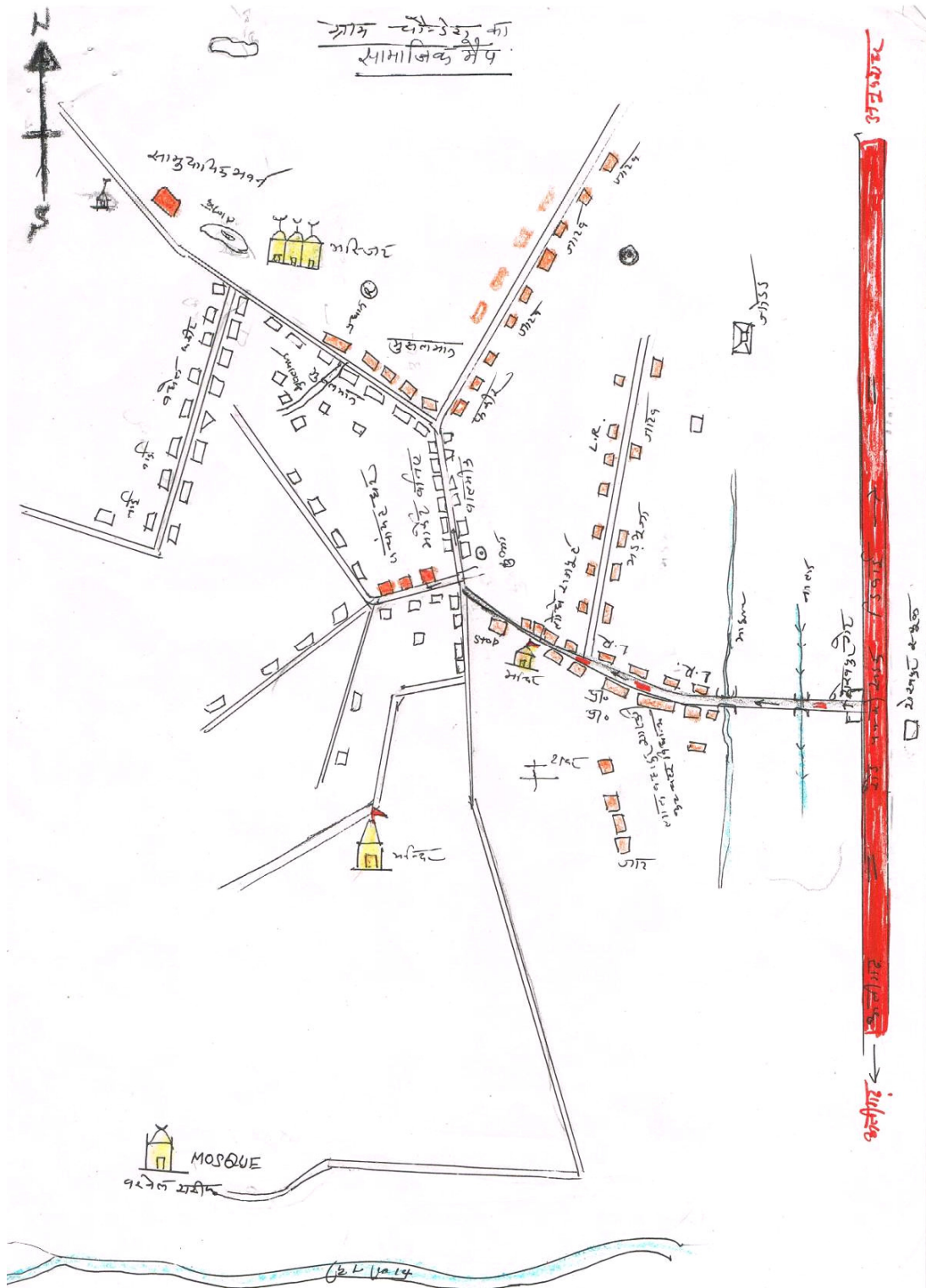
Participatory Rural Appraisal

Participatory mode of the villagers shows positive indication for the success of the programme. Traditionally the entire village community participate in the individual works. Social map of one of the watershed village drawn by villagers themselves, depicting various village figures is shown in sketched map in Fig.-4 & 5. Infrastructures position of the village recorded as follows :

Table – 9 : MW.S. Project – Chaundhera.

S. No.	Infrastructure	Unit	Qty.
1	2	3	4
1	Primary School	No.	3
2	Junior High School	No.	1
3	Kanya Pathshala	No.	1
4	Public Health Center	No.	1
5	Vet nary Hospital	No.	1
6	Panchayat Ghar	No.	2
7	Post Office	No.	1
8	Agan Bari Center	No.	-
9	Electricity	Yes	Yes
10	Road	Yes	2
11	Pond	No.	1
12	Hand Pump	No.	54
13	Irrigation Well	No.	8
14	Canal	No.	2
15	Temple	No.	1
16	Well (Drinking Water)	No.	1
17	Pumping Set	No.	103
18	Toilet	No.	49
19	Market	No.	1

SOCIAL MAP



Recorded importance of development institution

Farmers perception recorded for importance and role of different development institution in relation to infrastructure. Importance has been depicted with size of circle and role with distance from village circle. (Fig 8)

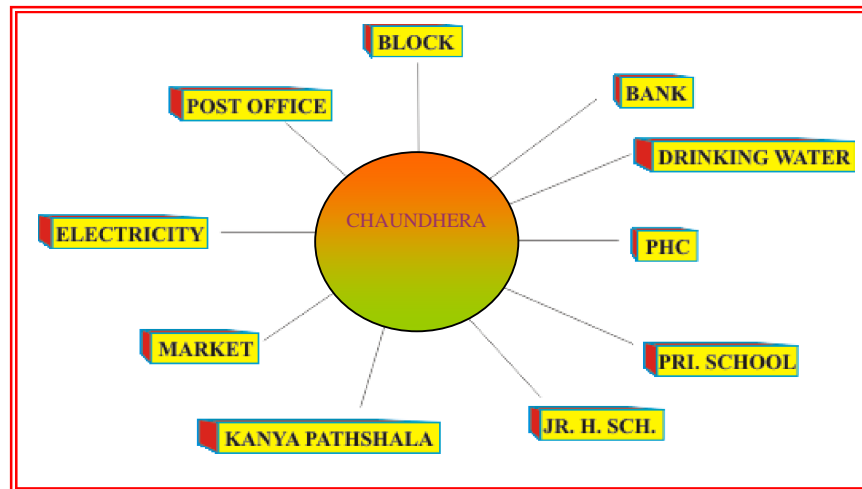


Fig. -8 (Venn diagram of Micro watershed)

(3.12) Communication :

Watershed can be approached from District Headquarter Bulandshahar to Project area 57 km. by Road.

(3.13) Natural Resource Base :

Transact of watershed showed typical land use profile consisting of plain agriculture land, erodic area and medium ravenous ridge. Main source of the irrigation are the canal for pre showing irrigation only. The total geographical area of the watershed is 712.00 Ha. classification.

Approach roads for the micro watershed is shown for the communication is shown on topo sheet map Fig 9 as next page.

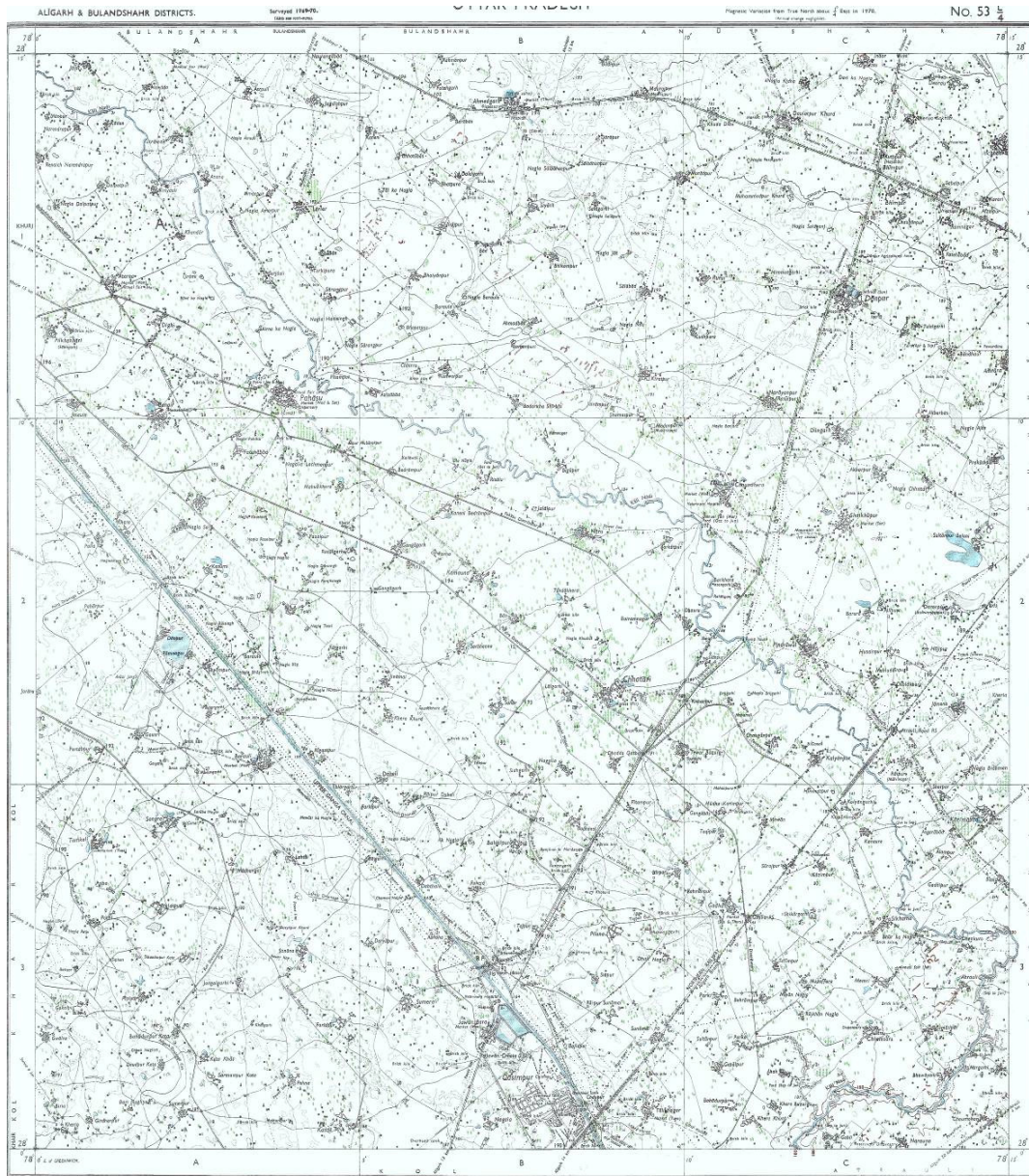


Fig.- 7 Communication Map on Toposheet

Table – 10 : Classification of area(Hect.)

S.No	Name of Village	Unit	Total Geographical Area	Rainfed Area	Wasteland	Village Land and Road	Irrigation Resource	
							Water Bodies	Borewell
1	2	3	4	5	6	7	8	9
1	Chaundhera	Ha.	671.735	537.38	55.221	24.054	-	33.55
2	Barkhera	Ha.	32.265	25.80	2.702	19.122	-	1.60
3	Dangara	Ha.	8.00	6.40	2.446	16.73	-	-
	Total		712.00	569.58	60.369	63.779	-	35.15

(3.14) Livelihood :

Total Population of the watershed is 8936 and out of the total population a majority more than 80% has farming as their major source of livelihood followed by labours, serviceman and small business class. Classified livelihood given in form as follows :

Table – 11 : Livelihood Classification in population :

S. No.	Name of Village	Farmer	Labour	In Service	In Local small business	Others
1	2	3	4	5	6	7
1.	Chaundhera	737	165	100	120	21
2.	Barkhera	42	20	2	15	4
3.	Dangara	5	2	-	3	1
	Total	784	187	102	138	26

(3.15) Dependency of forest fuel wood and fodder :

- a. Fuel wood :-** The main source of fuel is from cow dung cake, woody stem of crops. About 70% of the climactic energy requirement is met from the agriculture by product and cow dung cake. Rest is met out from the forest outside the village and watershed boundary, most preferred fuel wood is Juliflora fuel wood Juliflora obtained from standing along and between watershed.
- i- Fodder :-** Villages have not any sufficient signified dependency on forest based fodder as these resource are nothing availability in the forest.

(3.16) Labour requirement :

Labour requirements was found to be maximum at the time of October, November and December when the sowing of Rabi crops are done. The crucial periods are March and April coinciding harvesting and threshing of Rabi crops and July/August is sowing Kharif Crops take a little place. Other income generating enterprises having potential during the remaining.

(3.17) Crop Rotation :

Present Crop rotation in the watershed comprise of :

Kharif	-	Bajra	-	Rare
		Maize	-	Rare
		Jwar	-	Rare
Rabi	-	Fallow Wheat	-	Major
		Fallow Barly	-	Major
		Fallow Sugarcane	-	Major
		Fallow Mustard	-	Major
Zayad	-	Urad, Moong, Makka,		

The above said Rabi Crops is the most prevailing crop rotation on the agriculture lands both in the rainfed and irrigated conditions.

Organized vegetable cultivation fruit plantation and traditional agro forestry systems are lacking as per requirement in the watershed the limited vegetable cultivation in the watershed is confined as kitchen gardens and field to the irrigated condition in a scattered manner. The cultivation of cash crops other than the sugarcane, wheat and mustard also in the watershed.

(3.18) Historical Events :

Chronological record of important events of the watershed village is prepared through participatory rural appraisal (PRA) which is very useful in understanding of its background and chronology is given as follows :

Table – 12 : Historical Events

S. No.	Events/Activities	Year	Rem.
1	2	3	4
1	Established	1951	
2	Opening of Primary School	1957	
3	Opening of Junior School	1978	
4	Opening of Kanya Pathshala	1979	
5	Opening of PHC	2009-10	
6	Opening of Vet. Hospital	2001	
7	Panchayat Ghar	1971	
8	Introduction of Tractor	1973	
9	Gobar Gas Plant	-	
10	Thresher	1970	
11	First Tube well/Pumpset	1975	
12	First Motorcycle	1978	
13	T.V. & D.V.D. Players	1989	
14	Electricity in Village	1978	
15	Bituminous Road	2000	
16	First Hand Pump	1950	
17	Templo Renovation	1999	
18	First Land Line Telephone	2004	
19	Planning for Watershed Project	2010-11	

(3.19) Present Land Use in the Watershed :-

The watershed has diversified land uses. The varied present land use under different use in the watershed. The mixed land use followed in the watershed is almost similar in other parts of U.P. During P.R.A. Exercise prepared land has been shown in Table No. 13, 14 & 15.

Table – 13 : (Ownership)

S. No.	Name of Village	Pvt. Agri. Land		Govt. Revenu Land	Forest Land	Other Land
		S.C./S.T.	Others			
1	2	3	4	5	6	7
1	Chaundhera	65.00	563.01	-	-	43.725
2	Barakhera	15.00	16.21	-	-	1.055
3	Dangara	1.00	6.341	-	-	0.659
	Total	81.00	585.561	-	-	45.439

Table –14 : (Present Land under different categories)

S. No.	Name of Village	Land Use (Ha.)				Total
		Agricultural	Wasteland (All Types)	Seasonal waterbodies	Village/Road Etc.	
1	2	3	4	5	6	7
1	Chaundhera	620.50	55.221	-	24.054	699.775
2	Barakhera	32.00	2.702	-	19.122	53.824
3	Dangara	7.50	2.446	-	16.779	26.725
	Total	660.00	60.369	-	59.906	780.324

Table – 15 : (Present land use classified)

S. No.	Land Use Under	Unit (ha.)	Area (Ha.)	Percentage
1	2	3	4	5
1	Under Agriculture	Ha	660	
	A- Rainfed-	Ha	-	
	I- Crops	Ha	514.00	78%
	II- Agro forestry	Ha	10.00	1.5%
	B- Irrigated-	Ha	-	
	I- Assured	Ha	59.00	9%
	II- Portial	Ha	77.00	11%
2	Wasteland	Ha	-	
	A- Aforestation	Ha	-	
	B- Pasture	Ha	-	
	C- Untreatable	Ha	27.169	45%
	D- Treatable	Ha	33.20	55%

n given on Page No. 32

4- Focus on Present Land Use :

(4.1) Agriculture :

The total area under agriculture in the watershed is about 487.89 ha. out of which 574.00 ha. is under rainfed agriculture. Agriculture land uses in the watershed extended to diversified land capabilities starting marginal to good class II land. The irrigated and drinking water is most scarce natural resource in the watershed. The operation of tube well for irrigation of agricultural crops frequently leads to the drinking water. Problem to the farmers of watershed forcing them to carry drinking water from outside of the watershed area. The agricultural field bund are common in the watersheds however they frequently breach on heavy rains.

Various mixed texture of soils are located in patches through out the watershed. The heavy soils are almost kept fallow during rainy season. the agricultural soils also

have some as share calcium pan at variable depths. The irrigation water is conveyed by the earthen channels. Surface irrigation methods following mainly border method of flood method by the formers in the watershed. These factors reduce the water use efficiency of limited and valuable irrigation water.

Drought hardy species like Juliflora suitable multi purpose trees is suitable for rehabilitation of the wasteland. Rehabilitation of waste lands promoting agro forestry with appropriate fruit and forest species suitable vegetative barriers on sloppy lands can be high future value and by these adoption would be meet out many demands of fire wood and fodder in the wasteland. Except above but also for soil and water conservation, rehabilitation of wasteland and sustainable income generation for socio-economic upliftment of farmers.

Crop Productivity :

The farmers also do not have suitable cropping system to deal aberrant weather. Weeds impose considerable constraint in productivity of both Karif and Rabi crops under irrigated as well as rainfed production system farmer undertake normally one manual weeding in mustard and other valuable crops however, practices is energy and time consuming. Use of we decide is rare in the watershed.

In the watershed area, limited cropping in the Kharif with mixed cropping practices is not only irrigational but also unscientific and best for low productivity. Subsequent Rabi crops in general. Sugarcane & Mustard crop in particular are raised on residual soil moisture under rainfed production system during post manson season.

(4.2) Indigenous Technological Knowledge (ITK) :

Under process of PRA tracked out rural applying technology in various field of local technology and some technology is very popular in village. In which the agriculture is an old traditional practices of farmers who have improved themselves with passage of the time according to their domestic needs and technological reforms in the nearby areas. The villages have their traditional village ponds, practice of field bunding which typically constitute agricultural related ITKs in the watershed. The Mustard & sugarcane being a cash and firewood crop of the watershed and also sugarcane crop is being. Cultivated in self designed manner by the farmers. Its carried out that the area is totally depend on rain and under the rainfed area technology is

applied by the farmers. However limited fertilizer application specifically the DAP came in the practices since about 15-20 years.

(4.3) Forest and Other Vegetation :

Forest :

The watershed have a tract of wasteland area which are under uncultivable position is liesed in the watershed. These wasteland have not any tree vegetation or very less than real requirement for the wasteland use.

Horticulture/Agro forestry :

Horticulture and agro forestry practices were observed in the watershed.

(4.4) Agro forestry :

Agro forestry practices are lacking in the watershed. Though it has good potential under existing disposition and may a role particularly with respect to minimization of cropping risk, built up soil fertility and productivity, protection of soil erosion, soil conservation partly meeting out the fire wood demand of rural community and more over optimizing the economical return from system as whole under typical semi arid climate in the watershed. Bund and boundary plantation also have good potential to care the fire wood and fodder demands of the rural community in the watershed. The existing area under agro forestry is almost negligible. Prosopis Jhliflora may be planted as block or sole plantation specifically on marginal and degraded land in the watershed.

The agro forestry interventions comprising of ber, bail, aonla, guava, papular etc. may be applied for benefit of the farmers under rainfed to irrigation production system on leveled to slopping and marginal agricultural using proper planting techniques and term it control measures.

The multipurpose trees may be also help in supplementing fire wood and fodder demands of the rural community in the watershed and my be planted as hedge rows on rainfed, marginal and degraded lands.

(4.5) Horticulture :

Fruits and vegetables practices are lacking in the watershed area. Its practices may be sustainable very good potential for the formers of watershed. There are a limited lack fruit trees in number like mango, guava, lime, ber, aonla and papaya fruit trees well as vegetables like radish, okra, tomato, cabbage, garlic, onion, chilly, bringer and cucurbits but they are found surviving well in the watershed villages. Organized orchards (vatika) commercial vegetable cultivation horti-agri and other systems of agro forestry etc. are lacking but have good agriculture.

5. Soil and land capability classification :

(5.1) Soil Morphology :

Watershed is located North East corner of Bulandshahr Distt. near about 55 Km. away. The entire terrain of watershed is topographically divided into various land forms. Accordingly the soils of watershed have been grouped major categories is given as follow :

Hill Terrain	Plane Land Sloppy	Undulated Land	Rill Erosic Land	Moderate ravenous
-	35%	30%	18%	17%

Given categories in the blocks is located the soil morphology in the watershed areas. Representation of soil characteristics by soil profile is represented as follows :

Soil Profile :

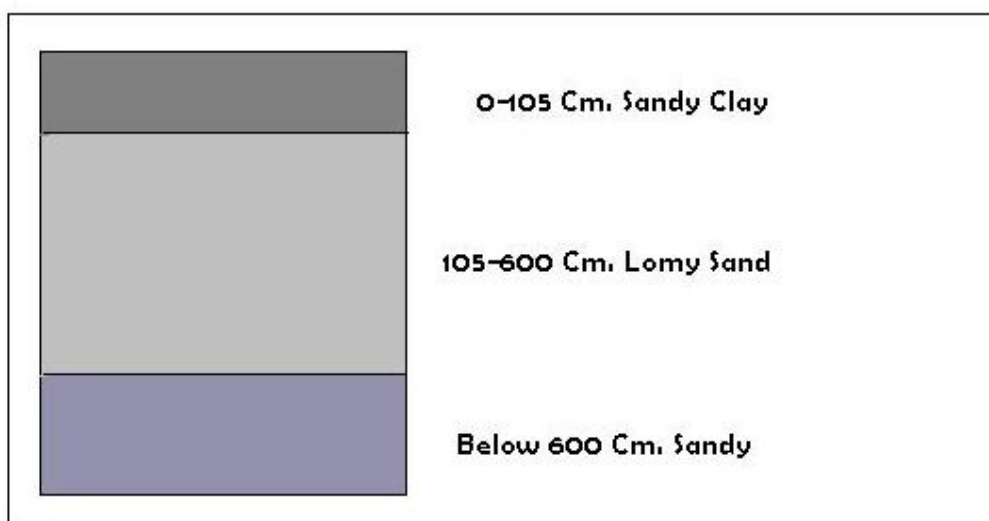


Fig. – 9 (Soil Profile)

Table – 16 : (Morphology of a Typical Soil Profile) :

Horizone	Depth in Cm.	Morphology
1	2	3
A V & H	0-150	Silky when moist, Hard when dry quick soluble, high elasticity, fissures, and cracks, occasional occurrence of free calcium carbonate granules black in colour, clay content 29%, PH- 8 to 8.7
B V & H	150-160	Whitish yellow in colour, very fine mixed with free cacaos and gravels, Hard when dry compact and indurate hard pan restricting development of root and down ward water transmission.
C V & H	7600	Red and white sand stone

(5.2) Soil and Characteristic and Fertility Status :

Soil characteristic pertaining to soil fertility of various classes accruing around villages in the watershed are given as follows :

Table – 17 : Soil Characteristic & Fertility Status :

Sl. No.	Soil Properties	LCC-II	LCC-III & IV
1	2	3	4
1	Sand %	47.04	35.04
2	Silt %	24.60	18.60
3	Clay %	38.36	63.6
4	Texture	Sandy Clay	Lomy Sand
5	PH (1:2)	8.41	8.67
6	Organic Carbon %	0.37	0.12
7	Available N Kg ha ⁻¹	316	173
8	Available P Kg ha ⁻¹	29	15
9	Available K Kg ha ⁻¹	189	325
10	EC (dS m ⁻¹)	0.47	0.12

(5.3) Land Capability Classification (LCC) :

Land capability classification (LCC) was done to classification the soils in different groups based upon the limitations and to emphasize the hazards prevailing in the watershed in order to find out the different topo-sequences, landforms, soil depth and erosion hazards. This was followed by the detailed investigation of selected landforms to bring out the LCC classes of the Watershed. Classes of land capability namely II, III, IV and V are demarcated in the watershed. The areas under different classes are shown as follows :

Table – 18 : Land Capability Classification (LCC) :

S. No.	Land capability class	Area in Ha.	Colour
1	2	3	4
1	I Class	-	-
2	II Class	97.2	15%
3	III Class	453.6	70%
4	IV Class	64.8	10%
5	V Class	32.4	5%
6	VI Class	-	-
7	VII Class	-	-
8	VIII Class	-	-

Land capability classification of various agricultural practices under land use can be classified as groups, class, sub class and units. Utilization of various land class is given as follows :

Table – 19 : Utilization of various land uses

S. N.	LCC	Forestry	Ltd. Grazing	Light Grazing	Dense Grazing	Limited Agriculture	Light Agriculture	Dense Agriculture	More Dense Agriculture
1	I								
2	II								
3	III								
4	IV								
5	V								
6	VI								
7	VII								
8	VIII								

(5.4) Land Capability Class II & III :

This group is one of the most extensive LCC watershed. and also near to class III for the agricultural practices. The soils are sandy & sandy loam in texture. The land under this class is nearly level to mild sloping (1-3%). The soils are deep and erosion hazard is slight. Most of the productive agriculture land comes under class II & III. These lands potentially very productive but due to rainfed a single cropping pattern is in habitation.

(5.5) Land Capability Class IV :

This class is found in lower portion near the outlets of watershed. The soils are coarser in texture, deep, erosion hazard and undulating in topography. Rill and initiation of gully can be seen near the outlet of the watershed.

(5.6) Land Capability Class VII & VIII :

This class of land is not found in watershed. Somewhere lack of soil are found with admixture gravels fragments in these classes of lands.

(5.7) Conclusions :

The majority of land form is coming under class II, which give an insight of good agriculture production potential of the watershed.

The land capability classification provides reasonable good information with regard to capability of soil, that could be used for agriculture, agrihorticulture, silviculture and posture development.

The productivity of these lands could be further enhanced by adoption of simple soil & water conservation measures like bunding practices.

The reasonable area is under watershed of wasteland and other wasteland including grater potential of this watershed for forestry and pasture development. Rare places namely water body of low portion of land area under seasonally works as water harvesting structures and these harvested water is used or can use for some other beneficial activities during the crop season also.

6. Problems and needs of the watershed indentified during the PRA

(6.1) Problem Identification and prioritization :

jj- The are has undulating topography, steep unstable slopes, gradient of excessive branches of rills and hence highly prone to soil erosion.

kk- Major issues addressed to food sufficiency economic growth and environmental security in the watershed area.

- ll- Effective soil depth is limited and highly variable hampering good crop growth.
- mm- The watershed have low productive cropping due to tradition single cropping pattern and over all average crop production percentage not sufficient against requirement.
- nn- Identified that there is no assured irrigation system has been development capacity of water bodies are reduced due to silt ration which are utilized to store of rainy water and they are renovatable.

(6.9) Transact walk during the PRA :

Problems identified and prioritized during the transact walk and PRA exercises in all comprised villages of watershed. There were pooled and a list of problems representing the whole watershed was prepared. Problems were ranked as per their total weight age in the watershed village.

Table – 20 : Ranking of Problem identification and prioritization of watershed

S.No.	Problem	Rank
1	2	3
1	Lack of irrigation	4
2	Lack of drinking water	8
3	Low production of field crops	5
4	Lack of fodder availability and low productivity	4
5	Lack of availability of fuel wood	5
6	Lack of market facility	7
7	Lack of quality seeds, fertilizer, pesticides etc.	6
8.	Medical and Health care facilities for milching animals and low productivity.	8
9	Lack of medical, educational and transportation facilities	9
10	Lack of water bodies renovation	4
11	Lack of run of earthen check bunds	3
12	Lack of water harvesting structures	4
13	Lack of livelihoods opportunity	4

Prioritized ranking (Upto four Numbers) :-

- 22- Lack of earthen check bunds.
- 23- Lack of livelihood opportunities.
- 24- Lack of irrigation water was the greatest problem. Lack of irrigation water problem experienced by the people followed by low crop production.

(6.3) Analysis of SWOT of the watershed :

Strength (S), Weakness (W), Opportunity (O) and Threat (T) analysis is a useful decision support tool. A SWOT analysis of watershed is presented as follows :

SWOT analysis of the watershed

<p style="text-align: center;">Strengths (S)</p> <p>lxxi. Cooperative work culture in traditional activities lxxii. Close ethnic ties lxxiii. Road at the top as well as outlet of the watershed lxxiv. Hard working lxxv. Resource pool of crop genetics diversity lxxvi. Awareness of farmers about watershed management programme lxxvii. Well established CPR maintaining and sharing system lxxviii. Stall feeding of animals lxxix. Well maintained seasonal water bodies lxxx. Social outlook of the community towards land less</p>	<p style="text-align: center;">Weakness (W)</p> <p>lxiv. Poor water management lxv. Resource poor farmers lxvi. Out migration of youth lxvii. Low and erratic rainfall lxviii. Fragile geology lxix. Fragmented land holding lxx. Heavy infestation of wild animals lxxi. Problem of fuel and fodder lxxii. Shallow soil depth and with high percentage of gravel</p>
<p style="text-align: center;">Opportunities (O)</p> <p>xlxiii. Wide range of annual and perennial crops xlxiv. Scope of regular employment opportunities to check out migration xlxv. Strengthening of existing irrigation system xlxvi. Conducive climate for rainfed crop diversification xlxvii. Good scope for Agro forestry and dry land horticulture xlxviii. Potential for collective action and management of CPR</p>	<p style="text-align: center;">Threats (T)</p> <p>xxxvi. Prone to adverse climate like drought xxxvii. High market risk xxxviii. Social conflicts owing to PRI and WSM policies and local politics xxxix. Weak coordination among line departments xl. Lack of expertise of implementing agency in different aspects of WSM</p>

7. Proposed land use for the watershed :

Watershed management plan preparation due importance is given to topographic, land suitability, irrigation potentially, prevailing farming systems, micro farming situation, farming, farmers preferences and priorities along with economic and environment securities.

Crop and tree selection and area distribution was done as per farmers priorities revealed through PRA exercise.

The watershed management plan for watershed is prepared with specific objectives of food sufficiency, income and employment generation with environment security.

Technical options were with the ITK based on the latest available experiment findings. Due attention was given to the resource of the farmers and adjustments were made in capital intensive resource demanding technological outputs while making them adoptable to the resource poor farmers. Emphasis was given on maximum use of farm yard manure. The proposed land use plan of the watershed is shown as follow as in table

Table – 21 : Present and proposed land use plan of the watershed

S.No.	Land use	Present (ha)	Proposed area (ha)
1	2	3	4
1	Agriculture		
a	Rainfed		
	I Crops	514	660
	II Agro-forestry	10.00	33.00
b	Irrigated		
	I Assured	59.00	59.00
	II Partial	77.00	89.00
2	Waste land		
a	Aforestation		25.00
b	Pasture		
c	Untreatable	27.169	19.00
d	Treatable	33.20	21.00
3	Village land	63.828	-

(7.1) Status of Present Water Resources Utilization :

Watershed is having some canal system. Management and maintenance of these canal are required. Before sowing of Rabi crops, water from these canal is issued as supplementary irrigation for Rabi sowing ar allowed to go as waste. After releasing water from canal, submergence area also put under cultivation.

Some where bore well irrigation applied by the farmers in the watershed.

(7.2) Proposed Plan for Irrigation Development :

- a- Present system of irrigation and wastage of water during October–November need to be made more efficient from water management point of view by minimizing conveyance losses in the existing water courses.
- b- Present irrigation canal capacity have to build up by the reform. Which are lack capacity of water.
- c- Construction of new water harvesting earthen structures, Pucca Check Dem, Series Gully Plugging, etc. has been sloppy portion to increase irrigation potential and for recharging of ground water, soil and moisture conservation maximum field irrigation, best production and expected change of crop rotation.
- d- The up gradation of the exciting system of irrigation will result in :
 - i- Minimization of conveyance losses.
 - ii- Increase in frequency of irrigation.
 - iii- Adoption of high yielding varieties of crops.
 - iv- Assured cultivation of cash crops.
 - v- Capacity buildup by the planning of new water harvesting structures.

(7.3) Ground Water Recharge :

For the purpose of ground water recharge, the area of the upper side of watershed is recommended for Field Bunds, Contour Bunds, Peripheral Bunds and Submergence Bunds and in the lower portion Contour Staggered Trenches, Gully Plugs, Earthen Check Dem and Pacca Outlets. In the undulated sloppy portion of the watershed recommended water harvesting structure for dual purpose as ground water storage and under ground water recharge.

(7.4) Crop Production :

Practices proposed in the watershed is given as follows :-

- a- Mulching and crop residue management.
- b- Application of green manuring.
- c- Vermi Composting.
- d- Crop rotation and inter cropping.
- e- Biofertilizers.

(7.5) Tillage Operation :

Deep tillage technology is proposed to apply to be demonstrated for benefit of farmers in the watershed.

(7.6) Improved Seeds of High Yielding Verities (H.Y.V.) :

Recommendation of improved varieties is necessary for improving the productivity and farm income. Through replacement of low yielding traditional verities of seeds in villages of watershed.

(7.7) Balanced Fertilizer Use :-

Demonstration of use of fertilizer in various crops of watershed recommended balance fertilizer use in different crops will be benefited of forming community.

(7.8) Control of insects and diseases :

Aphid in the mustard 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 pest and diseased will also be demonstrated in the watershed for benefit of the growers.

(7.9) Dry Land Horticulture :

Such portion of dry land in which proposed horticulture development planning recommended species like Ber, Bel and Aonla will be planted at suitable spacing in the watershed.

(7.10) Agri Horticulture :

Aonla and Sahjan would be suitable horticultural crops to the locality. Therefore, a part of land in the farmer field shall be selected and brought under Agri-horticulture system. The cropping system followed will be Jwar and Wheat.

(7.11) Plantation (Fuel wood) :

Such a portion which are under wasteland will be taken falling in the class-IV category in the watershed. These lands will be planted with species like Vilayati Babool (Prosopis Juliflora), Babool (Acacia Nilotica), Karanj (Pangamia Glabra).

9. Socio Economic Analysis of the of the Project :

(9.1) Sustainability and environment security :

The proposed land use plan will improve the land utilization index and crop diversification index significantly as compared to the existing one. in the proposed watershed management plan proper blending of the bio engineering measures will be applied on above 80% of the total area of watershed. It is estimated that more than above 70% of the watershed area will be treated and consequently the soil loss and runoff from the area is expected to be reduced by 70% respectively.

It will help in maintaining ecosystem integrity on sustained basis along with improving the livelihood security of the farming community.

(9.2) Economic Analysis :

Economic analysis of the project was carried by taking direct benefits and costs considering 10 years for project life at 10% discount rate. Whole watershed development plan was divided into three sector as agriculture, horticulture and forest/Fuel wood plantation. Net Present Value (NPV) and Benefit Cost ratio criteria were applied judge the economic efficiency of each enterprises and sector. Net present value (NPV) of the project life is considered to be 10 years and discount rate for NPV estimation is 10% is given NPV and benefits as follows :-

Table – 22 : Present productivity income analysis :

S. No.	Name of Sector	Name of Crops	Production/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	3.00	4300.00	12900.00	6450.00	6450.00	1:1
		Moong	3.00	4500.00	13500.00	6075.00	7425.00	1.12:1
		Jwar	4.80	600.00	2880.00	1584.00	1296.00	0.82:1
		Wheat	18.50	850.00	15725.00	8650.00	7075.00	0.82:1
		Pea	7.50	2250.00	16875.00	10970.00	5905.00	0.54:1
		Mustard	3.50	1850.00	6475.00	3235.00	3240.00	1:1
Total		-			105105.00	54105.00	51000.00	0.94:1
Average		-			13138.00	6763.00	6375.00	0.94:1
B	Forestry	Vilayati				15000.00	-	Nil
		Babool						
C	Horticulture	Ber				20000.00	-	Nil
		Aonla				20000.00	-	Nil
		Bel				20000.00	-	Nil
Total		-				60000.00	-	Nil
Average		-				20000.00	-	Nil
Grand Total						-		

Table –23 : Post productivity and income analysis for Post Productivity**Value and B.C.:**

S. No.	Name of Sector	Name of Crops	Produ ction/ha.	Rate/ Qtl.	Cost of Production	Expend. of cultivation	Net income	B.C. Ratio between Col. 8 & 7
1	2	3	4	5	6	7	8	9
A	Agriculture	Urad	4.00	5000.00	20000.00	8325.00	11615.00	1.39:1
		Moong	4.00	5000.00	20000.00	8200.00	11800.00	1.44:1
		Jwar	5.50	800.00	4400.00	1900.00	2500.00	1.32:1
		Wheat	25.00	1000.00	25000.00	11680.00	13320.00	1.14:1
		Pea	9.50	3300.00	31350.00	14810.00	18540.00	1.12:1
		Mustard	5.00	2500.00	12500.00	4370.00	8130.00	1.86:1
Total		-	-	-	172250.00	72845.00	99765.00	1.38:1
Average		-	-	-	21531.00	9061.00	12471.00	1.38:1
B	Forestry	Vilayati Babool	80.00	500.00	40000.00	15000.00	25000.00	1.67:1
C	Horticulture	Ber	35.00	1500.00	52500.00	20000.00	32500.00	1.67:1
		Aonla	35.00	2000.00	70000.00	20000.00	50000.00	2.50:1
		Bel	40.00	1500.00	80000.00	20000.00	40000.00	2:1
Total		-	-	-	182500.00	7000.00	122500.00	2.04:1
Average		-	-	-	60833.00	20000.00	40833.00	2.1:1
Grand Total		-	-	-	1394750.00	147485.00	247265.00	1.68:1

Table –24 : Summary of NPV, PPV and B.C. Ratio (Sector wise) :

S. No.	Name of Sector	NPV		PPV		B.C. Ratio
		Expend.	Net Income	Expend.	Net Income	
1	2	3	4	5	6	7
1	Rain fed Agriculture	54105	51000	72485.00	99765.00	1.38:1
2	Forest/Fuel wood Plantation	15000	-	15000	25000	1.67:1
3	Horticulture	60000	-	60000	122500	2.04:1
Total		129105	51000	147485.00	247265	1.68:1

(9.3) Economics of Agriculture Sector :

The development cost can be recovered by the adoption of plan in present rain fed agriculture is being done on well maintained field, therefore does not require much investment. In rain fed agriculture, investment of Rs. 44.50 lacs is proposed to made is given as fallows :

Table – 25 : Economics of Agriculture Sector :

S. No.	Name of sector	Name of Activities / Plan	Treatble Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Rainfed	Soil, moisture and water cons works	648	369.78	879.85	510.28	1:38:1

(9.4) Economics of forest fuel wood plantation :

Economic analysis of fuel wood plantation in the watershed. Project life is considered to be 20 years and discount rate for NPV estimation is 10 % is followed and as is given follows :

Table –26 : Economics of forest fuel wood Plantation :

S. No.	Name of sector	Comman Name of Plant	Area (Ha.)	NPV (Lacs)	Post Productivity Value (Lacs)	Benifit / Income	B.C. Ratio
1	2	3	4	5	6	7	8
1.	Forest Fuel wood sector	Vilayati Babool (Prasopis Juliflora)	25	2.50	6.675	4.175	1.67:1

(9.5) Economics of Horticulture Sector :

Economic analysis of Horticulture Plantation in agri-horti system and on wasteland patches of watershed project, life is considered about 15-20 years and discount factor rate for NPV estimation is 10% is follows :

Table – 27 : Economics of Horticulture system :

S. No.	Name of Sector	Common name of Plants	Area (Ha.)	NPV (Lacs)	Post Productive Value (Lacs)	Benefit Lacs	B.C. Ratio
1	2	3	4	5	6	7	8
1	Horticulture	Ber (zyziphus mouritana)	4.00	0.80	2.104	1.304	1.63:1
		Aonla (Embelica officianalis)	3.80	0.76	2.660	1.90	2.5:1
		Bel (Aegle marmelos)	2.20	0.44	1.320	0.88	2:1
Total			10.00	2.00	6.084	4.084	2.04:1

(9.6) Food requirement and sufficiency :

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

Table – 28 : Status of food requirement and availability of per annual :

S. No.	Name of Foods	Requirement Q./Yr.	Present Status		Expected Post Status	
			Availability Q./Yr.	Deficit or surplus Q./Yr.	Availability Q./Yr.	Deficit or surplus Q./Yr.
1	2	3	4	5	6	7
1	Cereals 110 Kg.	11935	10144	1791	20290	8355
2	Pulses 36.50	3960	2178	1782	7128	3168
3	Oil Seeds 29.20	3168	1267	1901	5068	1900
4	Vegetable 71 kg	9873	1974	7899	17771	7898

(9.7) Employment generation :

One of the major problem of the labour migration in watershed project. By the implementation of the project activities employment opportunities will be generated. However the changes in land use pattern and adoption of other subsidiary enterprise will generate employment opportunities in the watershed as given in table follows :

Table – 29 : Employment generation under proposed works :

S. No.	Employment activities/works	Area under work	Cost	Mandays generation (Nos.)			
				Unskilled	Skill	Total	Person
1	2	3	4	5	6	7	8
2	Graded Contour Bund	74	2.22	2220	-	2220	74
3	Gully Plug, C.D.	122	9.15	6405	149	6554	218
4	Submergence Bund	104	4.16	4160	-	4160	138
1	Peripheral Bund	104	3.640	3640	-	3640	121
5	W.H.B.	129	11.61	6966	394	7360	245
6	Renovation of Bund	80	2.40	2400	-	2400	80
7	Reno. of W.H.B.	-	-	-	-	-	-
8	Community Pond	-	-	-	-	-	-
9	Afforestation	25	3.70	740	-	740	25
10	Horticulture	10	2.00	400	-	400	13
Total		648	38.88	26931	543	27474	914

10. Formation of watershed committee :

Under compliance of common guideline Para (6.3) is followed and by the help of watershed development team, watershed committee is organized in the micro watershed village Teyore Bujurg with 10 members as prescribed in common guide line. List for organization of W.C. village details given as follows :

Table – 30 : Details of comprised village W.C. organization in M.W.S. :

S. No.	Particulars	Details	Block	Geographical Area
1	2	3	4	5
1	Micro watershed code	3B3E4d1d	Pahasu	712.00
2	Name of Gram Panchayat in M.W.S.	Chaundhera	Pahasu	671.735
		Barankhera	Pahasu	32.265
		Dangra	Pahasu	8.00
		Total		712.00

Table – 31 : List of organized W.C. for the Gram Panchyat Chaundhera in watershed.

S. No.	Name of selected members	Age	Representation Members from	Post	Qualification	Village
1	2	3	4	5	6	7
1	Shahida pani avadhi		President	Pradhan	12	Chaundhera
2	Muhibburahman	22	Secretary	Secretary	12	Chaundhera
3	S.K. Sharma	52	WDT	Member	Agr. Eng.	Chaundhera
4	Akhatar	55	U.G.	Member	Sakshar	Chaundhera
5	Amar Singh	55	U.G.	Member	12	Chaundhera
6	Rinku	30	S.H.G.	Member	12	Chaundhera
7	Nanhu	38	S.H.G.	Member	8	Chaundhera
8	Jangjeet	38	U.G.	Member	12	Chaundhera
9	Ranjeet	28	U.G.	Member	8	Chaundhera
10	Smt. Omvati	45	Female SC	Member	Nirkshar	Chaundhera
11	Satyprakash	42	PIA	Work	Graduation	Chaundhera

(10.1) Formation of Self Help Groups in M.W.S.

By the help of watershed committee and watershed development team self help group are formatted / organized. Families and persons are selected from poor, small and marginal farmers families, landless poor families, agriculture labour families, women, herdsman and shepherd and S.C. families in the formatted self help groups are given as follow :

Table – 32 : Ganga Ji Self help group – Pahasu Dehat.

S. No.	Name of member in formatted SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Rinku	30	Jatav	Livestock	New
2	Arun Kumar	30	Jatav	Livestock	New
3	Chhotu	23	Jatav	Livestock	New
4	Uday	40	Jatav	Livestock	New
5	Gokila	38	Jatav	Livestock	New
6	Harendra Singh	35	Jatav	Livestock	New
7	Nanhu	38	Jatav	Livestock	New
8	Vijay Singh	28	Jatav	Livestock	New
9	Santosh Kumar	21	Jatav	Livestock	New
10	Vani Singh	50	Jatav	Livestock	New

Table – 33 : Self help group Chaundhera – Buffaloes.

S. No.	Name of member in formed SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Jagjeet	38	SC	Livestock	New
2	Vinod Kumar	28	SC	Livestock	New
3	Roshan Lal	25	SC	Livestock	New
4	Munni Lal	55	SC	Livestock	New
5	Rupram	45	SC	Livestock	New
6	Rajpal	28	SC	Livestock	New
7	Baburam	55	SC	Livestock	New
8	Vedprakash	40	SC	Livestock	New
9	Kumwarpal	33	SC	Livestock	New
10	Ramphal	45	SC	Livestock	New

Table – 34 : Self help group in chaundhera of watershed.

S. No.	Name of member in farmated SHG's	Age	From represented family	Name of proposed activities	Activation Position
1	2	3	4	5	6
1	Jhamman Singh	35	SC	Goat Palan	New
2	Vijay Pal Singh		SC	Goat Palan	New
3	Saddik		BC	Goat Palan	New
4	Dwaraki		BC	Goat Palan	New
5	Rajendra Singh		BC	Goat Palan	New
6	Varana		BC	Goat Palan	New
7	Lalpat		SC	Goat Palan	New
8	Sadik		SC	Goat Palan	New
9	Rashid	27	SC	Goat Palan	New
10	Amir	30	BC	Goat Palan	New

Formation of User's Groups :

User's groups are formed by the help of watershed committee and watershed development team in the micro watershed comprised villages. Farmers which have land village are involved in the User's groups and they will be directly benefited as expected by the implementation of watershed project. Easy and convenient conditions are made to resource use between user's groups and they will be responsible to operate and maintenance for the created assets in the watershed. Nos. of formed user's groups details are given as follows :

Table – 35 : Village wise user's groups

S. No.	Name of village	No. of groups	No. of farmers	Total Agri. Land	Area under treatment	Cost of assets
1	2	3	4	5	6	7
1	Chaundhera	45	737	620.50	587.206	-
2	Barankhera	3	42	32.00	31.478	-
3	Dangra	-	05	7.50	7.341	-
		48	784	660	648	-

10. Estimation and Costing of Proposed activities of the watershed Project Year 2009-

10.

Proposed works / activities for the Project Period (Year 2010-11) under proposed treatable area 648.00 Ha. Out of total Geographical area 712.00 Ha.

(10.1) Financial and Physical Outlets :**Table – 36 : Financial and Physical Outlets for the Year 2009-10 :**

Sl. No.	Components	Unit cost per ha.	Physical ha.	Financial (Lacs)			Man-days Generation
				Labour Component	Material Component	Total	
1	2	3	4	5	6	7	8
A	Management Cost 10%						
1	Administrative Cost – TA & DA Hiring of Vehicles, Official Expenditure Electricity & Phone bill Computer, Stationery and office consumable materials & contingency	1200	-	-	7.776	7.776	-
2	Monitoring	120	-	-	0.7776	0.7776	-
3	Evaluation	120	-	-	0.7776	0.7776	-
	Sub Total	1440			9.3312	9.3312	
B	Preparatory Phase 10%						
1	Entry Point Activities 4%	480	-	0.6221	2.4883	3.1104	622
2	Institutional & Capacity Building 5%	600	-	-	3.8880	3.8880	-
3	Detailed Project Report 1%	120	-	-	0.7776	0.7776	-
	Sub Total	1200		0.6221	7.1539	7.776	622
C	Watershed Work Phase						
a	Watershed Development Works						
1	Graded, Contour & Field Bunds	3000	74	2.22	-	2.22	2220
2	Gully Plug, Earthen Checkdam /WHS	7500	122	6.405	2.745	9.15	6554
3	Submergence bunds	4000	104	4.16	-	4.16	4160
4	Peripheral Bund	3500	104	3.64	-	3.640	3640
5	Earthen Water Harvesting Bund	9000	129	6.966	4.644	11.61	7360
6	Renovation of existing Bunds	3000	80	2.400	-	2.40	2400
7	Renovation of existing W.H.B	-	-	-	-	-	-
8	Aforestation and Development of silvi postural system	14800	25	0.74	2.96	3.70	740
9	Dry Land Horticulture	20000	10	0.40	1.60	2.00	400
10	Community Pound (Renovation)	-	-	-	-	-	-
	Sub Total	6000	648	26.931	11.949	38.88	27474
B	Livelihood Programme (Community Based) 7.620						
	Income generating activities through SHG's for landless and marginal farmers 10%						
1	Live stock development activities	200	-	-	1.2962	1.2962	-
2	Bee Keeping	100	-	-	0.6477	0.6477	-
3	Poultry Farming	200	-	-	1.2962	1.2962	-
4	Nursery Development	300	-	-	1.9440	1.9440	-
5	Vegetable Production	100	-	-	0.6477	0.6477	-
6	Milk Dairy Promotion Unit	200	-	-	1.2962	1.2962	-
7	Establishment of Vermi compost Unit	100	-	-	0.6477	0.6477	-
8	Sub Total	1200	-	-	7.7757	7.7757	-
C	Production System and micro Enterprises						
1	Crop production, diversification of agriculture and introduction of agro forestry	1170	-	-	7.5816	7.5816	-
2	Demonstration of improved composting system	390	-	-	2.5272	2.5272	-
	Sub Total	1560			10.1088	10.1088	
D	Consolidation Phase 5% Sub Total	600			3.8880	4.158	
Grand Total		12000	648	27.5513	50.2069	77.76	28096

:-: संकल्प पत्र :-:

ग्राम पंचायत:- चौडेंरा, कोड सं०- 2B3E4d1d विकास खण्ड- पहासू जिला- बुलन्दशहर

यह कि आई०डब्लू०एम०पी० परियोजना में तैयार की गयी निर्माण की नयी सृजित परिसम्पत्तियों को ग्राम पंचायत चौडेंरा एवं माइक्रोवाटरशेड के अन्तर्गत सम्मिलित ग्रामों में योजना क्रियान्वयन कराने एवं योजना उपरान्त चालू रखने तथा सुजिप्त परिसम्पत्तियों के अनुरक्षण हेतु कृत संकल्प एवं इच्छुक है।

चौडेंरा ग्राम पंचायत के सभी स्रोत स्थल जैसे तालाब ग्राम सभा गोचर (चारगाह) जल संसाधन, जंगल आदि में भूमि विकास परियोजना के अन्तर्गत किये जायेंगे। उन कार्यों को समाज के कमजोर वर्ग जैसे अनुसूचित जाति/जनजाति, महिला वर्ग एवं अल्प भूमिहीन गरीबी रेखा के नीचे के लाभार्थियों को लाभ पहुंचाने हेतु इच्छुक होंगे।

हम योजना संचालन हेतु प्रस्तावित करते हैं एवं सहमति देते हैं कि भारत सरकार के समस्त मार्गदर्शी सिद्धान्तों के अनुपालन में कार्य सम्पन्न करायेगे। यह भी घोषित करते हैं कि चयनित क्षेत्र जिसको मेरे द्वारा भलीभाँति देखा गया है, और प्रस्तावित योजना में प्रस्तावित समस्त कार्य 15 सालो से नही कराया गया है। जिसकी मुझे पूर्णरूप से जानकारी है और अनुमोदन करते हैं।

श्री ए.सी.एन.ए.ए.
Naseel Khan
नीशादरपी

دیوانیہ میں کجی کریم

Muheeb Khan

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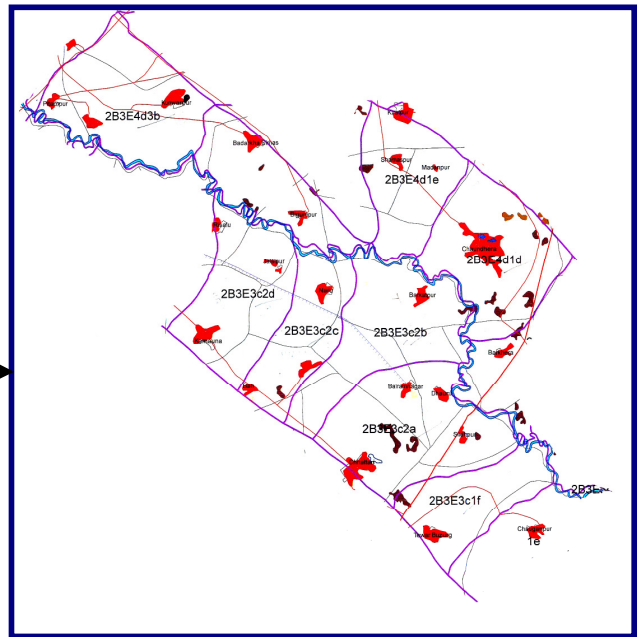
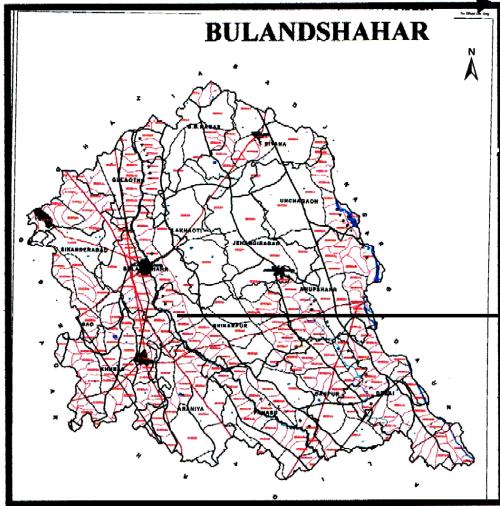
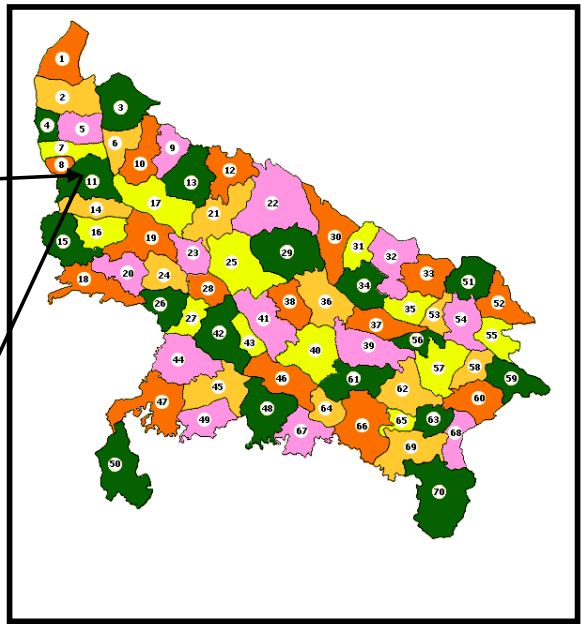
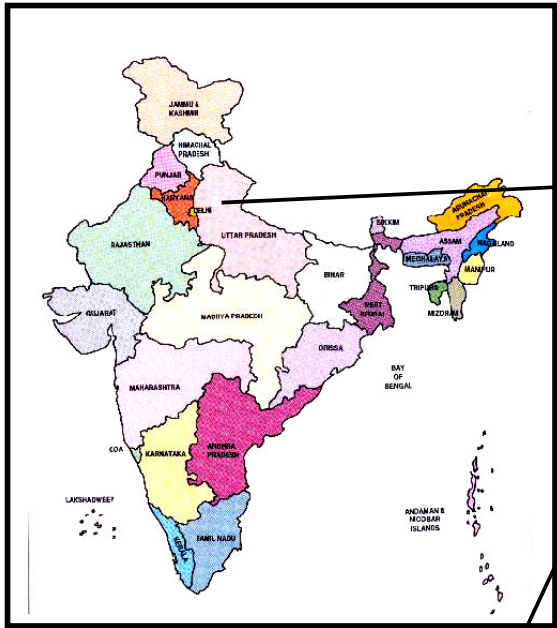
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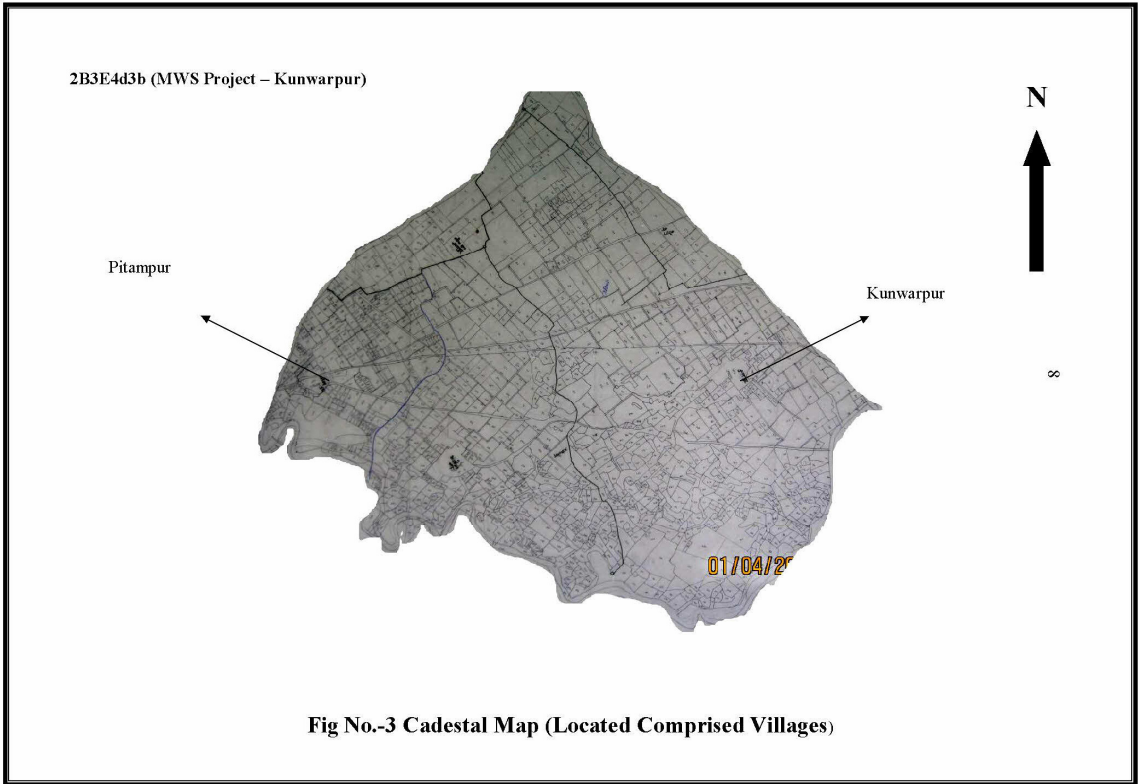
Narosh

राज
एरदे

शाहिदा बेगम प्रधान
ग्राम सभा-चौडेंरा
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जिला-बुलन्दशहर (उ०प्र०)



Index Map of the Watershed

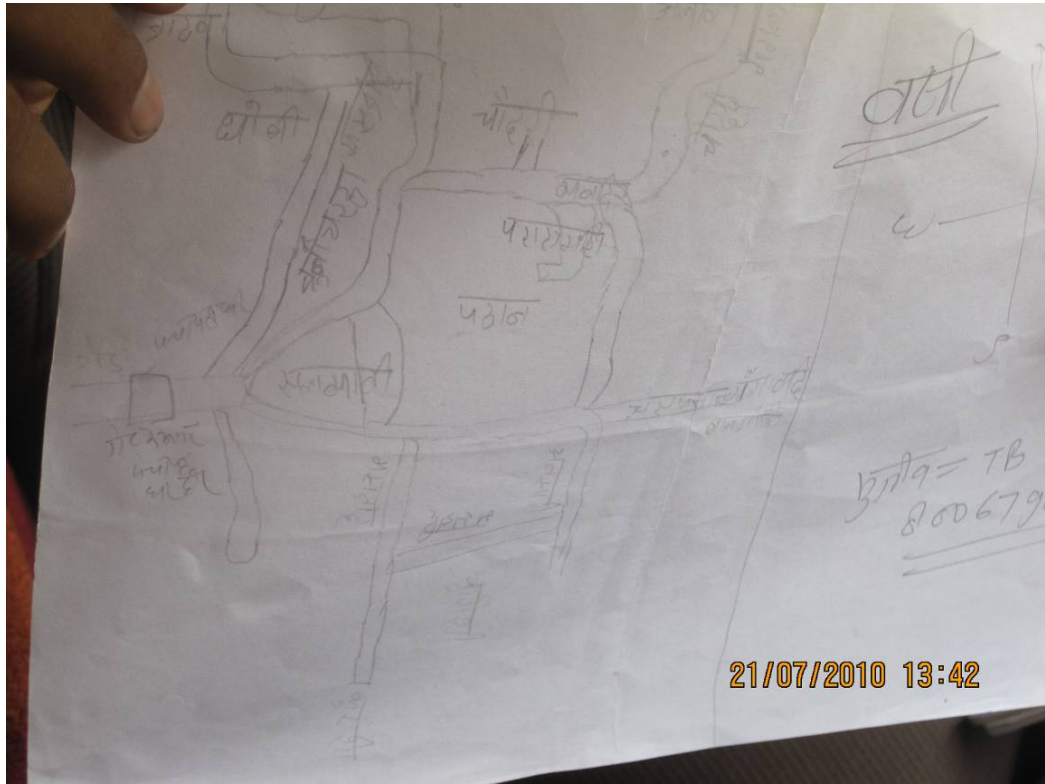




PRA during transact Walk



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PRA during transact Walk

Watershed work Phase :

Sample Estimate for 1 Ha. Afforestation Work :

Sl. No.	Detail of Work	Unit	Quantity	Rate	Amount
1	2	3	4	5	6
1	Clearance of Plantation Spot area	ha.	1.00	200.00	200.00
2	Excavations of Pits	Nos.	1000	7.20	7200.00
3	Purchasing of Form yard manure	Cmt.	600.00	10.00	6000.00
4	Filling of pits with mixing form yard manure	Nos.	1000	0.80	8000.00
5	Cartage for plants with 3% Loss	Nos.	1030	4.00	4120.00
6	Local Cartage of Plants	Nos.	1000	1.50	1500.00
7	Plantation Work	Nos.	1000	4.30	4300.00
8	Irrigation of Plants	Nos.	16000	2.30	36800.00
9	Muttering and Trillage of Plants	Nos.	4000	0.50	2000.00
10	Plantation Labour	Nos.	80	100.00	8000.00
11	Purchasing of Plants	Nos.	1000	60.00	60000.00
12	Display Board	Nos.	1	5000	5000.00
Total					135920.00
Say					136000.00

Watershed work Phase Horticulture :**Sample Estimate for Horticulture Programme for 1 ha. area :**

- 1- Name of Plant : Aonla
- 2- Row to row distance : 6 mtr.
- 3- Plant to plant distance : 6 mtr.
- 4- Plant area : 1 ha.
- 5- No. of Plants : 275

Sl. No.	ITEM	Unit	Quantity	Rate	Amount
1	2	3	4	5	6
1	Pit alignment	Nos.	275	0.16	44.00
2	Excavation of Pit (0.6x0.6x0.6)	Nos.	275	3.40	935.00
3	Filling of pit with fertilizers	Nos.	275	0.60	165.00
4	Purchasing of seedling with cartage	Nos.	275	50.00	137.50
5	FYM with insecticides	Nos.	275	0.80	220.00
6	Plantation of seedling	Nos.	275	4.30	1182.50
7	Display Board	Nos.	1	3500.00	3500.00
Total					6184.00
Addl. 20% under care and management					1236.80
Net					7420.80
Say					7500.00

Watershed work Phase Livelihood programme :

Sample Estimate for income generation activities through S.H.G. for Landless and marginal farmers :

Sl. No.	Name of Activities	Particulars	Quantity	Rate	Amount
1	2	3	4	5	6
A	Goat Keeping	Purchase of Goat (Barbari)	10 No.	3500.00	35000.00
		Purchase of Male Goat	01 No.	5000.00	5000.00
		Medical Treatment	10 No.	250.00	2500.00
		Other management	-	-	3500.00
		Total	-	-	46000.00
B	Poultry Farming	Cost of Chuja (Vanraja)	50 No.	500.00	500.00
		Cartage	-	500.00	500.00
		Medical Treatment	-	200.00	200.00
		Cage	-	5000.00	5000.00
		Total	-	-	6200.00
C	Honey Bee	Honey Box	4x8 unit	2500.00	80000.00
		Rani Bee	-	-	1000.00
		Other Management	-	-	3000.00
		Total	-	-	84000.00
D	Mini Dal Plant	Machine	01 No.	15000.00	15000.00
		Grain Purchasing	-	50000.00	50000.00
		Stick Machine, Bag etc.	01 No.	5000.00	5000.00
		Total	-	-	70000.00

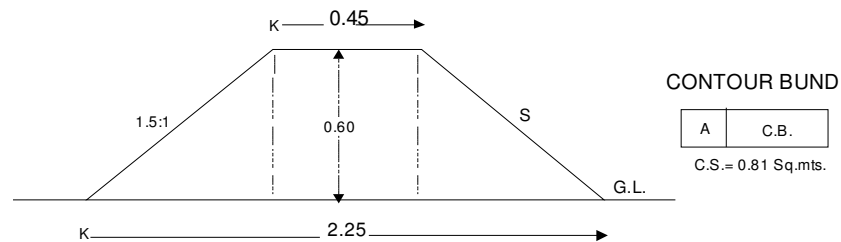
Watershed Work Phase :

Details of Material and Labour Cost For the 3.00 mtr. crest of Drop Outlet

Sl. No.	ITEM	Qty.	Rate	Per	Amount	Labour Requirements		
						Mession	Labour	Total
1	2	3	4	5	6	7	8	9
A- Material Requirement and Cost								
1	Cement	118	285.00	Bag	33630.00	-	-	-
2	Sand	17.50	1500.00	Cmt	26250.00	-	-	-
3	Bricks	15552	3600.00	1000	55987.00	-	-	-
4	Grit (25-50mm)	4.00	1200.00	Cmt	4800.00	-	-	-
5	Grit (16-20mm)	0.60	1300.00	Cmt	780.00	-	-	-
Total					121447.00	-	-	-
Water Arrangements 3%					8643.00	-	-	-
Grand Total					125090.00	-	-	-
B- Labour Requirements and Cost								
1	E/W	30.90	43.47	Cmt	1343.00	-	13.40	13.4
2	C:C/Work (1:4:8)	4.585	494.00	Cmt	2265.00	0.66	15.18	15.84
3	C:C/W (1:3:6)	0.657	-	-	-	-	-	-
4	M/W (1:4)	32.40	370.00	Cmt	11988.00	32.4	64.80	97.20
5	Plaster/W (1:4)	28.03	41.87	M ²	1174.00	3.50	5.25	8.75
6	Pointing W (1:3)	6.00	28.50	M ²	171.00	2.85	2.85	5.70
7	Queering of Labour for 10 Days ½ lab/day	5 No	100.00	No	500.00	-	5	5
Total					17441.00	39.41	106.48	145.89
Say					17500.00	40.00	107.00	147.00
Grand Total (A+B)					142531.00			
Say					142600.00			

TYPICAL DESIGN OF COTOUR BUND

- f- Field slop – 0.5%
- g- Type of Soil – Sandy loam
- h- Rain fall – 24 hr. Rain fall in cm. = 20 cm.
- i- Vertical Interval in two bunds – V.I. = $S+2/6.6= 0.5+2/6.6=0.378$ mt.
- j- Horizontal Interval in two bunds- H.I. = $100 \text{ V.I./}S=100 \times 0.454/0.5=75.60$ mts.
- k- Hight of bund = $H=\sqrt{\text{Re} \times \text{Vi}/ 50z} = \sqrt{20 \times 0.378/50}=0.39$ mts
- Where Re = 24 hrs. Rain fall in 20 cm.
- l- Free board 20% or minimum 15 cm.= $0.378+0.15=0.528$ mts.Or 0.60 mts
- m- Lenth of bund per hact. = $100 \times S/\text{Vi}=100 \times 0.5/0.378=132.27$ mts.
- n- Lenth of laterals = $100 \text{Vi}/2=100 \times 0.378/2=18.90$ mts.
- o- Total lenth of bund = $132.27+18.90=151.17$ Or 150 mts. per hect.
- p- C.S. of bund –



q- **Per hect. Cost –**

$$\text{CS}=0.81 \text{ m}^2$$

$$\text{Earth work} = 150 \times 0.81 = 121.50 \text{ m}^3$$

$$\text{Output for labour} = 3.25 \text{ m}^3$$

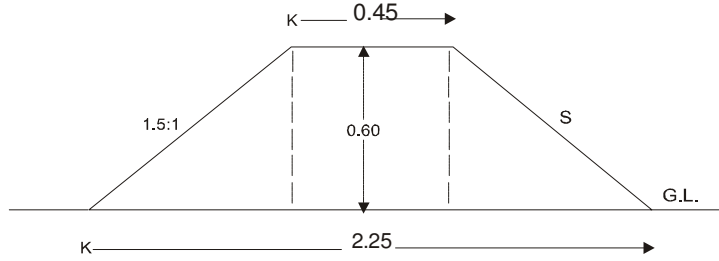
$$\text{Cost of Earth work @ Rs. 30.77 per/m}^3 = \text{Rs. 3738.55}$$

$$7.5\% \text{ Dressing Charge extra} = \text{Rs. 280.39}$$

Total Rs. 4018.94 per ha.

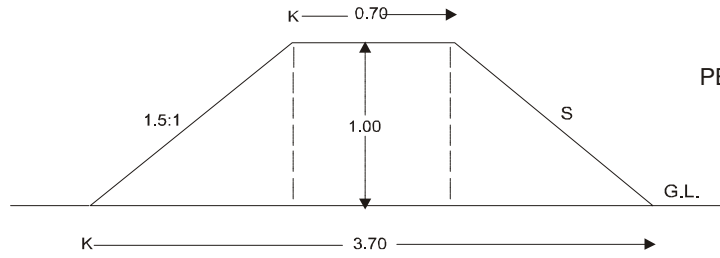
DESIGN OF EARTHEN BUND

All dimensions are in mts.



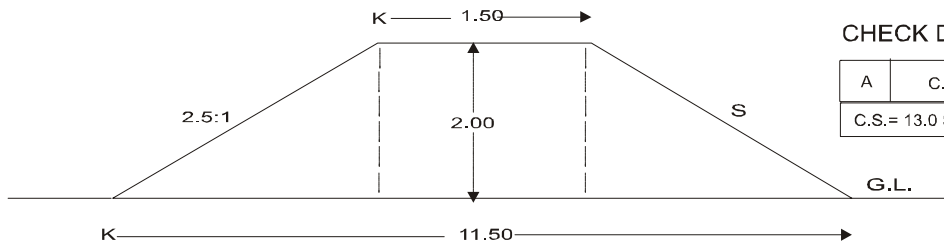
CONTOUR BUND

A	C.B.
C.S.= 0.81 Sq.mts.	



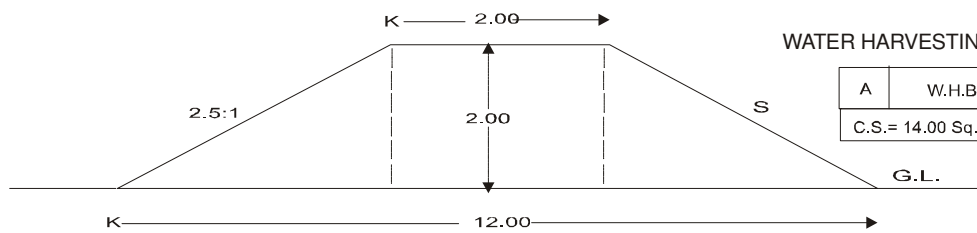
PERIPHERAL BUND

A	P.B.
C.S.= 2.20Sq. Mts.	



CHECK DAM

A	C.D.
C.S.= 13.0 Sq. Mts.0	

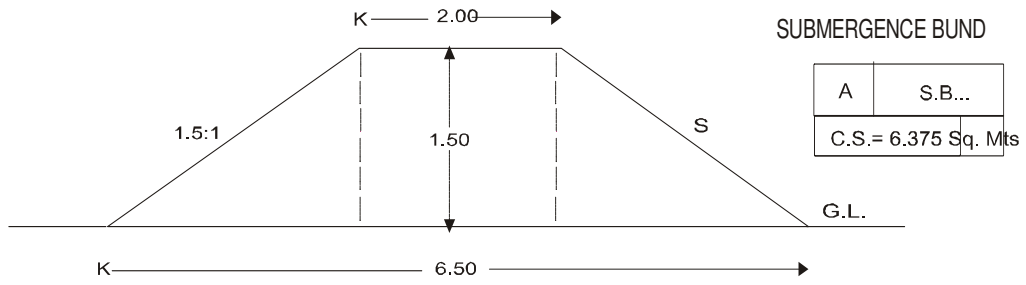


WATER HARVESTING BUND

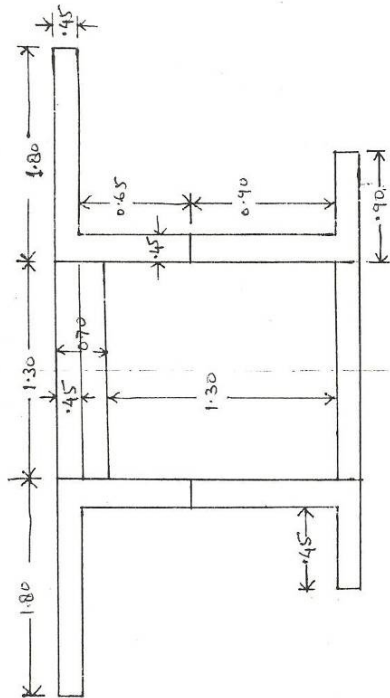
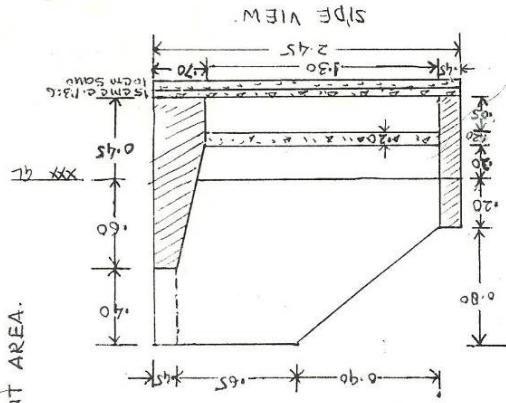
A	W.H.B..
C.S.= 14.00 Sq. Mts	

DESIGN OF EARTHEN BUND

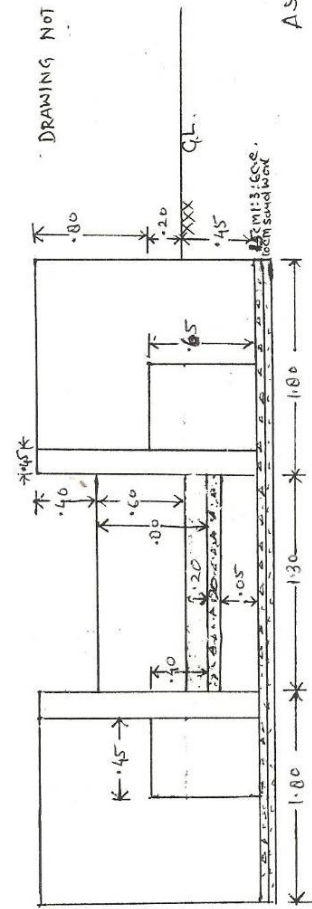
All dimensions are in mts.



DRAWING OF DROP SPILWAY FOR SHEET CATCHMENT AREA.



PLAN



FRONT ELEVATION

DRAWING NOT TO THE SCALE.

ASCI JE B.S.A.

Design of Drop Spillway Catchment area – 5 Hect. for Contour bund.

1. Catchment area : 5 hect.
2. Rain fall intensity : 120 mm/hr.
3. Run off coefficient : 0.3
4. Hight of bund : 1 mt.
5. Depth of storage h : 0.60 mt.

1. Hydrologic Design:

$Q = CIA./360$ By Rational formula.

Where Q = Discharge in Cumee.
C = Run off Coefficient.
I = Intency of Rainfall
A = Area in hect.

$$= \frac{0.30 \times 120 \times 5.00}{360} = 0.50 \text{ Cumee}$$

2. Hydroulic Design :

Maximum discharge through

$$Q = \frac{1.711 LH^{3/2}}{1.1 + .01 f.}$$

Where L = Length of Crest
H = Head over the crest
F = Drop 0.60 mt.

$$0.5 = \frac{1.711 \times L \times (4)^{3/2}}{1.1 + 0.01 \times 0.60}$$

$$0.5 = \frac{1.711 \times L \times 0.253}{1.106} = \frac{0.433 L}{1.106}$$

$$0.433 \times L = 0.50 \times 1.106$$

$$L = \frac{0.553}{0.433} = 1.277 \text{ mt} \quad \text{Sa } 1.30 \text{ mt.}$$

Length of Crest L = 1.30 ML

Hight of Crest F = 0.60 ML

Head Over th Crest = 0.40 ML

3. Structural Design:

A. Menimum Length of head wall Exn. $E = (3H + 0.60)$ or 1.5 f.

$$3H + .60 \quad \text{or} = 1.5 \text{ f.}$$

$$3 \times 0.40 + .60 = 1.50 \times 0.60$$

$$1.80 \text{ mt.} = 0.90 \text{ mt. Say } 1.00 \text{ mt.}$$

B. Length of Apron : $LB = f (2.28 H/F + 0.54)$

$$= 0.6 (2.28 \times \frac{.40}{.60} + 0.54)$$

$$= 1.23 \text{ Sa } 1.30 \text{ mt.}$$

C. Hight of Side wall at the Joint of wing wall Exn.

$$J = 2H \text{ or}$$

$$= 2 \times 0.4 = 0.80 \text{ mt.}$$

d - M = Length of side wall = sloppy portion

$$\begin{aligned} M &= 2 (f + 1.33 H - J) \\ &= 2 (0.60 + 1.33 \times 0.40 - 0.80) \\ &= 0.66 \quad \text{Say } 0.65 \text{ mt.} \end{aligned}$$

K = Length of side wall straight portion

$$\begin{aligned} &= (LB + 0.1) - M \\ &= (1.30 + 0.1) - 0.65 \\ &= 1.40 - 0.65 = 0.75 \text{ mt.} \end{aligned}$$

D. Depth of Foundation

$$\begin{aligned} \text{Minimum depth} &= 0.473 \times (Q/F)^{1/3} \\ &= 0.473 \times \frac{(0.50)}{0.60}^{1/3} \\ &= 0.473 \times 0.83^{1/3} \\ &= 0.473 \times 0.94 = 0.444 \text{ Sa } 0.45 \text{ mt.} \end{aligned}$$

$$\text{Maximum depth} = 1.5 \times 0.44 = 0.66 \text{ Sa } 0.70 \text{ mt.}$$

Main Dimension of structure.

$$\begin{aligned} \text{Length of head wall} &= 1.30 \text{ mt.} \\ \text{Height of Crest} &= 0.60 \text{ mt.} \\ \text{Head over the Crest} &= 0.40 \text{ mt.} \end{aligned}$$

$$\begin{aligned} \text{Minimum top width of head wall} &= 0.45 \text{ mt.} \\ \text{Bottom width of head wall} &= \frac{1}{2} \times \text{ht. crest} + \text{Top width} \\ &= 0.50 \times 0.6 = 0.75 \text{ Say } 0.70 \text{ mt.} \\ \text{Head wall Exn.} &= 1.80 \text{ mt.} \\ \text{Length of Apron} &= 1.30 \text{ mt.} \end{aligned}$$

Estimate for Production System & Micro Enterprises.

Estimate for demonstration : 40% amount Expend in Kharif Crop & 60% Amount Expend in Rabi crops Against Allocated Fund for Production system & Micro Enterprises.

Management :

- A. Integrated Nutrient Management use 50% (FYM + Bio fertilizers)
- B. Integrated Weed & Pests management. 50% Chemical fertilizers
- C. Water Application.
- D. Selection of seed- Draught resistance high yielding variety.

Selected Crops in Kharif & Rabi Season-

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

Cast per hect demonstration for Kharif Crops.

S. No.	Items	Name of Kharif crops/ per hect. Cast.				
		Bajara	Til	Urd	Moong	Bajara fodder
1	2	3	4	5	6	7
1	Qty. of seed.	6 kg.	4 kg.	15	15	15-20
	Seed Rate/ Kg (Rs.)	200 Rs kg.	150 Rs.	125 Rs.	100 Rs.	200 Rs.
	Cost of seed	1200	600	1875	1500	3000
2	Use of Fertilizer					
	Qty of Urea in kg	80	15	4.50	4.50	85
	Rates/kg	5.30	5.30	5.30	5.30	5.30
	Amount	424.00	79.50	23.85	23.85	450.50
	Qty. of DAP in kg	65	45	45	45	65
	Rates / kg	10.50	10.50	1.50	10.50	10.50
	Amount	682.50	472.50	472.50	475.50	682.50
	Qty. of MOP in kg	35	25	17.50	17.50	35
	Rate	5.10	5.10	5.10	5.10	5.10
	Amount	178.50	127.50	89.25	89.25	178.50
3	Pest & weed management 2500 Rs./ hect.	2500	2500.00	2500	2500	2500.00
4	Water Application	-	-	-	-	-
	Per hect.	4985	3779.50	4960.60	4588.60	6811.50
	Total Cost/hectare	5000	3800.00	5000.00	4600.00	6800.00

Watershed work Phase :**Production system and micro enterprises :****Sample demonstration for Rabi crops :**

Sl. No.	ITEMS	Name of Rabi Crops per ha. Cost			
		Mustard	Wheat	Gram	Barseem
1	2	3	4	5	6
A	Quantity of Seed	4.5	120-130	15	30
	1. Seed /Kg.	160.00	22	100	120
	2. Cost of seed	640.00	2640	1500	5100
B	Use of fertilizers	-	-	-	-
	1. Uria in Kg.	85	105	-	26
	2. Rate per Kg.	5.30	5.30	5.30	5.30
	3. Amount	450.50	556.50	-	137.80
	4. DAP in kg.	65.00	65	65	45
	5. Amount	10.50	10.50	10.50	10.50
	6. Qty. of MOP in kg.	682.50	682.50	682.50	472.50
	7. Rate/Kg.	35.00	35	25	17
	8. Amount	5.10	5.10	5.10	5.10
	9. Rate per Kg.	86.70	178.50	127.50	86.75
	10. Amount	2500.00	2500	2500	2500
C	Paste and weed manager 2500/- per ha.	3000.00	7500	1500	20000
D	Water Application	7359.00	14057.57	14810.00	28297
	Total Cost per ha.	5000.00	3800.00	15000	28000

Design of Drop Spillway 3 mtr. crest :

Design Criteria :

- (i) Total catchments area = 25 ha
- (ii) Rainfall Entrancity = 120 mm/hr.
- (iii) Run of Coefficient = 0.40 mt.
- (iv) Head over the crest = 0.50 mt.
- (v) Type of Soil = Mar + Cabar

Total Discharge Catchments Area :

$$Q = \frac{CIA}{360}$$
$$Q = \frac{0.40 \times 120 \times 25}{360}$$
$$Q = \frac{1200}{360} = 3.33 \text{ Cmt.}$$

Take Design Discharge Drop Spillway $\frac{1}{2}$ of the full Discharge for the Length of Crest :

$$Q = CLH^{3/2} \quad C = \text{Coefficient Discharge} = 1.71$$
$$Q = 1.71 \times L \times 0.50^{3/2} \quad L = \text{Length of Crest}$$
$$1.665 = 1.71 \times L \times 0.351$$
$$L = \frac{1.665}{0.600} = 2.77 \text{ mt.}$$

Take Length of Crest = 2.77 mt. or 3.00 mt.

Design of Drop Spillway for 3 mtr. crest :

Design Criteria :

- (i) Total catchments area = 30 ha
- (ii) Rainfall Entrancity = 120 mm/hr.
- (iii) Run of Coefficient = 0.40 mt.
- (iv) Head over the crest = 0.50 mt.
- (v) Type of Soil = Mar + Cabar

Total Discharge Catchments Area :

$$Q = \frac{CIA}{360}$$
$$Q = \frac{0.40 \times 120 \times 30}{360}$$
$$Q = \frac{1140}{360} = 4.00 \text{ Cmt.}$$

Take Design Discharge Drop Spillway $\frac{1}{2}$ of the full Discharge for the Length of Crest :

$$Q = CLH^{3/2} \quad C = \text{Coefficient Discharge} = 1.71$$
$$Q = 1.71 \times L \times 0.50^{3/2} \quad L = \text{Length of Crest}$$
$$2.00 = 1.71 \times L \times 0.351$$
$$L = \frac{2.00}{0.600} = 3.33 \text{ mt.}$$

Take Length of Crest = 3.33 mt. or 3.00 mt.

Design of Drop Spillway for 4 mtr. crest :

Design Criteria :

- (i) Total catchments area = 36 ha
- (ii) Rainfall Entrancity = 120 mm/hr.
- (iii) Run of Coefficient = 0.40 mt.
- (iv) Head over the crest = 0.50 mt.
- (v) Type of Soil = Mar + Cabar

Total Discharge Catchment Area :

$$Q = \frac{CIA}{360}$$
$$Q = \frac{0.40 \times 120 \times 36}{360}$$
$$Q = \frac{1728}{360} = 4.80 \text{ Cmt}$$

Take Design Discharge Drop Spillway $\frac{1}{2}$ of the full Discharge for the Length of Crest :

$$Q = CLH^{3/2} \quad C = \text{Coefficient Discharge} = 1.71$$
$$Q = 1.71 \times L \times 0.50^{3/2} \quad L = \text{Length of Crest}$$
$$2.40 = 1.71 \times L \times 0.351$$
$$L = \frac{2.40}{0.600} = 4.00 \text{ mt.}$$

Take Length of Crest = 4.00 mt.

Design of Drop Spillway for 5 mtr. crest :

Design Criteria :

- (i) Total catchments area = 45 ha
- (ii) Rainfall Entrancity = 120 mm/hr.
- (iii) Run of Coefficient = 0.40 mt.
- (iv) Head over the crest = 0.50 mt.
- (v) Type of Soil = Mar + Cabar

Total Discharge Catchment Area :

$$Q = \frac{CIA}{360}$$
$$Q = \frac{0.40 \times 120 \times 45}{360}$$
$$Q = \frac{2160}{360} = 6.00 \text{ Cmt.}$$

Take Design Discharge Drop Spillway $\frac{1}{2}$ of the full Discharge for the Length of Crest :

$$Q = CLH^{3/2} \quad C = \text{Coefficient Discharge} = 1.71$$
$$Q = 1.71 \times L \times 0.50^{3/2} \quad L = \text{Length of Crest}$$
$$2.00 = 1.71 \times L \times 0.351$$
$$L = \frac{3.00}{0.600} = 5.00 \text{ mt.}$$

Take Length of Crest = 5.00 mt.

Estimate of Drop Spillway for 3 Mtr. Crest :

Sl. No.	ITEM	Nos.	L	B	D/H	Qty.
1	2	3	4	5	6	7
1. Earth Work in Foundation						
a.	Head Wall Extension	2	2.65	1.00	1.50	7.95
b.	Side Wall	2	2.05	0.80	1.50	4.92
c.	Crest Wall	1	3.00	1.50	1.50	6.75
d.	Tai Wall	1	3.00	0.80	1.50	3.60
e.	Side Wall Extension	2	1.65	0.80	1.50	3.96
f.	Apron	1	3.00	1.55	0.80	3.72
Total						30.90
2. Sand Laying in Foundation						
a.	Head Wall Extension	2	2.65	0.90	0.10	0.477
b.	Side Wall	2	2.05	0.70	0.10	0.287
c.	Crest Wall	1	3.00	1.30	0.10	0.390
d.	Tai Wall	1	3.00	0.70	0.10	0.210
e.	Side Wall Extension	2	1.65	0.70	0.10	0.231
f.	Apron	1	3.00	1.55	0.10	0.465
Total						2.060
3. C.C. Work in Foundation (1:3:6)						
a.	Head Wall Extension	2	2.65	0.90	0.20	0.954
b.	Side Wall	2	2.05	0.70	0.20	0.575
c.	Crest Wall	1	3.00	1.30	0.20	0.780
d.	Tai Wall	1	3.00	0.70	0.20	0.422
e.	Side Wall Extension	2	1.65	0.70	0.20	0.462
f.	Apron	1	3.00	1.55	0.30	1.395
Total						4.585
C : C Work (1:2:4)						
a.	Apron (1:2:4)	1	3.00	1.55	0.10	0.465
b.	Crest Wall Top	1	3.00	0.80	0.08	0.192
Total						0.657
4. Khanda Masanary Work (1:4)						
a.	Head Wall Extension	2	2.65	0.90	1.10	5.247
b.	Side Wall	2	2.05	0.70	1.10	3.157
c.	Crest Wall	1	3.00	1.30	1.10	4.290
d.	Tai Wall	1	3.00	0.70	1.10	2.310
e.	Side Wall Extension	2	1.65	0.70	1.10	2.541
f.	Apron	1	3.00	1.55	0.20	0.930
Above the G/L						
a.	Head Wall Extension	2	2.65	0.80	1.60	4.664
b.	Side Wall	2	0.70	0.65	1.60	1.456
c.	Slope Wall	2	$(1.60+85)/2$	0.65	1.35	2.149
d.	Crest Wall	1	3.00	$(0.80+1.20)/2$	1.00	3.15
e.	Tai Wall	1	3.33	0.65	0.35	0.682
f.	Side Wall Extension	2	1.65	0.65	0.85	1.823
Total						32.399
5. Plaster Work (1:4)						
a.	Head Wall Top	2	2.65	0.80	-	4.240
b.	Side Wall Top	2	2.30	0.65	-	2.990
c.	Crest Wall	1	3.00	1.80	-	5.400
d.	Crest Wall of Side	1	3.00	1.20	-	3.600
e.	Head Wall of Side	2	2.65	-	1.20	6.360
f.	Tai Wall	1	3.00	1.10	-	3.300
g.	Side Wall Extension	2	1.65	0.65	-	2.140
Total						28.030
6. Pointing (1:3)						
a.	Side Wall	2	1.50	-	1.60	4.800
b.	Slope Wall	2	$(1.60+85)/2$	-	1.35	3.300
Total						8.100
	Less	2	$(0.80+1.30)/2$	-	1.00	2.100
Net						6.000

Estimate of Drop Spillway for 4 Mtr. Crest :

Sl. No.	ITEM	Nos.	L	B	D/H	Qty.
1	2	3	4	5	6	7
1. Earth Work in Foundation						
a.	Head Wall Extension	2	2.65	1.00	2.00	10.60
b.	Side Wall	2	4.45	0.80	2.00	15.84
c.	Crest Wall	1	4.00	2.00	2.00	16.00
d.	Tai Wall	1	4.00	0.80	2.00	6.40
e.	Side Wall Extension	2	1.65	0.80	2.00	5.28
f.	Apron	1	4.00	3.45	0.80	11.04
Total						65.16
2. Sand Laying in Foundation						
a.	Head Wall Extension	2	2.65	1.00	0.10	0.477
b.	Side Wall	2	4.45	0.80	0.10	0.623
c.	Crest Wall	1	4.00	2.00	0.10	0.720
d.	Tai Wall	1	4.00	0.80	0.10	0.280
e.	Side Wall Extension	2	1.65	0.80	0.10	0.231
f.	Apron	1	4.00	3.45	0.10	1.380
Total						3.711
3. C.C. Work in Foundation (1:3:6)						
a.	Head Wall Extension	2	2.65	1.00	0.20	0.954
b.	Side Wall	2	4.45	0.80	0.20	1.246
c.	Crest Wall	1	4.00	2.00	0.20	1.440
d.	Tai Wall	1	4.00	0.80	0.20	0.560
e.	Side Wall Extension	2	1.65	0.80	0.20	0.462
f.	Apron	1	4.00	3.45	0.30	4.140
Total						8.802
C : C Work (1:2:4)						
a.	Apron	1	4.00	3.45	0.10	1.380
b.	Crest Wall Top	1	4.00	0.80	0.10	0.256
Total						1.636
4. Khanda Masanary Work (1:4)						
Up to G/L (1:4)						
a.	Head Wall Extension	2	2.65	0.90	1.30	6.201
b.	Side Wall	2	4.45	0.70	1.30	8.099
c.	Crest Wall	1	4.00	1.80	1.30	9.360
d.	Tai Wall	1	4.00	0.70	1.30	3.640
e.	Side Wall Extension	2	1.65	0.70	1.30	3.003
Above the G/L						
a.	Head Wall Extension	2	2.65	0.80	2.50	10.600
b.	Side Wall	2	2.00	0.65	2.50	6.500
c.	Crest Wall	1	4.00	$(0.80+1.80)/2$	2.00	10.400
d.	Slope Wall	2	$(1.0+2.50)/2$	0.65	2.45	5.573
e.	Tai Wall	1	4.00	0.65	0.50	1.300
f.	Side Wall Extension	2	1.65	0.65	1.00	2.145
Total						66.821
5. Plaster Work (1:4)						
a.	Head Wall Top	2	2.65	0.80	-	4.240
b.	Side Wall Top	2	4.85	0.65	-	6.300
c.	Crest Wall Top	1	4.00	0.80	-	3.200
d.	Tie Wall Top	1	4.00	1.15	-	4.600
e.	Side Wall Extension	2	1.65	0.65	-	2.140
f.	Head Wall Extension	2	2.65	-	1.60	8.480
g.	Crest Wall Up Side	1	4.00	-	1.20	4.800
Total						33.760
6. Pointing (1:3)						
a.	Side Wall	2	2.80	-	2.50	14.000
b.	Slope Wall	2	$(2.50+1.0)/2$	-	2.45	8.570
Total						22.570
	Less	2	$(0.80+1.80)/2$	-	2.00	5.200
Net						17.370

Estimate of Drop Spillway for 5 Mtr. Crest :

Sl. No.	ITEM	Nos.	L	B	D/H	Qty.
1	2	3	4	5	6	7
1. Earth Work in Foundation						
a.	Head Wall Extension	2	2.65	1.00	2.00	10.60
b.	Side Wall	2	4.45	0.80	2.00	15.84
c.	Crest Wall	1	5.00	2.00	2.00	20.00
d.	Tai Wall	1	5.00	0.80	2.00	8.00
e.	Side Wall Extension	2	1.65	0.80	2.00	5.28
f.	Apron	1	5.00	3.45	0.80	13.80
Total						73.52
2. Sand Laying in Foundation						
a.	Head Wall Extension	2	2.65	0.90	0.10	0.477
b.	Side Wall	2	4.45	0.70	0.10	0.623
c.	Crest Wall	1	5.00	1.80	0.10	0.900
d.	Tai Wall	1	5.00	0.70	0.10	0.350
e.	Side Wall Extension	2	1.65	0.70	0.10	0.231
f.	Apron	1	5.00	3.45	0.10	1.725
Total						4.306
3. C.C. Work in Foundation (1:4:8)						
a.	Head Wall Extension	2	2.65	0.90	0.20	0.954
b.	Side Wall	2	4.45	0.70	0.20	1.246
c.	Crest Wall	1	5.00	1.80	0.20	1.800
d.	Tai Wall	1	5.00	0.70	0.20	0.700
e.	Side Wall Extension	2	1.65	0.70	0.20	0.462
f.	Apron	1	5.00	3.45	0.30	5.175
Total						10.337
C : C Work (1:2:4)						
a.	Apron	1	5.00	3.45	0.10	1.725
b.	Crest Wall Top	1	5.00	0.80	0.08	0.320
Total						2.045
4. Khanda Masanary Work (1:4)						
Up to G/L (1:4)						
a.	Head Wall Extension	2	2.65	0.90	1.30	6.201
b.	Side Wall	2	4.45	0.70	1.30	8.099
c.	Crest Wall	1	5.00	1.80	1.30	9.360
d.	Tai Wall	1	5.00	0.70	1.30	4.550
e.	Side Wall Extension	2	1.65	0.70	1.30	3.030
Above the G/L						
a.	Head Wall Extension	2	2.65	0.80	2.50	13.250
b.	Side Wall	2	2.00	0.65	2.50	6.500
c.	Crest Wall	1	5.00	$(0.80+1.80)/2$	2.00	13.000
d.	Slope Wall	2	$(1.0+2.50)/2$	0.65	2.45	5.573
e.	Tai Wall	1	5.00	0.65	0.50	1.625
f.	Side Wall Extension	2	1.65	0.65	1.00	2.145
Total						73.333
5. Plaster Work (1:4)						
a.	Head Wall Top	2	2.65	0.80	-	4.240
b.	Side Wall Top	2	4.85	0.65	-	6.300
c.	Crest Wall Top	1	5.00	0.80	-	4.000
d.	Tie Wall Top	1	5.00	1.15	-	5.750
e.	Side Wall Extension Top	2	1.65	0.65	-	2.100
f.	Head Wall Up Side	2	2.65	-	1.60	8.480
g.	Crest Wall Up Side	1	5.00	-	1.30	6.500
Total						37.370
6. Pointing (1:3)						
a.	Side Wall	2	2.80	-	2.50	14.000
b.	Slope Wall	2	$(2.50+1.0)/2$	-	2.45	8.570
Total						22.570
	Less	2	$(0.80+1.80)/2$	-	2.00	5.200
Net						17.370

Expected/Estimated outcome of IWMP-III (2010-11)

1	2	3	4	5
Sl. no.	Item	Unit	Pre project status	Post project status
1	Status of water table	Mt	10-11	8-10
2	Ground water Structures repaired/rejuvenated	No.	-	-
3	Quality of Drinking water	Quality	Hard + Soft	Soft
4	Availability of Drinking Water	Days	310	365
5	Increase in irrigated area	%	35	45
Change in cropping/land use pattern		-	-	-
6	Area under Agriculture crop	-	-	-
	(i) Area under Single crop	Ha	755	300
	(ii) Area under Double crop	Ha	3105	3265
	(iii) Area under Multiple crop	Ha	70	255
	(iv) Cropping intensity	%	65%	80 %
7	Increase in area under Vegetation (tree cover)	Ha	28	62
8	Increase in area under Horticulture	Ha	12	28
9	Area under fuel & Fodder	Ha	7	11
10	Increase in Milk Production	Litter par animal	4-5 Lt	7-8 Lt
11	No of SHGs	-	-	24
12	Increase in livelihood	Rs/cap/Annum	24000	35000
13	Migration	%	2	1
14	SHG federations formed		-	-
15	Credit linkage with Banks		-	24