CONTENTS (IWMP VI)

CHAPTER- 1

METHODOLOGY

INTRODUCTION

The Government of India (GOI) adopted watershed management as a strategy to address the sustainable agricultural productivity in the rainfed areas since the last three decades. Further, GOI has adopted watershed management as a national policy since 2003. Several studies have highlighted that appropriate natural resource management and its utilization results in enhancement in agricultural productivity. In order to achieve food security, minimize the water conflicts and reduce poverty, it has become essential to increase productivity of rainfed / dry land farming by complete utilization of the available natural resources.

In Haryana, watershed activities were undertaken by Department of Agriculture (Soil Conservation), Forest Department and Rural Development Department. The existing scheme of watershed, like DPAP, DDP, IWDP & Haryali were brought under one umbrella in the name of Integrated Watershed Management Programme in the year 2008. The scheme is basically for rainfed area, Common Guidelines were framed by National Rainfed Area Authority. Rural Development Department is the Nodal Department for implementation of IWMP through State Level Nodal Agency.

In order to implement watershed area (IWMP VI) programme, a systematic baseline survey has been conducted to know the potentiality of the village. With this view, a baseline survey was conducted in six micro- watersheds Kharkhara (2C5G1q1), Malpura (2C5G1p3), Garhi Alawalpur (2C5G1p4), Khijuri (2C5H2a1), Jeetpura (2C5G6q2), Majra sheoraj (2C5G6q6). The base line survey conducted shall be considered as bench mark against which the results of project could be compared at the end of the implementation. It would also be helpful in guiding watershed programmes and to plan its goal in identifiable terms and be used as future reference. PRA techniques and transect walk were conducted with the Gram Sabha members and beneficiaries for building confidence in participation during project planning.

1.1 SCIENTIFIC PLANNING

1.1.1 Cluster Approach

This envisages a broader vision of Geo- hydrological unit which involves treating the cluster (IWMP VI) of 6 micro watersheds namely Kharkhara (2C5G1q1), Malpura (2C5G1p3), Garhi Alawalpur (2C5G1p4), Khijuri (2C5H2a1), Jeetpura (2C5G6q2), Majra sheoraj (2C5G6q6) with their respective codes.

1.1.2 Base Line Survey

Bench mark survey was conducted for collection of base line data on various bio-physical and socio-economic aspects. The methodology adopted was as follows:

1.1.3 Collection of Primary Data

Though the project was sanctioned in September, 2011 the preparatory phase started in 2012. Initially, a meeting was arranged with officials of concerned departments and technical experts located at Kharkhara, Malpura, Garhi Alawalpur, Khijuri, Jeetpura, Majra sheoraj micro- watersheds. During this meeting, Preliminary Project Report (PPR) were thoroughly discussed.

In order to have first hand information, a joint visit in the project area was made along with PRI members. In this survey, physical location of the watershed, drainage pattern, land use, employment scenario, agriculture produce and other problems related to the area were assessed. Sarpanches and local people were involved in the discussions and a note of the local needs and scope of watershed works was taken up.

The survey of India toposheets (Survey of India) of the area available on the 1:50000 scales of the project area were procured and all assigned villages were marked on the copies of the toposheets (Survey of India) as well as on the maps prepared by Soil and Land Use Survey of India (SLUSI).

The primary data related to land holding, crop area and production were collected from agriculture and revenue records of the village, the socio economic data of the target villages were procured from Anganwari workers and Panchayat Secretary in the village and district.

1.1.4 Collection of Secondary data

The data with regard to Demographic, socio-economic, infrastructure, land use, primary and secondary occupation, major crops grown and the yield level of fruits and vegetable crops, marketing facilities, fodder production, agro-forestry crops, live stock and milk production, status of self help groups, previous watershed schemes and works undertaken under MGNREGA etc. was gathered with the help of a designed Performa. Additional information was gathered by group and individual discussions with women groups, landless and other poor sections of the society. The issues concerning water availability, use of common property resources, fuel and fodder availability, wage employment opportunity and other major concerns were discussed, debated and recorded. Rainfall data was collected from the Deputy Director Agriculture (PPR).

1.2 PARTICIPATORY RURAL APPRAISAL

The due process of Participatory Rural Appraisal was followed in which village committees were sensitized about project activities. An appraisal of land resources, water resources, forest and pasture land resources, common property resources, production system and livestock resources was carried out by collecting data from primary and secondary sources. Group meetings were organized at common places and problems with possible solution were debated, discussed and efforts were made to reach an agreement on activities required under the projects. This was followed by transect walks across the entire area of the village and spots indicated by the community. The Technical possibilities were discussed and measurements were recorded for jointly agreed activities. Similarly, discussions were held about entry point activities and items of work were finalized keeping in view the availability of funds in the project. Through discussions were held on production activities and new innovative techniques of improving crop, fruit and milk production. The women groups were sensitized about income generating activities and skill improvement by various types of trainings. The department field staff facilitated the process of participation at the planning stage. The department officials

simultaneously stated the process of forming watershed committees for each village. The roles and responsibilities of all stake holders as per guidelines, the mechanism of fund flows, cost sharing arrangement in different components, and operational mechanism of the projects were thoroughly discussed with the community and to the Watershed Committees (WC) in detail.

1.2.1 Participatory Net Planning

The action plan was formulated based on the PRA, Geo-hydrological condition, Drainage pattern, Soil class, Soil erosion, forest and agriculture land. The project proposals were deliberated in the Gram Sabha meetings which were approved with required amendments.

Based on the experience of the experts working in the area and catchment area characteristics each structures like Water Conveyance System, UGP Line, Dug Out Pond (New/Renovation), Ramp/Ghat Inlet and Outlet, Small Earthen Embankment with vegetative support, Earthen Embankment with pucca outlet, Roof top rain water recharge structures etc. were recommended to conserve and store water used for life saving additional irrigation potential in the rainfed area and to avoid further degradation of the land.

1.2.2 Community Participants in Social Mapping

The village communities were apprised about project activities. Group meetings were organized at common places, problems and possible solutions were debated, discussed and efforts were made to reach agreement on activities required under the project. Social mapping involving local community was prepared. Infrastructure services and other village resources such as ponds, wells, agriculture land etc. were mapped.

1.2.3 Transect Walk

Reconnaissance survey was carried out through transect walk in order to identify the needs, treatments required and worksites. The sites were marked on the maps and different treatment measures required were recommended.

Transect walk

1.2.4 Focus Group Discussions

Focus Group Discussions (FGD) were conducted in order to obtain communities' approval on various identified needs. It was helpful in complementing the assessment emerged from PRA and to derive the opinion of the communities on various issues.

Gram Sabha member's participation in group discussion

1.3 USE OF GIS TECHNOLOGY FOR PLANNING

Scientific tool has been promoted at various stages of watershed development planning.

Various maps were prepared such as Base map, Present Land Use, Drainage and Contours, Slope, Soil Classification, Land Capability Classification, Soil Fertility Status, Ground Water Depth and Quality, Proposed and existing activities of works. All Watershed maps (micro- watershed) have been prepared using Soil and Land use Survey of India (SLUSI) maps with coding.

1.3.1 Prioritization

With the assistance of Geographical Information System (GIS), various layers were created like Topography (slope), Drainage and contour, Groundwater conditions, Slope, soil and Land Capability classes. All these parameters were given weightage as per the guidelines issued by Govt. of India. The map prepared was used during the field visit for finalization of works and project objectives.

1.3.2 Planning

Based on the land use and Topographical maps in addition to social maps (PRA) prepared by the participants, analysis was carried out for the planning in micro- watersheds. The action plan was formulated using maps of Drainage pattern, Soil class,

The project proposals were deliberated in the Gram Sabha meetings which were approved with required amendments.

Based on the experience of the experts working in the area and catchment area characteristics each structure like Water Conveyance System, UGP Line, Dug Out Pond (New/Renovation), Ramp/Ghat Inlet and Outlet, Small Earthen Embankment with vegetative support, Earthen Embankment with pucca outlet, Roof top rain water recharge structures etc. were provided in consultation with the Gram Sabha Members. However finally only those activities are included which were suggested by the Gram Sabha according to their needs.

1.3.3 Hydrological modeling

The relevant hydrological parameters were used for delineation of micro- watersheds as per the existing drainage system. The works/ activities under drainage line treatment are proposed as per topography, present land use, site conditions and run- off in consultation with WC. These maps were generated as per SLUSI coding system. The maps are produced by developing different layers using GIS technology.

Table 1. Detail of scientific planning and inputs in IWMP projects

S.No.	Scientific Criteria/input used	Whether Scientific Criteria was used
A	**Planning**	
	Cluster approach	Yes

S.No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	Hydro-geological survey	Yes
	Contour Mapping	Yes
	Participatory net planning (PNP)	Yes
	Remote sensing data-especially soil	Yes
	Ridge to valley treatment	Yes
	Online IT connectivity between	Yes
	1. Project and DRDA cell/ZP	Yes
	2. DRDA and SLNA	Yes
	3. SLNA and DoLR	Yes
	Availability of GIS layers	Yes
	1. Survey of India map/imagery /SLUSI map	Yes
	2. Micro- Watershed Boundary	Yes
	3. Drainage pattern	Yes
	4. Soil (soil fertility status)	Yes

S.No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	5. Land use	Yes
	6. Ground water status	Yes
B	Inputs	-
	Bio pesticides	Yes
	Organic manure	Yes
	Vermin- compost	Yes
	Bio Fertilizer	Yes
	Water saving devices	Yes
	Mechanical tools	Yes
	Bio fencing	No
	Nutrient Budgeting	No
	Automatic water level recorder & sedimentation samplers	No

1.4 Preparation of Action Plan and Approval

Based on the need and problems in watershed area; a draft action plan was prepared and placed before the concerned watershed development committee as per schedule circulated by Additional Deputy Commissioner for approval of the Watershed Committees. After detailed deliberations and incorporation of relevant recommendation/ suggestions, the action plan was approved in the meeting of Gram Sabha. The resolution of each village falling in the watershed has been received. The record is available with the PIA and WAPCOS.

CHAPTER – 2

PROJECT BACKGROUND

2.1 PROJECT BACKGROUND

Integrated Watershed Management Programme (IWMP VI) project is falls in Rewari block of Rewari district in Haryana state. The project is a cluster of six micro- watersheds namely Kharkhara (2C5G1q1), Malpura (2C5G1p3), Garhi alawalpur (2C5G1p4), Khijuri (2C5H2a1), Jeetpura (2C5G6q2), Majra Sheoraj (2C5G6q6). The total geographical area of the project is **4735 ha** out of which **3420 ha** has been undertaken to be treated under IWMP VI starting from year 2011-2012. The project is divided into six micro watersheds. The Base map is shown in **Annexure I.**

Table 1: Basic Project Information

Sr. No	Name of the project	Name of the micro watersheds	Code No.	Name of the villages	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
1	Kharkhara watershed (IWMP VI)	Kharkhara	2C5G1q1	Kharkhara Alwalpur	Rewari	Rewari	828	553	66.36	ASCO Rewari
2	Kharkhara watershed	Malpura	2C5G1p3	Malpura Kapriwas	Rewari	Rewari	989	538	64.56	ASCO Rewari

Sr. No	Name of the project	Name of the micro watersheds	Code No.	Name of the villages	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
	(IWMP VI)			Joniawas						
3	Kharkhara watershed (IWMP VI)	Garhi alawalpur	2C5G1p4	Garhi Alawalpur Maheshwari	Rewari	Rewari	625	550	66.00	ASCO Rewari
4	Kharkhara watershed (IWMP VI)	Khijuri	2C5H2a1	Khijuri Nikhri Niganiawas	Rewari	Rewari	939	671	80.52	ASCO Rewari
5	Kharkhara watershed (IWMP VI)	Jeetpura	2C5G6q2	Jeetpura Masani Alamgirpur	Rewari	Rewari	990	763	91.56	ASCO Rewari
6	Kharkhara watershed (IWMP VI)	Majra Sheoraj	2C5G6q6	Majra Sheoraj Majra Gurdass	Rewari	Rewari	364	345	41.40	ASCO Rewari
					Grand Total		**4735**	**3420**	**410.40**	

2.2 NEED OF WATERSHED DEVELOPMENT PROGRAMME

Watershed development programme is prioritized on the basis of thirteen parameters namely;

i. poverty index,

ii. percentage of SC,
iii. actual wages,
iv. percentage of small and marginal farmers,
v. ground water status,
vi. moisture index,
vii. area under rain fed agriculture,
viii. drinking water situation in the area ,
ix. percentage of degraded land,
x. productivity potential of land,
xi. continuity of any other watershed already developed/treated,
xii. cluster approach for plain terrain,
xiii. cluster approach for hilly terrain,

The criteria and weightage of each of the parameters has been given in **Table 2**.

Table 2. Criteria and Weightage for Selection of Watershed

S. No.	Criteria	Maximum Score	Ranges and Scores			
i.	Poverty index (% of	10	Above 80 % (10)	80 to 50 % (7.5)	50 to 20 % (5)	Below 20%

S. No.	Criteria	Maximum Score	Ranges and Scores			
	poor to population)					(2.5)
ii.	% of SC/ST population	10	More than 40 % (10)	20 to 40 % (5)	Less than 20% (3)	
iii.	Actual wages	5	Actual wages are significantly lower than minimum wages (5)	Actual wages are equal to or higher than minimum wages (0)		
iv.	% of small and marginal farmers	10	More than 80 % (10)	50 to 80 % (5)	Less than 50% (3)	
v.	Ground water status	5	Over exploited (5)	Critical (3)	Sub Critical (2)	Safe (0)
vi.	Moisture index/ DPAP/DDP block	15	-66.7 & below (15) DDP block	-33.3 to -66.6 (10) DPAP Block	0 to -33.2 (0) Non DPAP/DDP Block	
vii	Area under rain fed agriculture	15	More than 90 % (15)	80 to 90 % (10)	70 to 80 % (5)	Below 70 % (Reject)
viii	Drinking water	10	No source (10)	Problematic village (7.5)	Partially covered (5)	Fully covered(0)
ix	Degraded land	15	High-above 20 % (15)	Medium-10 to 20 % (10)	Low-less than 10 % of TGA (5)	
x	Productivity potential of the land	15	Lands with low production & where productivity can be significantly enhanced with reasonable efforts (15)	Lands with moderate production & where productivity can be enhanced with reasonable efforts (10)	Lands with high production & where productivity can be marginally	

S. No.	Criteria	Maximum Score	Ranges and Scores			
					enhanced with reasonable efforts (5)	
xi	Contiguity to another watershed that has already been developed/treated	10	Contiguous to previously treated watershed & contiguity within the micro-watersheds in the project (10)	Contiguity within the micro-watersheds in the project but non contiguous to previously treated watershed (5)	Neither contiguous to previously treated watershed nor contiguity within the micro-watersheds in the project (0)	
xii	Cluster approach in the plains (More than one contiguous micro-watersheds in the project)	15	Above 6 micro-watersheds in cluster (15)	4 to 6 micro-watersheds in cluster (10)	2 to 4 micro-watersheds in cluster (5)	
xiii	Cluster approach in the hilly tract (More than one contiguous micro-watersheds in the project)	15	Above 5 micro-watersheds in cluster (15)	3 to 5 micro-watersheds in cluster (10)	2 to 3 micro-watersheds in cluster (5)	
	Total	**150**	**150**	**93**	**37**	**2.5**

Based on above criteria and weightage of 80 concerning these thirteen parameters, a composite ranking was given to Kharkhara Watershed (IWMP VI) project as given in **Table- 3.**

The total numbers of families under BPL are less than the total number of households in the village. Hence a score of 5 was allotted. Rainfed agriculture is more and more than 80 percent and more than 50 % farmers are small and marginal. So the scoring is done 5. The project area comes under Arravalli range and Sahibi basin of Haryana, has no assured irrigation facility, erratic rainfall, deep, poor quality and less ground water discharge, hence the ground water status score is 5. The percentage of schedule castes in this watershed is about 30 percent of the total population, hence 5 score was allotted. Due to high percentage of the poor population i.e. about 70 percent thus the scope of poverty index is 5. More than 60 percent of the farmers are small and marginal in nature. Hence a composite rank of 5 is allotted. With all the parameters taken together gives the watershed score to be 80.

Table- 3: Weightage of the Project

1	2	3	4	5	6	7	8												
Sr. No.	District	Name of the project	No. of micro-water-sheds proposed to be covered	Proposed Area for Development	Type of project (Hilly/ Desert/ Others)	Proposed cost (Rs. In Lakh)	Weightage under the criteria												
							i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	Total

1.	Rewari	Kharkhara watershed (IWMP VI)	6	3420	others	410.40	5	5	0	5	5	10	10	5	5	10	5	10	0	80

Table 4: Watershed Information

Name of the Project	No. of Micro-Watersheds to be Treated	Watershed codes	Watershed regime/type/order
Kharkhara Watershed (IWMP VI)	6	2C5G1q1, 2C5G1p3, 2C5G1p4, 2C5H2a1, 2C5G6q2, 2C5G6q6	Others

2.3 OTHER ONGOING DEVELOPMENT PROJECTS / SCHEMES IN THE PROJECT VILLAGES

These villages being backward have been on top priority in number of developmental projects. These programmes are Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Total Sanitation Campaign (TSC), Swarnajaynti Gram Swarojgar Yogna (SGSY) and Indira Awas Yojana (IAY), NWDPRA. The programmes that are active in this area are tabulated in **Table 5.**

Table 5. Ongoing Developmental Programs in the Project Area

S. No.	Name of the Program /Project	Name of Micro watersheds	Sponsoring agency	Objective	Estimated number of beneficiaries for year 2013-14 (Job card issued)
1	MGNREGA	Kharkhara	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of village.	123
2	MGNREGA	Malpura	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of village.	219
3	MGNREGA	Garhi alawalpur	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of village.	106
4	MGNREGA	Khijuri	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of village.	196
5	MGNREGA	Jeetpura	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of village.	132
6	MGNREGA	Majra Sheoraj	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of village.	152

The District Rural Development Agency has undertaken various schemes under watershed development programme and the status is presented in **Table 6.**

Table 6: Previous Watershed Programme in the Project Area (if any)

Watershed Area Development Treated/Sanctioned				
1	2	3	4	5

S. No	Names of District	Total micro watersheds in the District		Micro- watersheds covered so far						Net watersheds to be covered	
				Deptt. of Land Resources		Other Ministries/ Deptt.		Total watersheds covered			
				Pre- IWMP projects (DPAP+DDP+IWDP)		Any other watershed project					
		No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)
1	Rewari	402	150678	115	57500	15 (EAS)	7500	130 (221 villages)	65000	181	85678

CHAPTER – 3

BASIC INFORMATION OF THE PROJECT AREA

GEOGRAPHY AND GEOHYDROLOGY

Kharkhara Watershed (IWMP VI) falls in Rewari Block of District Rewari. The area is occupied by Indo- Gangetic alluvium plains and area is traversed and drained by Sahibi river. Physiographically, the area is divided Sahibi Basin and submergence of masani bairaj. The area of watershed lies in between 28˚09'15''to 28˚15'20'' N Latitude & 76˚38'55'' to 76˚50'15'' east longitude with general elevation varies between 235- 250 m (google earth maps) above mean sea level MSL. The average rainfall of district is 702mm. About 80 percent of its annual rainfall is received in the month of July to September. Intensity of rainfall is scattered and erratic in this area, water retention capacity is very low, and so area suffers of drought conditions in alternative years. The Contour and Drainage map is presented in Annexure II.

3.1 LAND USE PATTERN

The village wise land use pattern is tabulated in **Table-1.** Land use map is shown in Annexure-III.

Table. 1 Land use pattern of Kharkhara Watershed (IWMP VI)

Sr. No.	Name of Micro Watershed With Code	Name of Villages	Geographical Area in (ha)	Treatable area of the village(ha)	Land under agriculture use (ha)	Rain fed area (ha)	Wasteland	
							Cultivable	Non-Cultivable
1	Kharkhara (2C5G1q1)	Kharkhara (part)	375	318	205	148	55	115
		Alwalpur (part)	302	235	279	212	0	23

Sr. No.	Name of Micro Watershed With Code	Name of Villages	Geographical Area in (ha)	Treatable area of the village(ha)	Land under agriculture use (ha)	Rain fed area (ha)	Wasteland	
							Cultivable	Non-Cultivable
2	Malpura (2C5G1p3)	Malpura (part)	301	256	187	142	12	102
		Kapriwas (part)	225	182	161	118	0	64
		Joniawas (part)	125	100	87	62	0	38
3	Garhi alawalpur (2C5G1p4)	Garhi Alawalpur	301	260	279	238	**0**	22
		Maheshwari	324	290	283	249	0	41
4	Khijuri (2C5H2a1)	Khijuri (part)	351	268	306	223	0	45
		Nikhri (part)	245	213	110	78	0	135
		Niganiawas	213	190	122	99	1	90
5	Jeetpura (2C5G6q2)	Jeetpura	303	285	303	285	0	0
		Masani	225	221	180	176	**8**	**37**
		Alamgirpur (part)	315	257	265	207	15	35
6	Majra Sheoraj (2C5G6q6)	Majra Sheoraj	212	201	186	175	0	26
		Majra Gurdass	152	144	131	123	0	21
Grand Total			**3969**	**3420**	**3084**	**2535**	**91**	**794**

(Source – District Census Handbook, 2001 Rewari)

3.2 SOIL AND TOPOGRAPHY

The soils of Kharkhara Watershed are shallow to deep, loamy skeletal, typic ustorthent on/ along hillocks. The soils are very deep, sandy to coarse loamy, typic ustipssamant/ torripssammant, typic ustifluvent, typic haplustepts and typic haplocambids in the majority area. The topography of the area ranges from level to nearly level except on/ along hillocks. Soils are subject to susceptible to moderate to severe water and wind erosion. The slope ranges from 0.5 to 3% with gentle slope on/ along hillocks. In some low lying area small saline patches observed. Slope map is presented in Annexure IV.

Table 2. Soil type and Topography

Sr. No.	Name of Micro Watersheds	Code	Geographical area (ha)	Major Soil types	Topography
1	Kharkhara	2C5G1q1	677	Sandy to coarse loamy	Level to nearly level
2	Malpura	2C5G1p3	651	Loamy skeletal and sandy to coarse loamy	Level to gentle
3	Garhi alawalpur	2C5G1p4	625	Sandy to coarse loamy	Level to nearly level
4	Khijuri	2C5H2a1	809	Sandy to coarse loamy	Level to nearly level
5	Jeetpura	2C5G6q2	843	Sandy to coarse loamy	Level to nearly level
6	Majra Sheoraj	2C5G6q6	364	Sandy to coarse loamy	Level to nearly level
	Total		**3969**		

Source: - Department of Agriculture, Haryana

3.2.1 Flood and Drought Condition

There have been incidences of flood and drought as well in watershed villages. The data collected from the revenue department reveals the instances of flood on an average once in 5- 8 years in micro- watersheds Kharkhara, Khijuri, Jeetpura and Majra Sheoraj and drought every or alternative Year. The absence of assured irrigation and drought resulted in low to very low in crop yield.

Table 3. Flood and Drought condition

S.No.	Name of Micro- watersheds	Flood Incidence	Drought Incidence
1	Kharkhara	1 time in 5-8 Years	Every or Alternative Year
2	Malpura	Nil	Every or Alternative Year
3	Garhi alawalpur	Nil	Every or Alternative Year
4	Khijuri	1 time in 5-8 Years	Every or Alternative Year
5	Jeetpura	1 time in 5-8 Years	Every or Alternative Year
6	Majra Sheoraj	1 time in 5-8 Years	Every or Alternative Year

3.3 SOILS

3.3.1 Soil Erosion

In the identified six micro watersheds in fifteen villages, it is observed that due to thin vegetative cover to increase the loss of surface soil in the watershed area. This results in degradation of agricultural land and low organic matter contents. The organic carbon content in areas comparatively low to restrict average in agriculture production and degradation of soil physical and chemical properties. Average annual rainfall 702mm of the district falling under these watersheds during heavy storms in rainy season the top soils washed away in the form of runoff which also carries valuable top soil (sheet). Soil erosion in respect of sheet is quite high. Majority of the watershed Community are dependent on rainfed agriculture due to lack of assured irrigation facilities and unsafe ground water conditions. Agriculture suffers due to area being rain fed and due to erratic rains in the region, the unplanned industrial intervention and unscientific/illegal mining resulting in further deterioration of socio economic conditions of community.

3.3.2 Soil Salinity/Alkalinity (Salinity ingress):

There is low to moderate soil salinity in the Project and pH is normal and within the limits of 7.05 to 8.15.

Based on the soil samples analysis and reports the village wise distribution of pH is tabulated and shown in Table. 4.

Table 4. Soil pH and Salinity

S.No.	Name of Micro Watersheds	Soil pH	Type of salinity
1	Kharkhara	7.10- 7.86	Low to Moderate
2	Malpura	7.05 – 8.05	Low to Moderate
3	Garhi alawalpur	7.11- 8.15	Low to Moderate
4	Khijuri	7.12- 8.03	Low to Moderate
5	Jeetpura	7.15- 8.10	Low to Moderate
6	Majra Sheoraj	7.25- 8.11	Low to Moderate

3.3.3 SOIL CLASSIFICATION

Major soil associations fall in the watershed are seven units. The detailed description of all soil associations are given below. The Soil map is presented in **Annexure V.** The fertility status of the project area, available nitrogen is low and available phosphorus is low to medium. However, the available potash varies from medium to high. The fertility status map of the project area is exhibited in **Annexure-VI**.

Soil Mapping Unit- 2 (Ruppu Saroi Soil Association)

The Ruppu Saroi soil series is only series in this soil association. The soil series is excessively drained, Sandy loam to Loam, Loamy Skeletal Mixed hyperthermic Lithic Ustorthents. The soil series is non calcareous, shallow to deep, pH 7.15- 7.45, dark yellowish brown to yellowish brown in colour (10YR 4/4-10YR 5/4) developed on Steep to Very steep slope in Aravali Hills with ''Rock out crops''.

Soil Mapping Unit- 4 (Khol- Bohka Soil Association)

The Khol soil series is dominated in this soil association and associated soil series is Bohka soil series. The dominant soils are Excessive to Well drained, Sandy, Sandy Mixed hyperthermic Typic Torripsamments, 1st associate soil series is well drained, Loamy sand to Sandy loam, Coarse loamy non-calcareous Calcareous Mixed hyperthermic Typic Haplocambids, Khol soil series is strongly calcareous, very deep, pH 8.00- 8.70, pale brown to yellowish brown in colour (10YR 6/3-10YR 5/4) developed on Unstable sand dunes/Undulating terrain and Bohka soil series is slightly calcareous, very deep, pH 7.70-8.20, brown to pale brown in colour (10YR 4/3-10YR 6/3) developed on Gently sloping/Leveled plain with Hard layer of calcium carbonate concretions from 160cm depth.

Soil Mapping Unit- 13 (Bharawas- Sulkha Soil Association)

The Bharawas soil series is dominated in this soil association and associated soil series is Sulkha soil series. The dominant soil is well drained, Sandy loam to Silty loam, Coarse loamy Mixed hyperthermic Typic Haplocambids, 1st associate soil series is excessively drained, loamy sand, Sandy Mixed hyperthermic Typic Torripsamments, Bharawas soil series is non calcareous, very deep, pH 8.50-8.70, dark brown to brown in colour (10YR 4/3-10YR 5/4) developed on Slope of undulating Aeolian plains/Aeolian sand under arid climate with Many calcium carbonate concretions in B and C horizon and Sulkha soil series is moderately strong calcareous, very deep, pH 8.40-8.60, yellowish brown in colour (10YR 5/4-10YR 5/8) developed on Gentle sloping Aeolian plains/Aeolian sand under arid climate with Common medium hard concretions of calcium carbonate in C- horizon.

Soil Mapping Unit- 14 (Bawal - Rewari Soil Association)

The Bawal soil series is dominated in this soil association and associated soil series is Rewari soil series. The dominant soil is well drained, Loamy sand to Sandy loam, Sandy Mixed hyperthermic Typic Ustipsamments, 1st associate soil series is well drained, Sandy loam to Loamy sand to Sandy Clay loam, Coarse loamy Mixed hyperthermic Typic Ustifluvents, Bawal soil series is non calcareous, very deep, pH 8.10-8.21, yellowish brown in colour (10YR 5/4-10YR 5/6) developed on Fluvio-aeolian plains/old dry riverbeds and Rewari soil series is non calcareous, very deep, pH 7.70-7.80, dark brown to yellowish brown in colour (10YR 3/3-10YR 5/6) developed on Gently sloping Fluvio-Aeolian plain/Alluvium nearer to old river channels

Soil Mapping Unit- 15 (Rewari- Bawal Soil Association)

The Rewari soil series is dominated in this soil association and associated soil series is Bawal soil series. The dominant soil is well drained, Sandy loam to Loamy sand to Sandy Clay loam, Coarse loamy Mixed hyperthermic Typic Ustifluvents, 1st associate soil series is well drained, Loamy sand to Sandy loam, Sandy Mixed hyperthermic Typic Ustipsamments, Rewari soil series is non calcareous, very deep, pH 7.70-7.80, dark brown to yellowish brown in colour (10YR 3/3-10YR 5/6) developed on Gently sloping Fluvio-Aeolian plain/Alluvium nearer to old river channels and Bawal soil series is non calcareous, very deep, pH 8.10-8.21, yellowish brown in colour (10YR 5/4-10YR 5/6) developed on Fluvio-aeolian plains/old dry riverbeds.

Soil Mapping Unit- 16 (Mundsa- Dharuhera Soil Association)

The Mundsa soil series is dominated in this soil association and associated soil series is Dharuhera soil series. The dominant soil is well drained, Loamy sand to Sandy loam, Coarse loamy Mixed hyperthermic Typic Haplustepts, 1st associate soil series is well drained, Sandy clay loam to sandy Loam, Fine loamy Mixed hyperthermic Typic Haplustepts, Mundsa soil series is non calcareous, very deep, pH 8.40-9.20, dark yellowish brown in colour (10YR 4/4- 10YR 4/6) developed on Alluvium on very gently sloping Fluvio-Aeolian plain and Dharuhera soil series is non calcareous, very deep, pH 8.20-8.60, dark brown to yellowish brown in colour (10YR 4/3-10YR 5/6) developed on Very gently sloping topography/Fluvio-aeolian plains over alluvium.

Soil Mapping Unit- 17 (Bawal Soil Association)

The Bawal soil series is only series in this soil association. The soil series is well drained, Loamy sand to Sandy loam, Sandy Mixed hyperthermic Typic Ustipsamments. The soil series is non calcareous, very deep, pH 8.10-8.21, yellowish brown in colour (10YR 5/4-10YR 5/6) developed on Fluvio-aeolian plains/old dry riverbeds.

(Source: Received from HARSAC on 1: 50000 scale)

3.3.4 Land Capability Classification

It is an interpretative grouping of soils based on inherent soil characteristics, external land features and environmental factors that limit the use of land. As per land capability classification, class 1 to class IV land is suited to agriculture. Classes V to VIII are not suitable for agriculture. These are used for pastures, forestry, and wildlife and recreation purposes and other industrial and township. Depending upon the degree of limitation and the kind of problems involved in management of soils, the land capability sub classes were indicated by adding the following limitation symbols to the capability classes:

1. Erosion and runoff (e) including risk of erosion and great erosion damage.
2. Excess of water (w) including wetness, high water table, and problem of drainage.
3. Root zone limitation (s) including shallow depth, low water holding capacity, salinity or alkalinity/rockiness.
4. Climate limitation (c).

The soils of the selected Watersheds have been grouped into three land capability classes. A brief description of each capability sub class is given as under and the **Land capability map is exhibited in Annexure-VII.**

Land capability subclass III e2s2

These soils are very deep, light to coarse loamy/ fine loamy texture located on level to nearly level slope. These soils are well drained, moderately permeable, moderate water holding capacity and moderate to severe erosion hazard.

Following recommendations are suggested for the economic use of this sub-class:

1. Land leveling should be done at 50% subsidy, because farmers are not economically capable to bear the rate of land leveling.
2. Engineering measures like Percolation Embankments and other related measures are to be under taken.
3. Agronomic measures like Dry farming, strip& Mixed cropping with other soil conservation measures like agro forestry and rainfed horticulture are recommended.
4. Green manuring should be promoted for increase physical and chemical properties of soil.
5. Masonry structure (outlet) should be constructed with field bandhs and percolation embankments for rills control and insitu moisture conservation.
6. Strengthening of old abandoned water courses.
7. Provide water storage tanks for storage of excess canal water for using supplementary irrigation during lean period.

Land capability subclass IV e3s3

These soils are very deep, light textured soils nearly level lands. The water holding capacity is poor to very poor and the water erosion hazard is moderate to severe. The wind erosion is also a main cause to create undulating topography.

Following recommendations are suggested for the economic use of this sub-class:

1. Special soil conservation measures should be adopted to check water erosion and increase ground water recharge; soils should be provided permanent vegetation (Agro-forestry) cover to check further deterioration of soils.
2. Soils would be cultivated in suitable crop rotation with adopting dry farming techniques.
3. Masonry structure should be constructed in field bunds and percolation embankment.
4. Land leveling should be done at 50% subsidy, because formers are not economically capable to bear the rate of land leveling.
5. Construction of percolation ponds and embankments for increasing ground water recharge.
6. Construction of small earthen embankments with vegetative support for Sand dunes stabilization.
7. Strengthening of old abandoned water courses.
8. Provide water storage tanks for storage of excess canal water for using supplementary irrigation during lean period.

Land capability subclass VI es

These soils are shallow to deep developed on gentle to steep slope, light to medium skeletal structure textured soils, complex sloping, moderate to severely eroded lands. The water holding capacity is very poor and the water erosion hazard is moderate to severe.

Following recommendations are suggested for the economic use of this sub-class:

1. Specific and special soil conservation measures should be adopted to check water erosion adopting land development majors soils should be provided permanent vegetation (A forestation) and rainfed horticulture cover to check further deterioration of soils.
2. Restrict to unscientific mining in the hilly area.

3. Soils would be suitable for pasture development; forestation and other major water harvesting structures (Percolation pond).

3.3.5 Climatic Conditions

The average rainfall of the district is 702 mm (during the past 19 years data). The highest rainfall is 1138 mm during the year 2008. The uneven rainfall distribution is leading to run off soil every year to the steams/nalas, rivulets and depressed area of the Kharkhara Watershed (IWMP VI). The year wise rainfall from 1994 to 2012 is presented in **Table.5**

Table-5. Rainfall during the years 1994-12

S.No.	Year	Rainfall (in mm)
1	1994	791
2	1995	1087
3	1996	1064
4	1997	589
5	1998	953
6	1999	718
7	2000	479
8	2001	665
9	2002	408
10	2003	1024
11	2004	527
12	2005	889
13	2006	557

14	2007	575
15	2008	1138
16	2009	428
17	2010	625
18	2011	508
19	2012	323
	Average Rainfall	**702**

(Source: - Deputy Director Agriculture, Rewari)

The mean maximum temperature is 41.8˚ C (May and June) and mean minimum is 5.6˚ C (January) of the district.

3.3.6 Physiography and Reliefs

Physiographically, the area slope falls South to North. The general Elevation in the area belongs to recent and old alluvium plains with sand overburden in pockets to make small hummocks in the area. 235-250 m above mean sea level (google earth maps). The elevation range and percentage slope distribution has been presented in **Table 6.**

Table 6. Physiography and Relief

Project Name	Elevation (MSL)	Slope Range (%)	Major Streams
Kharkhara Watershed (IWMP VI)	235- 250	0.5 to 3 and above	Sahibi

3.4 LAND AND AGRICULTURE

The land holding pattern of the villages under Kharkhara Watershed shows that the majority of the land holding is below 5.0 ha. The lack of assured irrigation source has forced the majority of the small farmers and landless labours of Watershed to migrate from

village to ensure there, employment and livelihood to nearest Industrial towns is Delhi, Gurgaon, Dharuhera, Rewari and Bhiwadi (Rajasthan). This affects directly the demographic profile of the villages.

The major crops Bajra, Gawar, green fodder and pulses in Kharif under rain fed conditions. The major crops during Rabi wheat, mustard, gram, green fodder and seasonal vegetables in rain fed and irrigated conditions. The soil and water conservation measures such as Engineering like Water Conveyance System, UGP Line, Dug out Pond, Small Earthen Embankment with vegetative support, Earthen Embankment with pacca outlet, Ramp/ Ghat Inlet and Outlet, Roof top rain water recharge structures etc. The project would help the farmers to take crop production which will enhance the net production value. The following plants are commonly observed in the Project Area. The natural vegetation in the project area is exhibited in **Table 7.**

Table 7. NATURAL VEGETATION

Sr. No.	Trees	Fruits	Grasses and Shurbs
1	Babool & Australian Babool	Pomegranate	Saccharum munja
2	Black Siris	Ber	Bhroot
3	Jal	Lemon	Jharberi
4	Shisham	Guava	Ker (Tint)
5	Neem	Jamun	
6	Khejri	Amla	
7	Pipal	Papaya	
8	Eucalyptus		

3.4.1 Land Ownership Details

The Caste wise land owned (in ha) is Tabulated in Table 8.

Table 8:- Land Ownership Details

GENERAL	OBC	SC	ST	Total owners
1448	2727	08	-----	4183

3.4.2 AGRICULTURE/PATTERN

Table 9. Agriculture/ Pattern

Sr. No.	Name of Micro Watersheds	Village	Land under agriculture use (ha)	Net Sown area (ha)	
				One time	Two times
1	Kharkhara	Kharkhara	205	167	135
		Alwalpur	279	215	181
2	Malpura	Malpura	187	149	121
		Kapriwas	161	125	115
		Joniawas	87	67	57
3	Garhi alawalpur	Garhi Alawalpur	279	205	191
		Maheshwari	283	209	193
4	Khijuri	Khijuri	306	241	203
		Nikhri	110	86	72

Sr. No.	Name of Micro Watersheds	Village	Land under agriculture use (ha)	Net Sown area (ha)	
				One time	Two times
		Niganiawas	122	92	82
5	Jeetpura	Jeetpura	303	237	219
		Masani	180	141	128
		Alamgirpur	265	205	185
6	Majra Sheoraj	Majra Sheoraj	186	148	129
		Majra Gurdass	131	102	94
		Total	**3084**	**2389**	**2105**

(Source: Department of Agriculture, Haryana)

3.4.3 IRRIGATION

Lack of Assured Irrigation Facilities

The area falls under acute water stress category. The present source of irrigation is ground water where the area is underlain by fresh to marginal water quality. The remaining cultivable area is under rainfed agriculture. The present source of irrigation in the watershed has been tabulated in **Table 10.**

Table 10. Irrigation Pattern.

S.No	Name of Micro Watersheds	Name of Villages	Source 4: Groundwater (Tube wells)	
			Availability months	Net area (ha)
1	Kharkhara	Kharkhara	July to June	286
		Alwalpur	July to June	301

S.No	Name of Micro Watersheds	Name of Villages	Source 4: Groundwater (Tube wells)	
			Availability months	Net area (ha)
2	Malpura	Malpura	July to June	375
		Kapriwas	July to June	257
		Joniawas	July to June	119
3	Garhi alawalpur	Garhi Alawalpur	July to June	279
		Maheshwari	July to June	283
4	Khijuri	Khijuri	July to June	241
		Nikhri	July to June	140
		Niganiawas	July to June	122
5	Jeetpura	Jeetpura	July to June	218
		Masani	July to June	166
		Alamgirpur	July to June	412
6	Majra Sheoraj	Majra Sheoraj	July to June	145
		Majra Gurdass	July to June	126
		Total		**3470**

(Source – District Census Handbook Rewari**)**

3.4.4 CROPPING PATTERN (crop details)

Cropping Pattern

The village wise area production and productivity of each crop is tabulated in **Table 11 A and 11 B** (Rabi and Kharif)**.**

Table 11 A. Crop Details (Rabi)

S. No.	Name of Micro Watersheds	Village	Rabi crops(Wheat)				(Mustard)				(Barley)		
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.
1	Kharkhara	Kharkhara	55	82500	1500	Yes	40	48000	1200	Yes	7	8400	1200
		Alwalpur	101	153520	1520	Yes	39	40950	1050	Yes	8	10400	1300
2	Malpura	Malpura	71	111825	1575	Yes	16	17632	1102	Yes	4	4740	1185
		Kapriwas	65	103675	1595	Yes	31	32612	1052	Yes	2	2500	1250
		Joniawas	28	42000	1500	Yes	18	21150	1175	Yes	2	2400	1200
3	Garhi alawalpur	Garhi Alawalpur	83	131555	1585	Yes	74	94276	1274	Yes	10	12150	1215
		Maheshwari	55	87725	1595	Yes	70	80500	1150	Yes	-	-	-
4	Khijuri	Khijuri	60	93000	1550	Yes	102	137700	1350	Yes	-	-	-
		Nikhri	39	58500	1500	Yes	21	24675	1175	Yes	-	-	-
		Niganiawas	31	51925	1675	Yes	24	31800	1325	Yes	2	2550	1275
5	Jeetpura	Jeetpura	68	125800	1850	Yes	104	143000	1375	Yes	3	3750	1250

S. No.	Name of Micro Watersheds	Village	Rabi crops(Wheat)				(Mustard)				(Barley)		
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.
		Masani	52	93340	1795	Yes	51	65535	1285	Yes	-	-	-
		Alamgirpur	105	165270	1574	Yes	34	46716	1374	Yes	2	2550	1275
6	Majra Sheoraj	Majra Sheoraj	42	66150	1575	Yes	58	62350	1075	Yes	-	-	-
		Majra Gurdass	19	28880	1520	Yes	46	48300	1050	Yes	-	-	-
		Grand Total	**874**				**728**				**40**		

Table 11 B. Crop Details (Kharif)

S. No.	Name of Micro Watersheds	Village	(Bajra)				(Gwar)		
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.
1	Kharkhara	Kharkhara	141	324300	2300	Yes	1	1950	1950
		Alwalpur	165	354750	2150	Yes	1	1745	1745
2	Malpura	Malpura	107	235400	2200	Yes	-	-	-
		Kapriwas	84	182700	2175	Yes	-	-	-
		Joniawas	42	90300	2150	Yes	2	3904	1952
3	Garhi	Garhi Alawalpur	136	292400	2150	Yes	13	22763	1751

S. No.	Name of Micro Watersheds	Village	(Bajra)				(Gwar)		
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.
	alawalpur	Maheshwari	121	263175	2175	Yes	3	5847	1949
4	Khijuri	Khijuri	172	460100	2675	Yes	2	3500	1750
		Nikhri	64	137600	2150	Yes	4	7000	1750
		Niganiawas	65	169000	2600	Yes	2	3900	1950
5	Jeetpura	Jeetpura	125	335625	2685	Yes	8	13960	1745
		Masani	91	253435	2785	Yes	20	34940	1747
		Alamgirpur	152	406600	2675	Yes	10	19500	1950
6	Majra Sheoraj	Majra Sheoraj	43	98255	2285	Yes	-	-	-
		Majra Gurdass	53	132235	2495	Yes	3	5253	1751
		Grand Total	**1561**				**69**		

3.4.5 Livestock

Farmers in these villages have already been keeping the milch animals; mostly buffalos. The milk production of these animals (local breeds) is low (**Table 12)**. There is a need for the improvement of the local breed through artificial insemination, proper vaccination and nutritive feed. Introduction of cross breed cows and murrah buffalo with better milk production will popularize dairy farming in the area. Also, the farmyard manure procured from these animals will help improve the soil health.

Table 12. Village Wise Distribution of Milk Production in Kharkhara Watershed (IWMP VI)

S. No	Name of Micro Watersheds	Villages	Buffalo(*Lit/per day/annum) for 6 months	Cow(*lit/per day/annum) for 6 months	Sheep	Goat	Camel
1	Kharkhara	Kharkhara	998/7984/1437120 (Lit/annum)	515/2832.5/509850 (Lit/annum)	-	36	-
		Alwalpur	444/3552/639360 (Lit/annum)	150/825/148500 (Lit/annum)	-	9	-
2	Malpura	Malpura	349/2792/502560 (Lit/annum)	141/775.5/139590 (Lit/annum)	-	-	-
		Kapriwas	290/2320/417600 (Lit/annum)	104/572/102960 (Lit/annum)	-	20	-
		Joniawas	349/2792/502560 (Lit/annum)	125/687.5/123750 (Lit/annum)	-	28	-
3	Garhi alawalpur	Garhi Alawalpur	422/3376/607680 (Lit/annum)	158/869/156420 (Lit/annum)	-	81	-
		Maheshwari	459/3672/660960 (Lit/annum)	153/841.5/151470 (Lit/annum)	-	-	-
4	Khijuri	Khijuri	0	58/319/57420 (Lit/annum)	-	46	3
		Nikhri	437/3496/629280 (Lit/annum)	192/1056/190080 (Lit/annum)	204	33	2
		Niganiawas	395/3160/568800 (Lit/annum)	43/236.5/42570 (Lit/annum)	-	-	-
5	Jeetpura	Jeetpura	349/2792/502560 (Lit/annum)	68/374/67320 (Lit/annum)	-	27	1
		Masani	419/3352/603360 (Lit/annum)	73/401.5/72270 (Lit/annum)	116	88	2
		Alamgirpur	262/2096/377280 (Lit/annum)	0	-	-	-
6	Majra Sheoraj	Majra Sheoraj	242/1936/348480 (Lit/annum)	226/1243/223740 (Lit/annum)	-	25	-
		Majra Gurdass	214/1712/308160 (Lit/annum)	49/269.5/48510 (Lit/annum)	41	88	3

(Source: Animal Husbandry, Rewari)

***Average milk Yield of Buffalo 7.5 – 8.5 lit/ day and Cow Average milk Yield 3.5- 4.5 lit/ day**

3.4.6 Ground Water Concern

a) Depth to Water

Ground Water Cell of Haryana has fixed hydrograph station scattered in the district whose monitoring is undertaken during pre and post monsoon season. The water level data has been analyzed for the purpose of ground water studies in the watershed area. The ground water behavior in the watershed reveals the variation of depth to water level from 8.2 to 32.5m below ground level. In Kharkhara, Jeetpura, Khijuri, Garhi Alawalpur and Majra Sheoraj (part), the water table is 10- 20m below ground level. Small portion in micro watershed Malpura lies in the depth range of 20-30m and 30-40m in northern side of the watershed. Pocket of micro watershed Majra Sheoraj falls in shallow water table conditions between 3-10m. The depth to water level follows the topography of the area. The village wise water level data has been tabulated in **Table 13.** Depth to water level map has been prepared and presented in the **Annexure VIII.**

Table 13. Village Wise Depth to Water Level of Kharkhara Watershed (IWMP VI)

S. No.	Name of Micro Watersheds	Name of Villages	Source	Pre- Project level (m)
1	Kharkhara	Kharkhara	Open wells	17.4
		Alwalpur	Open wells	18.4
2	Malpura	Malpura	Open wells	32.5
		Kapriwas	Open wells	25.9
		Joniawas	Open wells	16.9
3	Garhi alawalpur	Garhi Alawalpur	Open wells	17
		Maheshwari	Open wells	17.2

S. No.	Name of Micro Watersheds	Name of Villages	Source	Pre- Project level (m)
4	Khijuri	Khijuri	Open wells	17.1
		Nikhri	Open wells	17.2
		Niganiawas	Open wells	16.9
5	Jeetpura	Jeetpura	Open wells	17
		Masani	Open wells	17
		Alamgirpur	Open wells	16.9
6	Majra Sheoraj	Majra Sheoraj	Open wells	8.2
		Majra Gurdass	Open wells	16.9

The source of drinking water supply is through the tube wells as well as canal network in the area. The water quality distribution of the watershed reveals the area of Malpura, Garhi Alawalpur and Kharkhara micro watershed is underlain by fresh ground water quality. The remaining area of the watershed is underlain by marginal water quality except as mall pocket of Khijuri and Majra Sheoraj under brackish quality of water. The water quality map of the area is presented in **Annexure-IX**. The drinking water supply is available thought the year but shortage in villages during May and June where the supply is augmented by tankers. The department of Public Health Engineering is responsible for the water supply for drinking purpose.

b) Water table fluctuation

The long-term water levels trend indicates average fall varies between 0.38 to 1.15 m/year except in a small pocket underlain by saline water.

The seasonal fluctuation varies from 2.38 to (-) 0.38 m in the area. (CGWB)

c) Rain water harvesting and Recharging

The rapid growth of rural population leads to escalation of water demand. Conservation of ground water is important because it takes years to be replenished. In areas where ground water is used, care must be taken to replenish with rainwater.

It has been proposed to make rainwater-harvesting by construction of water harvesting structures. The provision of this has been provided in the project proposal.

3.4.7 Details Of Common Property Resources: The department of panchayat has maintained the record of common property resources of area under various institutions. The data has been taken has been collected DDPO, Rewari. The details of common property resource in Kharkhara Watershed (IWMP VI) are tabulated in **Table 14.**

Table 14. Detail of Common Property Resources

Name of the Project	CPR Particulars	Total Area, ha (Area owned / in possession of)				Area available for treatment (ha)			
Kharkhara Watershed (IWMP VI)		Pvt. Person	Govt.	PRI	Any Other	Pvt. Person	Govt.	PRI	Any Other
	Waste land	---	---	793	---	---	---	94	---
	Pasture	---	---	61	---	---	---	61	---
	Orchards	16.25	---	---	---	16.25	---	---	---
	Village wood lot	---	---	58	---	---	---	58	---
	Forest	---	---	85	---	---	---	85	---
	Village ponds, lake	---	---	27	---	---	---	27	---

	Community Buildings	---	70	---	---	---	70	---	---
	Weekly Mkts	---	---	---	---	---	---	---	---
	Permanent Mkts	---	---	---	---	---	---	---	---
	Temples/place of worship	3	---	19	---	3	---	19	---
	Others	---	---	---	---	---	---	---	---

3.5 SOCIO ECONOMIC AND LITERACY PROFILE

Land holdings: The area under the project is cultivated by small and marginal farmers. Almost 70 percent of the farmers fall under this category. These small land holdings are scattered over 2-3 smaller pieces of land.

Poor economic conditions of farmers: The general socio economic condition of the farmers in this area are quite poor. They cannot use necessary agriculture inputs in a timely fashion due to financial constraints which adversely affects the crop yield.

Village wise household, total population and schedule caste population has been worked out from the census book and is tabulated in **table 15.** The literacy rate of micro watershed wise distribution is also exhibited in **Table 16**.

3.5.1 Demographic Status

Table 15. Demographic Status/ Population Pattern

S. No.	Name of the Micro watersheds	Name of villages	Total no. of houses	Total Population			SC			
				Male	Female	Total	Male	Female	Total	%age
1	Kharkhara	Kharkhara	690	1815	1661	3476	343	301	644	18

S. No.	Name of the Micro watersheds	Name of villages	Total no. of houses	Total Population			SC			
				Male	Female	Total	Male	Female	Total	%age
		Alwalpur	287	810	698	1508	128	114	242	16
2	Malpura	Malpura	598	1400	1173	2573	316	296	612	24
		Kapriwas	629	1589	1069	2658	308	260	568	21
		Joniawas	206	536	511	1047	89	93	182	17
3	Garhi alawalpur	Garhi Alawalpur	429	1179	991	2170	226	189	415	19
		Maheshwari	2127	5095	4085	9180	613	537	1150	12
4	Khijuri	Khijuri	312	868	811	1679	209	203	412	24
		Nikhri	250	652	603	1255	197	178	375	30
		Niganiawas	145	444	415	859	47	43	90	10
5	Jeetpura	Jeetpura	229	619	540	1159	103	96	199	17
		Masani	280	760	685	1445	213	186	399	27
		Alamgirpur	245	723	649	1372	356	318	674	49
6	Majra Sheoraj	Majra Sheoraj	246	661	641	1302	157	164	321	25
		Majra Gurdass	188	468	416	884	114	91	205	23
			6861	**17619**	**14948**	**32567**	**3419**	**3069**	**6488**	**20**

(Source- District Census 2011)

Table16. Village wise Literacy Rate in Kharkhara Watershed (IWMP VI)

S.No.	Name of the Micro watersheds	Name of villages	Total population	Literacy					
				Total Literates	% age	Male	% age	Female	% age
1	Kharkhara	Kharkhara	3476	2453	70	1435	58	1018	42
		Alwalpur	1508	969	64	594	61	375	39
2	Malpura	Malpura	2573	1928	75	1109	57	819	43
		Kapriwas	2658	1972	74	1285	65	687	35
		Joniawas	1047	752	72	442	59	310	41
3	Garhi alawalpur	Garhi Alawalpur	2170	1494	69	916	61	578	39
		Maheshwari	9180	6582	72	4007	61	2575	39
4	Khijuri	Khijuri	1679	1230	732	708	57	522	43
		Nikhri	1255	911	72	532	58	379	42
		Niganiawas	859	596	69	350	59	246	41
5	Jeetpura	Jeetpura	1159	873	75	514	59	359	41
		Masani	1445	991	68	599	60	392	40
		Alamgirpur	1372	940	68	565	60	375	40
6	Majra Sheoraj	Majra Sheoraj	1302	913	70	527	58	386	42
		Majra Gurdass	884	667	75	393	59	274	41

			32567	**23271**	**71**	**13976**	**60**	**9295**	**40**

(Source- District Census- 2011)

Table 17. EMPLOYMENT STATUS

S.No.	Name of Micro Watersheds	Name of villages	Schedule caste		Cultivators		Agricultural labourers		Household industry workers		Other workers	
			Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	Kharkhara	Kharkhara	343	301	229	48	19	12	9	4	463	127
		Alwalpur	128	114	136	14	29	10	14	2	128	22
2	Malpura	Malpura	316	296	71	41	7	7	6	0	580	39
		Kapriwas	308	260	84	24	19	3	19	4	839	60
		Joniawas	89	93	70	35	3	5	13	50	144	48
3	Garhi alawalpur	Garhi Alawalpur	226	189	181	101	29	13	5	0	369	92
		Maheshwari	613	537	178	38	31	3	36	3	2389	219
4	Khijuri	Khijuri	209	203	92	63	10	9	12	5	220	47
		Nikhri	197	178	96	5	34	3	1	0	161	92
		Niganiawas	47	43	96	0	8	0	0	0	72	3
5	Jeetpura	Jeetpura	103	96	93	10	2	1	0	0	138	14
		Masani	213	186	93	17	10	2	8	8	229	75
		Alamgirpur	356	318	124	21	62	30	1	0	150	13

6	Majra Sheoraj	Majra Sheoraj	157	164	117	7	0	2	0	1	200	78
		Majra Gurdass	114	91	26	4	22	0	2	2	139	43
		Total	**3419**	**3069**	**1686**	**428**	**285**	**100**	**126**	**79**	**6221**	**972**

Source: Census 2011

3.5.2 MIGRATION PATTERN

The major reason for migration is lack of employment opportunities, small uneconomical holding, and lack of fodder availability in summer etc. The village wise migration, period, reason for migration and probe able income generation has been compiled and shown in **Table 18.**

Table 18. Migration Pattern in Kharkhara Watershed (IWMP VI)

S. No.	Name of Micro Watersheds	Name of villages	Total Population	No. of persons migrating	No. of days per year of migration	Main reason for migration	Income during migration/ month/person
1	Kharkhara	Kharkhara	3476	18	90	Lack of employment opportunity	6500- 10000
		Alwalpur	1508	56	60	Lack of employment opportunity	6500- 10000
2	Malpura	Malpura	2573	10	90	Lack of employment opportunity	6500- 10000
		Kapriwas	2658	14	60	Lack of employment opportunity	6500- 10000
		Joniawas	1047	10	60	Lack of employment opportunity	6500- 10000
3	Garhi alawalpur	Garhi Alawalpur	2170	9	90	Lack of employment opportunity	6500- 10000

S. No.	Name of Micro Watersheds	Name of villages	Total Population	No. of persons migrating	No. of days per year of migration	Main reason for migration	Income during migration/ month/person
		Maheshwari	9180	11	60	Lack of employment opportunity	6500- 10000
4	Khijuri	Khijuri	1679	14	60	Lack of employment opportunity	6500- 10000
		Nikhri	1255	24	90	Lack of employment opportunity	6500- 10000
		Niganiawas	859	6	120	Lack of employment opportunity	6500- 10000
5	Jeetpura	Jeetpura	1159	6	120	Lack of employment opportunity	6500- 10000
		Masani	1445	24	60	Lack of employment opportunity	6500- 10000
		Alamgirpur	1372	7	60	Lack of employment opportunity	6500- 10000
6	Majra Sheoraj	Majra Sheoraj	1302	26	60	Lack of employment opportunity	6500- 10000
		Majra Gurdass	884	21	90	Lack of employment opportunity	6500- 10000

POVERTY: The distribution of the BPL and their percentage is presented in table 19.

Table 19. BPL Pattern

S. No.	Name of Micro watersheds	Name of villages	Total houses	Total Household- BPL	% of BPL HH
1	Kharkhara	Kharkhara	690	177	25
		Alwalpur	287	55	19

S. No.	Name of Micro watersheds	Name of villages	Total houses	Total Household-BPL	% of BPL HH
2	Malpura	Malpura	598	135	22
		Kapriwas	629	97	15
		Joniawas	206	81	39
3	Garhi alawalpur	Garhi Alawalpur	429	60	14
		Maheshwari	2127	181	8
4	Khijuri	Khijuri	312	116	37
		Nikhri	250	85	34
		Niganiawas	145	21	14
5	Jeetpura	Jeetpura	229	40	17
		Masani	280	95	34
		Alamgirpur	245	37	15
6	Majra Sheoraj	Majra Sheoraj	246	24	10
		Majra Gurdass	188	69	37
			6861	**1273**	**18**

(Source: District Administration Rewari, Haryana)

INFRASTRUCTURE DETAILS

All the villages are well connected by pucca road and primary or middle school exists in all villages. Health facilities is available in villages and have easy access to Health Centers. The village wise details of infrastructure are shown in **Table 20** and the facilities/ household assets in the villages under watershed is shown in **Table 21**.

Table 20. Village Infrastructure

S. No.	Name of Micro watersheds	Name of villages	Bank Y/N	Post office Y/N	School Primary/ High/ Sr.Sec	Milk Collection Centre Y/N	Pucca Road to Village Y/N	Health Facility Govt/Private Y/N	Veterinary facility Y/N
1	Kharkhara	Kharkhara	N	Y	Sr. Sec. School	Y	Y	N	N
		Alawalpur	N	N	Middle School	N	Y	Y	N
2	Malpura	Malpura	Y	Y	Primary School	N	Y	N	N
		Kapriwas	Y	Y	Sr. Sec. School	N	Y	Y	NN
		Joniawas	N	N	Primary School	N	Y	N	N
3	Garhi alawalpur	Garhi alawalpur	N	N	Middle School	N	Y	N	N
		Maheshwari	N	Y	Middle School	N	Y	N	N
4	Khijuri	Khijuri	N	N	Middle School	N	Y	N	Y
		Nikhri	N	N	High School	N	Y	Y	N
		Niganiawas	N	N	Primary School	Y	Y	N	N
5	Jeetpura	Jeetpura	N	N	Primary School	N	Y	N	N
		Masani	Y	Y	Sr. Sec. School	N	Y	Y	N
		Alamgirpur	N	N	Primary School	N	Y	N	N
6	Majra sheoraj	Majra sheoraj	N	Y	Sr. Sec. School	N	Y	N	Y
		Majra Gurdass	N	Y	Middle School	N	Y	N	N

FACILITIES/ HOUSEHOLD ASSETS

Table 21. Facilities/ Household assets in Kharkhara Watershed (IWMP VI)

S. No.	Name of micro water sheds	Name of villages	Total no. of Houses	HHs with Safe latrines	HHs with phones		HHs with vehicles		HHs with TV sets	HHs with cooking gas	HHs with drinking water	HHs with fridge
					Landline	Mobile	2 wheelers	4 wheelers				
1	Kharkhara	Kharkhara	690	172	41	345	103	27	110	55	690	37
		Alwalpur	287	71	17	143	43	11	45	22	287	15
2	Malpura	Malpura	598	149	35	299	89	23	95	47	598	32
		Kapriwas	629	157	37	314	94	25	100	50	629	34
		Joniawas	206	51	12	103	30	8	32	16	206	11
3	Garhi alawalpur	Garhi Alawalpur	429	107	25	214	64	17	68	34	429	23
		Maheshwari	2127	531	127	1063	319	85	340	170	2127	116
4	Khijuri	Khijuri	312	78	18	156	46	12	49	24	312	17
		Nikhri	250	62	15	125	37	10	40	20	250	13
		Niganiawas	145	36	8	72.5	21	5	23	11	145	7
5	Jeetpura	Jeetpura	229	57	13	114	34	9	36	18	229	12
		Masani	280	70	16	140	42	11	44	22	280	15

S. No.	Name of micro water sheds	Name of villages	Total no. of Houses	HHs with Safe latrines	HHs with phones		HHs with vehicles		HHs with TV sets	HHs with cooking gas	HHs with drinking water	HHs with fridge
					Landline	Mobile	2 wheelers	4 wheelers				
		Alamgirpur	245	61	14	122	36	9	39	19	245	13
6	Majra Sheoraj	Majra Sheoraj	246	61	14	123	36	9	39	19	246	13
		Majra Gurdass	188	47	11	94	28	7	30	15	188	10

3.5.3 LIVELIHOOD PATTERN: The livelihood from agriculture, animal husbandry, casual labour and others in the micro watershed (village wise) is shown in table 22.There is no major income from the common property resource to the individuals.

Table 22. Per capita (Household) income Kharkhara Watershed (IWMP VI)

S. No.	Name of micro watersheds	Name of villages	Agriculture in Rs. P.A	Animal Husbandry in Rs. P.A	Casual labour in Rs. P.A	Others in Rs. P.A	Total in Rs.
1	Kharkhara	Kharkhara	22500	18600	5800	4400	51300
		Alwalpur	20500	17400	4900	5200	48000
2	Malpura	Malpura	18400	14400	4200	4900	41900
		Kapriwas	21600	18400	5400	4300	49700
		Joniawas	24500	20500	6500	5500	57000
3	Garhi	Garhi Alawalpur	23200	22000	6000	5200	56400

S. No.	Name of micro watersheds	Name of villages	Agriculture in Rs. P.A	Animal Husbandry in Rs. P.A	Casual labour in Rs. P.A	Others in Rs. P.A	Total in Rs.
	alawalpur	Maheshwari	22300	20200	6500	4800	53800
4	Khijuri	Khijuri	21700	18400	5300	4200	49600
		Nikhri	20400	19400	5300	4900	50000
		Niganiawas	24600	22400	6000	5500	58500
5	Jeetpura	Jeetpura	20300	18400	5400	4600	48700
		Masani	17500	13500	4400	4500	39900
		Alamgirpur	25000	20000	6000	5000	56000
6	Majra Sheoraj	Majra Sheoraj	23400	19200	6200	4000	52800
		Majra Gurdass	19800	17800	5600	4300	47500

3.5.4 Comparative Status of crop Productivity

Three major crops namely Wheat, Mustard, Bajra and Gwar are sown in Watershed villages. Though main crops grown in this area is Wheat, Mustard, Bajra and Gwar. Compared to rest of the district and the state, the average yield of these crops is quite low.

3.6 REASONS FOR LOW PRODUCTIVITY

- Lack of assured irrigation for agriculture.
- Poor availability and quality of ground water.
- Irregular and erratic rainfall: there is long span between two subsequent rainfalls in the area.

- Sudden change in climate of the area.
- Low organic carbon content.
- Poor physical and chemical properties of the soils are light in texture with boulders in pockets and poor fertility.
- Low water holding/ retention capacity.
- Moderate to rapid permeability.
- Poor phosphorous and medium potash nutrients availability.
- Acceptance of hybrid/ high yielding varieties are nil to negligible.
- Soil erosion.
- Essential micro- nutrient deficiency in the soil.
- Dependence of monsoon.
- Low fertilizer consumption per unit cropped area.
- Lack of economic condition of farmers.
- Lack of good quality of seeds and fertilizer.
- Lack of post harvesting facilities such as storage and marketing.

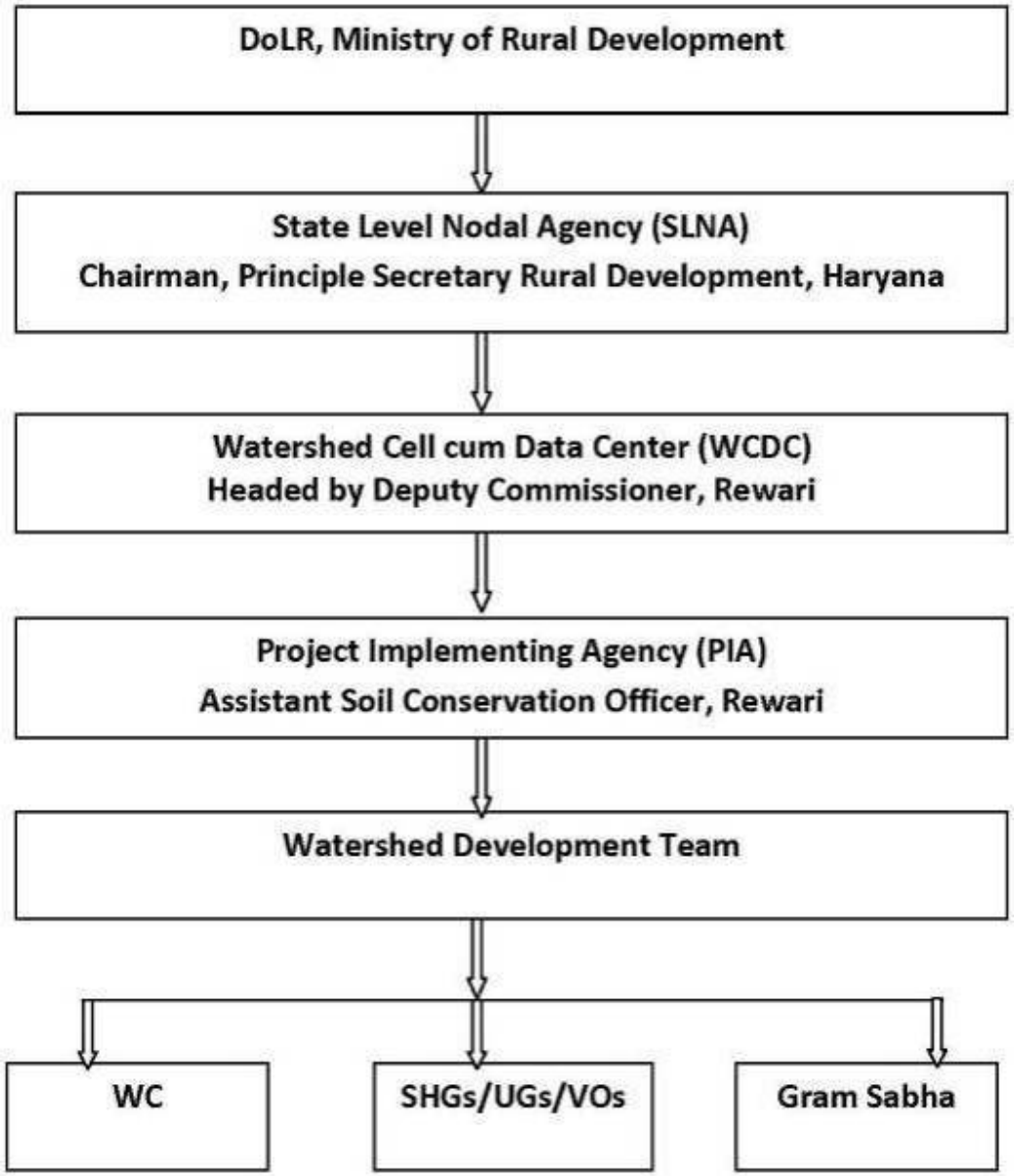
CHAPTER-4

PROJECT MANAGEMENT AGENCIES

4.1 INSTITUTIONAL ARRANGEMENT

Institutions play a major role in managing the projects. Realizing the importance of Community Participation, Decentralized Participatory Approach has been adopted for Watershed Management. Following decentralization and to achieve the objectives, there is a dire need for establishment of Institutional set up from National to Village Level (Micro Watershed Level), including cluster (Sub Watershed Level) and district level. These institutions need to be oriented from time to time and also empowered so that they take up the assigned tasks and work as per their responsibilities from the start of the program to effective management of Project. Considering the prevalent circumstances, these institutions should take decisions at their respective level. The involvement and participation of beneficiaries and other stakeholders is desired to be encouraged right from the planning stage.

The institutional set up is given below:


DoLR, Ministry of Rural Development
State Level Nodal Agency (SLNA)
Chairman, Principle Secretary Rural Development, Haryana
Watershed Cell cum Data Center (WCDC)
Headed by Deputy Commissioner, Rewari
Project Implementing Agency (PIA)
Assistant Soil Conservation Officer, Rewari
Watershed Development Team
WC
SHGs/UGs/VOs
Gram Sabha

4.2 STATE LEVEL NODAL AGENCY, HARYANA

State Level Nodal Agency (SLNA) is headed by Chief Executive Officer and supported by Technical Experts is completely functional. The regular meetings with PIA and other stake holders are held to provide necessary guidance as per the revised, common guidelines, 2011. The main functions of SLNA are:

- To implement the approved perspective and strategy plan of watershed development for the state.
- Acts as Nodal Agency at State Level for appraisal and clearance.
- To establish and maintain a State Level data cell from the funds sanctioned to the State and connect it online with the National Level Data Centre.
- To provide technical support to Watershed Cell cum Data Centre throughout the state.
- To approve a list of independent institutions for capacity building of various stakeholders within the state and work out the overall capacity building strategy in consultation with NRAA/Nodal Ministry.
- To approve project implementing agencies identified/selected by WCDC/District Level Committee by adopting appropriate objective selection criteria and transparent systems.
- To establish monitoring, evaluation and learning systems at various levels (Internal and external/independent system).
- To ensure regular and quality online monitoring of watershed projects in the State in association with Nodal Agency at the Central Level and securing feedback by developing partnerships with independent and capable agencies.

4.3 WATERSHED CELL CUM DATA CENTRE, REWARI

WCDC has been notified by SLNA and the same has been constituted. The team comprises of 3 to 4 subject matter specialists on Agriculture, Water Management, Social Mobilization and Management & Accounts. WCDC is be headed by Deputy Commissioner and Additional Deputy Commissioner has been designated as Project Manager under IWMP. The WCDC members comprise of Technical Expert, Computer Operator and Accountant. As per guideline 3 to 6 full time staff (3 in district with less than 25000 ha project area and 6 in districts with more than 25000 ha project area) would assist the Project Manager. The Project Manager will prepare well defined annual goals against which the performance will be monitored. The WCDC will be financially supported by the DoLR after review of available staff, infrastructure and actual requirement.

Organization of WCDC and its Objective

The primary objective is successful implementation of watershed programme. The organization bears the responsibility to assist and facilitate PIA from time to time. The broad functions of WCDC are as under:

- Providing technical support in planning and implementation of the project.
- Facilitation in preparation of Annual Action Plan.
- Monitoring and of project activities.
- Co-ordination with allied departments.
- Submission of various reports to SLNA.

4.4 Project Implementation Agency

The project Implementing Agencies (PIA), ASCO Rewari is selected by the State Level Nodal Agency (SLNA) for Integrated Watershed Management Programme (IWMP) in Haryana. In the district Rewari, where the area of development is 25100 ha, a separate dedicated unit, called the Watershed Cell cum Data Centre has been established which is to oversee the implementation of watershed programme. The PIA is responsible for implementation of watershed project. Soil and Water Conservation Department, Rewari, will guide with its vast experience in implementing various watershed development Projects.

PIA will put dedicated watershed development team and will provide necessary technical guidance to the Gram Sabha /Watershed Committee for implementation of development plans for the watershed projects through Participatory Rural Appraisal Exercise.

PIA will also undertake:

a) Community Organization,
b) Trainings for the village communities,
c) Supervise Watershed Development Activities,
d) Inspect & authenticate project accounts,
e) Monitor & review the overall project implementation,
f) Set up institutional arrangements for post project operations and
g) Maintenance and further development of the assets created during the project period.

Table 1. PIA/ Project Implementing Agency

S.No.	Name of the Project	Details of PIA	
1	Kharkhara Watershed (IWMP-VI)	i) Type of organization	District Level Nodal Agency
		ii) Name of organization	District Watershed Development Unit
		iii) Designation & Address	Assistant Soil Conservation Officer, Rewari
		iv) Telephone	094160- 69536
		v) Fax	01274- 225240
		vi) E-mail	drdarwr@hry.nic.in

The PIA is well competent to effectively manage this project and has a good rapport with the village community. The watershed committee members are giving them positive response in the preparatory phase. The overall responsibility of the PIA would be to oversee the project progresses well and to provide technical knowhow as when required. PIA has qualified and highly experienced

staff to accomplish this task and take this project forward and attain to a logical conclusion. PIA will be assisted by the Watershed Development Team.

4.4.1 Monitoring Level Staff at PIA Head Office

The highly experienced staff is engaged in the monitoring the project. The technical guidance to field staff from time to time is being provided. Meetings are being periodically held by head office with officials from the Rewari district to apprise themselves of the status of ongoing project.

4.5 Watershed Development Team

The watershed development team (WDT) is an integral part of the PIA. WDT would consist of subject specialists such as Agriculture, Animal Husbandry, Horticulture, Soil & Water Management and Forest. One woman member with experience in Social mobilization is also included in WDT. Assistant Soil Conservation Officer would be team leader of the WDTs. Team Leader will coordinate with other WDT members for smooth implementation of the project. One member of the WDT will be departmental official of the rank ADO (Soil Conservation)/ ADO (Agriculture) who will also be responsible for disbursement of funds along with Secretary Watershed Committee.

WDT will guide the watershed committee in the formulation of watershed action plan. An indicative list of the roles and responsibilities of the WDT would include among others, the following.

a) Constitution of Watershed Committee and its functioning,
b) Organizing and strengthening User groups, Self Help Groups,
c) Mobilizing women to ensure that the perspectives and interests of women are adequately reflected in the watershed action plan
d) Conducting Training and Capacity Building,
e) Common property resource management and equitable sharing

f) Preparing detailed resource development plan including Soil & Water Conservation,
g) Undertake engineering surveys,
h) Prepare engineering drawings and cost estimate for structures to be built.
i) Monitoring, checking, assessing, undertaking physical verification and measurements of the work done
j) Facilitating the development of livelihood opportunities for the landless
k) Maintaining project accounts
l) Arranging physical, financial and social audit of the work undertaken
m) Setting up suitable arrangements for post- project operation, maintenance and future development of the assets created during the project period.

4.6 WATERSHED COMMITTEE DETAILS

The process of formation of watershed committees of all villages has been completed and watershed committees have been formed in all villages. The representation on these committees consists of members from- SC, landless, women and members from self help groups and user groups. The committees would be imparted training for smooth management of the activities related to watershed.

Their representation of various groups is as under:

- Minimum of 50% members from SHGs and UGs, SCs, women and landless.
- One member from Watershed Development Team, especially women member (subject matter specialist in Social Science).

The Govt. of Haryana vide department memo No. PO (IWMP)-2012/1479 dated 05.03.2012 has decided to include the following members as members of the Watershed Committees.

- ❖ All alive ex-Sarpanches of concerned Gram Panchayats,
- ❖ Concerned member of Panchayat Samiti,
- ❖ Concerned member of Zila Parishad,

One of the members of Watershed Committees is nominated as Watershed Secretary to perform the following duties:

- ❖ Convening meetings of Watershed Committee, Gram Sabha,
- ❖ Maintaining all records and proceedings of the meetings.
- ❖ Follow up action on all decisions taken in the meetings.
- ❖ Ensuring people's participation.

4.6.1 Formation of Watershed Committees (WC)

The watershed committee has been constituted as per the guidelines para 6.3 (44) after convening a meeting of Gram Sabha. The schedule of the meeting was circulated by the Additional Deputy Commissioner well in advance. The watershed committees were constituted in each village as detailed in **Table 2.**

Table 2. Watershed Committees (WC) Details

Name of Micro Watersheds	Name of Villages	Name of President	Name of Secretary	Name of Members
Kharkhara	Kharkhara	Sumitra Devi	Under process	Rameshwar, Geeta, Vishal, Mukesh, Parkash, Bishamber, Sumitra devi, Naval Singh, Anaro devi, Molar Singh, Rajpal
	Alawalpur	Mukesh Kumar	Amit	Ram Bishan, Rasem Devi, Suman Devi, Saroj Devi, Raj Kumar, Sher Singh, Desh Raj, Suraj Bhan, Santosh,

Name of Micro Watersheds	Name of Villages	Name of President	Name of Secretary	Name of Members
				Niranjan
Malpura	Malpura	Susila Devi	Lalit	Badlu Ram, Raghbir Singh, Sakuntla, Bimla Devi, Ram Niwas, Sunil Kumar, Zile Singh, Puran Chand, Satya Narayan, Niranjan Lal
	Kapriwas	Jagdish	Mahender Singh	Rampal, Ram Kawar, Mamta Devi, Subhash, Hosiyar Singh, Rampal, Charan Singh, Satya Narayan, Niranjan Singh
	Joniawas	Maina Devi	Ranjeet	Inderpal, Lal Chand, Roshani, Lali Devi, Manohar Lal, Lakhmi Chand, Vijay Pal, Dharampal, Satya Narayan, Niranjan Lal
Garhi alawalpur	Garhi alawalpur	Karan Singh	Under Process	Gyan Chand, Dharm Chand, Kiranvati, Santosh devi, Satvir Singh, Surjit, Amar Singh, Lal Singh, Krishan Pal, Niranjan
	Maheshwari	Muni Devi	Sant lal	Amar Singh, Ramesh Chand, Hansraj, Joginder Singh, Munshiram, Jai singh, Satish, Karan Singh, Rahul
Khijuri	Khijuri	Mukesh	Ramotar	Haripal, Raj Bala, Raghubir, Bimla Devi, Ramotar, Ram Niwas, Ram Mohan, Ram Jas
	Nikhri	Sheo Ram	Pritam	Chaju Ram, Munsi Ram, Santosh, Poonam, Ram Niwas, Pawan, Teen Singh, Paras Ram, Mukesh, Rajpal
	Niganiawas	Krishana	Vikram	Rajbala, Satpal, Kamla, Madhu, Surender, Sheo Nath, Naresh, Kawar Singh, Mukesh Yadav, Rajpal

Name of Micro Watersheds	Name of Villages	Name of President	Name of Secretary	Name of Members
Jeetpura	Jeetpura	Satyanarayan	Amarjit	Chandgi ram, Chiranjilal, Chanderkala, Jagdish, Shakuntla, Jagdish, Shriram, Malkhan, Savitri, Rajpal
	Masani	Dharampal Yadav	Manoj	Lala Ram, Jai Kishan, Batheri, Santosh, Maya Devi, Mukesh, Shri Chand, Jagat, Savitri Devi, Rajpal Yadav
	Alamgirpur	Prem Singh	Rakesh	Ami Lal, Kawar Singh, Sarla Devi, Chota Devi, Krishan Singh, Ram Singh Yadav, Geeta Devi, Madan Lal, Bimla, Niranjan Singh
Majra Sheoraj	Majra Sheoraj	Ved Prakash	Under Process	Narender, Munshi Ram, Kela devi, Rajbala, Ashwini, Anandpal, Upma Yadav, Ashmita, Somdev, Satbir, Chada Singh
	Majra Gurdass	Anokhi Yadav	Parmesh	Ramavtar Singh, Susila Devi, Kamlesh Devi, Sudesh Devi, Satbir Singh, Vijay Singh, Dinesh, Vikram, Krishana, Rajpal

As per the Government decision, Sarpanch of the village is the chairman of the watershed committee. The Secretary of the Watershed Committee has been appointed by the Watershed Committee in the meeting of Gram Sabha. The Secretary will be paid honorarium and would be independent from the functioning of Panchayat Secretary. The secretary would be dedicated in the project activities and would take care of the watershed supervision and would be fully responsible for organizing the meeting and maintenance of records. The main responsibilities of secretary are as under:

- Convening the meeting and recording the minutes of WC meeting and will be responsible for follow up the decision taken by the WC Committee.

- The secretary will be responsible for financial transactions of the project and will sign the cheques with WDT nominee on the behalf of WC.
- He will motivate the villagers for voluntary contribution and ensure equitable distribution of resources.

4.7 INSTITUTIONAL SETUP AT WATERSHED LEVEL

4.7.1 Self Help Groups

The formation of the self help group in all the villages is underway. It is proposed to form at least 2 self help group in each village. In each village Self Help Groups consisting of 10 to 15 members having common goal are being formed. The members of SHGs would be drawn from very poor families, BPL families, SC families, Land less families, Small and Marginal farmers SHG would be homogeneous in nature and would work together for their socio-economic up-liftment. SHGs need to be imparted. Under the project, each SHGs would be given revolving fund Rs. 25000 each after 6 months of the date of formation. The income generating activities would be identified. For adopting economic activities would depend upon the decision of Self Help Group. Accordingly the Orientation and Trainings for their skill up gradation would be arranged in the project as activity. It is the responsibility of Watershed Committee to form SHGs in their respective villages under the guidance of Watershed Development Team and Project Implementing Agency.

4.7.2 User Groups

The Watershed Committee will constitute user group in the watershed area with the help of the WDT. In each Watershed village, user groups are also being formed. Members of these groups would be the beneficiaries of the Watershed project. User group are formed to manage the activities and also asset created under the programme on the long term basis. These groups would also be homogeneous in nature. User groups shall be given technical support as and when required by Watershed Committee and Watershed Development Team. During the preparatory stage while discussing with the Gram Sabha member it was decided that each group would formulate certain internal rules and have a feeling of wnership with community spirit. The members would be from various categories like landless, small farmer, marginal farmer and large farmer.

CHAPTER- 5

BUDGETING

MICRO WATERSHED WISE/COMPONENTS AND THEIR YEAR WISE PHASING BUDGET UNDER IWMP

IWMP VI KHARKHARA WATERSHED

5.1 BUDGETING

The State Level Nodal Agency will distribute funds to WCDC keeping in view the detailed annual action plan of each micro-watershed. The expenditure under the various component of the project will be carried out as per the guidelines. The activity wise allocations of funds as per the provision of budget components have been work out and exhibited in table. 1. The first step in the budgeting is dividing the cost of project into various components as detailed in the revised common guidelines. It would help the PIA in further identifying activities under different components and allocate appropriate funds.

MICRO WATERSHED WISE / COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP-VI

Area in Hectares and

Funds in Rs.

Table 1. Activity wise allocation of funds for Project Village

(BUDGET AT A GLANCE)

Name of the project	Project Area	Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
Kharkhera Watershed (IWMP VI)	4735	3420	41040000	Administrative costs	410400	410400	1231200	1231200	820800	4104000
				Monitoring	0	0	0	410400	0	410400
				Evaluation	0	0	0	0	410400	410400
				Entry point activities	1641600	0	0	0	0	1641600
				Institution and capacity building	0	2052000	0	0	0	2052000
				Detailed project report	410400	0	0	0	0	410400

				Watershed development works	0	3283200	6566400	6976800	6156000	22982400
				Livelihood activities for the asset less persons	0	0	1231200	2052000	410400	3693600
				Production system and micro enterprises	0	0	1231200	1641600	1231200	4104000
				Consolidation phase	0	0	0	0	1231200	1231200
				Total	**2462400**	**5745600**	**10260000**	**12312000**	**10260000**	**41040000**
				Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and Funds in Rs.

Table 2. PHASING YEAR WISE (Name of the Micro Watershed: Kharkhera)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total

553	6636000	Administrative costs	66360	66360	199080	199080	132720	663600
		Monitoring	0	0	0	66360	0	66360
		Evaluation	0	0	0	0	66360	66360
		Entry point activities	265440	0	0	0	0	265440
		Institution and capacity building	0	331800	0	0	0	331800
		Detailed project report	66360	0	0	0	0	66360
		Watershed development works	0	530880	1061760	1128120	995400	3716160
		Livelihood activities for the asset less persons	0	0	199080	331800	66360	597240
		Production system and micro enterprises	0	0	199080	265440	199080	663600
		Consolidation phase	0	0	0	0	199080	199080
		Total	**398160**	**929040**	**1659000**	**1990800**	**1659000**	**6636000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and Funds in Rs.

Table 3. PHASING YEAR WISE (Name of the Micro Watershed: Malpura)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
538	6456000	Administrative costs	64560	64560	193680	193680	129120	645600
		Monitoring	0	0	0	64560	0	64560
		Evaluation	0	0	0	0	64560	64560
		Entry point activities	258240	0	0	0	0	258240
		Institution and capacity building	0	322800	0	0	0	322800

		Detailed project report	64560	0	0	0	0	64560
		Watershed development works	0	516480	1032960	1097520	968400	3615360
		Livelihood activities for the asset less persons	0	0	193680	322800	64560	581040
		Production system and micro enterprises	0	0	193680	258240	193680	645600
		Consolidation phase	0	0	0	0	193680	193680
		Total	**387360**	**903840**	**1614000**	**1936800**	**1614000**	**6456000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHE

D WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and Funds in Rs

Table 4. PHASING YEAR WISE (Name of the Micro Watershed: Garhi Alawalpur)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
550	6600000	Administrative costs	66000	66000	198000	198000	132000	660000
		Monitoring	0	0	0	66000	0	66000
		Evaluation	0	0	0	0	66000	66000
		Entry point activities	264000	0	0	0	0	264000
		Institution and capacity building	0	330000	0	0	0	330000

		Detailed project report	66000	0	0	0	0	66000
		Watershed development works	0	528000	1056000	1122000	990000	3696000
		Livelihood activities for the asset less persons	0	0	198000	330000	66000	594000
		Production system and micro enterprises	0	0	198000	264000	198000	660000
		Consolidation phase	0	0	0	0	198000	198000
		Total	**396000**	**924000**	**1650000**	**1980000**	**1650000**	**6600000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and Funds in Rs.

Table 5. PHASING YEAR WISE (Name of the Micro Watershed: Khijuri)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
671	8052000	Administrative costs	80520	80520	241560	241560	161040	805200
		Monitoring	0	0	0	80520	0	80520
		Evaluation	0	0	0	0	80520	80520
		Entry point activities	322080	0	0	0	0	322080
		Institution and capacity building	0	402600	0	0	0	402600
		Detailed project report	80520	0	0	0	0	80520
		Watershed	0	644160	1288320	1368840	1207800	4509120

		development works						
		Livelihood activities for the asset less persons	0	0	241560	402600	80520	724680
		Production system and micro enterprises	0	0	241560	322080	241560	805200
		Consolidation phase	0	0	0	0	241560	241560
		Total	**483120**	**1127280**	**2013000**	**2415600**	**2013000**	**8052000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and Funds in Rs.

Table 6. PHASING YEAR WISE (Name of the Micro Watershed: Jeetpura)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
763	9156000	Administrative costs	91560	91560	274680	274680	183120	915600
		Monitoring	0	0	0	91560	0	91560
		Evaluation	0	0	0	0	91560	91560
		Entry point activities	366240	0	0	0	0	366240
		Institution and capacity building	0	457800	0	0	0	457800
		Detailed project report	91560	0	0	0	0	91560
		Watershed development works	0	732480	1464960	1556520	1373400	5127360
		Livelihood activities for the asset less persons	0	0	274680	457800	91560	824040
		Production system and micro enterprises	0	0	274680	366240	274680	915600
		Consolidation phase	0	0	0	0	274680	274680
		Total	**549360**	**1281840**	**2289000**	**2746800**	**2289000**	**9156000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and Funds in Rs.

Table 7. PHASING YEAR WISE (Name of the Micro Watershed: Majra Sheoraj)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
345	4140000	Administrative costs	41400	41400	124200	124200	82800	414000
		Monitoring	0	0	0	41400	0	41400
		Evaluation	0	0	0	0	41400	41400
		Entry point activities	165600	0	0	0	0	165600
		Institution and capacity building	0	207000	0	0	0	207000
		Detailed project report	41400	0	0	0	0	41400
		Watershed	0	331200	662400	703800	621000	2318400

		development works						
		Livelihood activities for the asset less persons	0	0	124200	207000	41400	372600
		Production system and micro enterprises	0	0	124200	165600	124200	414000
		Consolidation phase	0	0	0	0	124200	124200
		Total	**248400**	**579600**	**1035000**	**1242000**	**1035000**	**4140000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

CHAPTER – 6

PREPARATORY PHASES

During the first year, all activities involved by adopting participatory approach and empowerment of local institutions (WC, SHG, and UG). WAPCOS team assumed the role of facilitator during this phase. In this phase, the main activities are as follows:

6.1 AWARENESS GENERATION AND MOTIVATION FOR PARTICIPATION

Fortunately, due to the implementation of earlier watershed management projects and operation of various ongoing soil and water conservation schemes, there has been regular interaction of the departmental staff with the community. Because of positive result of earlier projects, people are responsive and are looking forward for projects intervention. The need for the soil and water conservation works have emerged due to persistent draught, which the area is facing. However, production system need lot of improvement and hence the need of awareness generation and motivation for collective efforts to face the malady of recurrent floods and draught.

6.1.1 Collection of Base Line Data and Hydrological Data

As explained earlier, baseline data from all possible sources is collected for the purpose of not only future impact assessment but also to design project intervention. Most of this was done at the PPR and DPR stages, which forms integral part of the preparatory phase. In addition, data on rain fall amount and distribution, weather conditions and frequency of floods and drought was compiled at DPR stage.

6.1.2 Formation of Village Level Institutions

It has been decided by the state that project activities shall be implemented throughout the watershed committees (WCs). In collaboration with the department, the village level WCs were formed by holding well-attended meeting in which all settlement and section of the society were represented. Due representation, was given to women, landless and BPL families as per norms issued by DoLR.

The self- Help Groups were formed during earlier projects but most of them are inactive and non – functional. These groups shall be revived and new ones were to be formed depending upon willingness of the interest groups. Considering and understanding the type of activities these groups wish to pursue and their capacity building requirements were given importance and duly noted.

6.1.3 Preparation of DPR

PRA exercise and comprehensive data base have been carried out for DPR preparation. Meetings were held at district level, micro-watershed wise and village wise by involving the concerned departments and members of Gram Sabha on this aspect**.** The Draft Project Report was prepared on the basic information generated from primary and secondary sources. This also includes the outcome of participatory rural appraisal and outcome of transect walk and stakeholders' discussions. A list of scope of works that finally emerged were prepared. Based on the technical survey, detailed cost estimates were prepared for components including resource management, entry point activities and production system. A broad frame work for capacity building at all levels as per the guidelines of DoLR was prepared. The livelihood opportunities which emerged from local product and market facility were analyzed and outlines of the same were included. Since the financial provisions were decided according to the area proposed to be covered, these provisions were distributed across project activities. The project activities are sequenced into three phase's namely preparatory phase, work phase, consolidation and withdrawal phase. So, the activities were segregated in the sequence and explained in detail. Finally the details about budget and its spilt up into annual action plan were also attempted. Various maps using GIS were created likes Base map, Present Land Use, Geo-hydrological, Micro Watershed, Drainage, Contours, Slope, Soil Classification, Land

Capability Classification, Ground Water Depth and Quality, Proposed and existing Activities of works. All the works proposed in the DPR are location specific and are as per the local demand and socio- economic conditions of the watersheds.

Strength, Weakness, Opportunities, Threat (SWOT) analysis of IWMP

A critical analysis of main strength of the proposed project, evident weaknesses, opportunities available for successful implementation and scope of achieving set objectives was made. Attention is also paid to possible threat against which sufficient inbuilt safeguards are provided. Such an analysis was done for the project in hand and summaries of observations were made and are mentioned below in all six watersheds in Rewari district.

Strengths

- Moderate rain fall
- Strong linkage with national and state level institutes and KGK for capacity building and technical guidance.
- Most families are engaged in animal husbandry activities.
- Availability of drinking water.
- Good response to earlier watershed management programmes.
- Local residents are active in micro enterprises.

Weaknesses

- Erratic rainfall
- Lack of good quality fodder.
- Lack of advanced cattle breed.
- Low level of milk production.
- Lack of knowledge base regarding scientific cattle management.

- Prevalence of soil erosion
- No organized micro enterprises activities.
- Lack of technical skills.

Opportunities

- Rain Water harvesting/recharging for production.
- Promotion of organic farming.
- Promotion of horticultural activities (dry land plants).
- Provide training on dairy farming and other income generating activities.
- Promotion of nursery raising and pasture development.
- There would be horizontal integration and convergence of development programmes being organized and run by govt.

Threats

There are few negative issues that may have adverse effect

- Unreliable rainfall.
- Absence of assured irrigation.
- Lack of cooperation and contribution from local residents.
- Low literacy rate in the project area.
- Rapid climate change affecting crops.
- Lack of awareness of Dairy farming as a commercial activity.
- The area is underlain by marginal to saline ground water.
- Frequent droughts.

CAPACITY BUILDING- 5%

Rs. 20, 52, 000/-

6.2 Capacity Building

1. Introduction

Watershed development is conceived as a strategy for protecting livelihoods of people inhabiting fragile ecosystems, which over period of time have become subject to multidimensional land degradation. Main stress has been to ensure availability of water for drinking and irrigation to support agro-horti-forestry operation vis-à-vis raise income level and provide adequate employment opportunities for communities living in such areas of concerns. As an intervention,Integrated Wasteland Development is nearly 20 years old. The initiatives have been subjected to periodic reviews by expert committees with a broader view to improve upon its strategy and components as well as match with the growing socio-ecological requirements

Para 9.VIII of common guidelines necessitate capacity building and training of all functionaries and stakeholders involved watershed programme on a war footing with definite action plan, requisite professionalism and all round competence.

2. Vision

A sincere effort to provide required professionalism and competence to the stakeholders associated with planning and implementation of IWMP in the state. This would include organisation development, human resource development, cooperation and network development and institutional development, all seen as a continuous process enabling functionaries to enhance their knowledge and skills and to develop the required orientation and perspectives thereby becoming more effective in discharging their roles and responsibilities.

3. Need

The term Capacity Development is understood as the development of people, organizations and society capability to manage resources effectively and efficiently in order to realize their own goals on a sustainable basis. In this context, four dimensions have to be distinguished:

- The development of the human resource or personnel development.
- The strengthening of the effectiveness and efficiency of organization or organizational development.
- The strengthening of cooperation between organizations and network development.
- The promotion of institutional frameworks for development.

Further, 47 projects have already been sanctioned in 2011-2012 in the state covering around 248 micro watersheds measuring 179531 hectares of area. The implementation of these new projects under the umbrella of common guidelines is reported to be in the initial stage under preparatory phase. The establishment of desired institutional setup at all levels, required level of awareness for ensuring effectiveness of all institutions and community participation is therefore necessitated for conclusive participation by all.

This also necessitates a comprehensive package to provide appropriate knowledge for speedy implementation of the projects in the state particularly in the districts.

4. Rationale

Para 81 of common guidelines for watershed development lays special emphasis on the following key elements of Capacity building strategy.

- Dedicated & decentralized institutional support & delivery mechanism
- Annual Action Plan for Capacity Building
- Pool of resource persons
- Well prepared training modules and reading materials

- Mechanism for effective monitoring and follow-up.

Keeping in firsthand experience of the state in launching 47 projects under IWMP and current state of planning and implementation under preparatory phase is to primarily prepared and build the capacity of different principal stakeholders of projects to speed up further implementation and also lay a strong foundation for subsequent phases.

5. Objectives

The main objectives of the current action plan for ongoing 47 projects are outlined as follows:-

- Create common understanding on different features and provisions of common guidelines as well as instructions directions issued from time to time by Central and State Governmental agencies.
- Develop proper conceptual understanding about integrated participatory watershed management including other issues such as equity, environmental and social sustainability among all implementing agencies at project and village levels, PRIs and local communities (**KNOWLEDGE**).
- Build necessary and required skills and managerial competence of all stakeholders about planning, implementation and management of various project activities using participatory approach (**SKILLS**).
- Help institutional growth of watershed committees at GP level.
- Strengthening community participation, ensuring positive involvement of communities and improvement of socio economic conditions in watershed areas (**ATTITUDES**).

Table 1. Statement of Targets under Proposed Training Action Plan at Micro Watershed Level to be conducted by WDT members of Rewari District

Sl. No.	Title of Training Programme and Duration	Level of Participants	Total persons	Trainees Per Programme	Number of Programmes
01	District Level Sensitization Workshop for Watershed Committees. **One Day**				
	Rewari	Members of Watershed Committees @ 10 per committee would also include accompanying WDT Members.	770	300-350	2
02	Block Level Functional Programmes for Secretaries of Watershed Committees. **Two Days**				
	Rewari	Secretaries of Village Watershed Committees	77	35-40	2
03	Project Level Sensitization Camps for WC **One Days**				
	Rewari	Members of Watershed Committees @ 10 Persons (Tentative) per WC	770	50	15
04	Village Level Awareness Camps on IWMP at Micro Watershed Level for User Groups **One Day**				
	Rewari	Approximately 50 prospective user groups per micro watershed.	2150	50	43
05	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP **One Day**				
	Rewari	Three persons (Leader, Secretary and Treasurer) per Self Help Group @ around one SHG per village.	231	50	5

Note: Training programmes under Sl. No. 01 are proposed to be conducted by HIRD in collaboration with SLNA and WCDCs.

6. Training Methods

A group of selected Watershed Development Team members would be trained on various methods to ensure that they are able to conduct the proposed interventions effectively with the help of some of the following methods.

- Interactive learning.
- Experience Sharing.
- Experimental Learning.
- Presentation of case studies.
- Classroom deliberations.
- Group [structured] exercises and discussions.

7. Tools

- Projectors
- Flip Charts
- Electronic films
- Print Material
- Other IEC material.

8. Resource Persons

8.1. Internal

Around two persons per WDT identified from the initial training activities by HIRD, Nilokheri would be trained on various aspects for designing and conducting the training programmes. It is expected that each WDT members would be required to function as a internal resource person for the proposed training programmes. Technical experts from each WCDC and PIA would also function as facilitators in the proposed training activities.

8.2. External

Further, in order to make the proposed interventions meaningful for achieving the broader objectives efforts would be made to liaison with various experts from district level line departments, agencies and state level institutions including HIRD as per the need of the programme.

9. Fund Requirement

The **approved revised norms for training for PRIs and RD functionaries" by MoRD, GoI in 2010** have been strictly used [for fixed and variable costs].

Table 2. Statement showing funds Requirement for training on IWMP in Haryana (Preparatory Phase – District Level)

Sr. No	Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD	Total Funds
1	District Level Sensitization Workshop(s) for Watershed Committees	38853
2	Block Level Functional Programmes for Secretaries of Watershed Committees. Two Days	7208
3	Village Level Sensitization Camps for WC One Days	36891
4	Village Level Awareness Camps on IWMP at Micro Watershed Level for Prospective User Groups One Day	47458

5	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP One Day	14770
	Total	**145180**

Table 3. Micro Watershed Wise Exposure cum training Visit for SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members of IWMP VI (Rewari)

S. No.	Target Group	Training Topics	No. of days	Budget per camp	No. of Camps	No. of Participants per camp	Cost for all participants per day	Cost per participant/ per day	Cost per person	Total Budget
1	Self Help Groups-2 SHGs- micro watershed level	Orientation on IWMP, SHGs cum Exposure Visit	2	16800	5	12	8400	700	2100	126000
2	User groups from each micro watershed	NRM, Post Project Management etc. –Exposure Visit	2	16800	5	12	8400	700	2100	126000
3	Sub watershed Level- WDT Members	Part II-Module I to V-Exposure Visit Outside State- Conceptual,	4	36000	5	6	9000	1500	4500	135000

S. No.	Target Group	Training Topics	No. of days	Budget per camp	No. of Camps	No. of Participants per camp	Cost for all participants per day	Cost per participant/ per day	Cost per person	Total Budget
		Technical, Social, Management of Finance, Monitoring and Evaluation.								
4	Sub watershed Level- PIA Members	Exposure Visit-Within Fundamentals of Watershed, Finance Management, Final Report on WDP etc	2	8400	5	6	4200	700	4500	135000
5	District Level-WDC	Exposure visit to successful watershed/ University.	2	8400	5	6	4200	700	1400	42000
6	District Level-Line Deptt., WDC	Exposure visit to successful watersheds within state.	2	16800	5	12	8400	700	1400	84000
7	SLNA and District Level Controlling	Exposure visit to successful watersheds	4	36000	5	6	9000	1500	6000	180000

S. No.	Target Group	Training Topics	No. of days	Budget per camp	No. of Camps	No. of Participants per camp	Cost for all participants per day	Cost per participant/ per day	Cost per person	Total Budget
	Officers	outside state								
Total			**18**	**139200**	**35**	**60**				**828000**

Table 4. Farmer's / Beneficiaries training camps with Extension Programmes of IWMP VI (Rewari)

S. No.	District	No. Micro watershed	No. of Camps/ Year/	Total No. of camps	Total No. of camps	Amount of per	Amount per Micro	Total Budget

			Micro watershed	**per Year**	**for 5 Year's**	**Camp**	**watershed**	
1.	Farmer Training Camp in each season	6	2	12	60	12,000	1,44,000	7,20,000
2.	Propaganda & Documentation (Puppet show, documentary movies show, video-graphy, Photography, wall Painting, Display Board, pamphlets, leaf lets. Etc)	6	2	12	60	5000	60,000	3,00,000
3	Contingency charges							58820
	Total							**1078820**

i) **Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD = Rs. 1,45,180/-**

ii) **Micro Watershed Wise Exposure cum training Visit For SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members**
= Rs. 8, 28,000/-

iii) **Farmer's / Beneficiaries training camps with Extension Program's = Rs. 10,78,820/-**

Grand Total = 20, 52,000/-

6.2.1. EXPECTED OUTCOME OF CAPACITY BUILDING

- All principal stakeholders would be covered under proposed training interventions by March, 2013.
- The knowledge level of different stakeholders on various provisions of Common Guidelines will increase to a significant level.
- The skill level of the principal stakeholders will be improved in managing watershed projects in consonance with the provisions of common guidelines and state government instructions.
- The programmes will help in ensuring that all stakeholders/agencies/institutions work with positive attitudes in order to utilize the benefit of the projects in fulfilling the objectives set forth.
- Programmes will create a sense of responsible partnership amongst various stakeholders.
- The programmes will also help in further identifying areas for future interventions.
- Improved participation of different stakeholders leading to speedy implementation of watershed development work phase.
- Experiences would help in consolidating other gaps for better planning and management of Capacity Building and Training interventions under new projects in future.

6.3 Entry Point Activities 4%

EPA activities are taken up under the watershed to build rapport with village community at the beginning of the project, generally certain important works which are in urgent demand of the local community are taken up. A group discussion was conducted in the Gram Sabha meeting/watershed committee regarding EPA activities. It was conveyed to the Gram Sabha that an amount of **Rs. 16, 41,600/-** was provided for EPA. The provision of IEC material for community will be met under EPA. The stake holders discussed the various activities which they felt is important but after the discussion the following activities were finalized. The convergence with the other project can also be undertaken.

Table 5. Entry Point Activities in Kharkhara Watershed (IWMP VI)

(Rs. In Lacs)

Sr. No.	Block	Name of Project	No. of EPAs Identified	No. of EPAs Completed	Name/Nature of EPA	Location	Expenditure
1.	Rewari	Kharkhara Watershed (IWMP VI)	15	15	R/Wall	Kharkhara	0.44
					R/Wall	Alawalpur	0.80
					Retaining Wall	Kapriwas	1.30
					Pacca Nala	Joniawas	0.68
					Pacca Nala	Garhi Alawalpur	2.05
					Ramp/Inlet	Maheshwari	1.26
					Water Tanki	Malpura	1.00
					Water Tanki	Alamgirpur	1.00
					Retaining Wall	Masani	1.05
					Ramp/Inlet	Nikhri	0.32
					Retaining Wall	Khijuri	2.02
					Pacca Nala	Niganiawas	0.59
					Retaining Wall	Jeetpura	1.33
					Ramp/Inlet	Majra Gurdas	1.39

Sr. No.	Block	Name of Project	No. of EPAs Identified	No. of EPAs Completed	Name/Nature of EPA	Location	Expenditure
					Pacca Nala	Majra Sheoraj	0.78
						Total	**16.01**

CHAPTER- 7

WORK PHASE

7.1 WATERSHED DEVELOPMENT WORKS - 56%

The Works under the project have been identified after the detailed survey of the Project Area and discussions held with watershed development team members along with officers from other field like Agriculture, Horticulture and Animal Husbandry. Participatory approach has been adopted to identify the activities under the project. The detailed discussions were held with watershed committees and works identified along with villagers after making visits to identified sites. The works mainly relate to soil and water conservation activities like Water Conveyance System, UGP Line, Dug out Pond (New/Renovation), Water Channel, Ramp/Ghat Inlet and Outlet, Small Earthen Embankment with vegetative support, Earthen Embankment with pucca outlet, Roof top rain water recharge structures etc. The proposed project proposals were presented in the Gram Sabha meeting as per the schedule and were approved with certain changes. The works thus identified are given in the attached sheets along with estimates – micro watershed wise.

Drainage line Treatment/ Natural resource Management

There are no large/ deep gullies in the area because most of the area is nearly level, however at few places near hillocks or sand dunes where slopes are nearly level to gentle, small gullies with complex slope have been formed which need specific treatment like construction of check dam (stone masonry) and earthen embankment.

The project area having small or large old ponds which have been silted up and needs strengthening. The land holding is small and any loss of land nearby area would be loss to the farmer. Under the IWDP/ Haryali some works like construction/renovation of farm ponds, small earthen embankments with vegetative support has been undertaken but still at few places water channel, inlet of the ponds and outlet needs to be constructed. So there repair and renovation is proposed. During the discussion it was felt to be genuine demand for repair, renovation and capacity enhancement of ponds in the area.

Proposed System: Run-off from upper area shall be reduced by a- forestation and other soil conservation measures which would also recharge the aquifer. As per need, retaining walls are proposed at strategic locations to protect the farm lands and bank of ponds.

Proposed Activity: Renovation and, construction of new ponds. The provision for construction of water channel, inlet, outlet, ramp and retaining walls are the basic need by project stakeholders which has been provided. In some villages, the construction of new ponds are proposed, subject to availability of funds. In summer months, it is widely held that buffaloes must spend 3 to 4 hours in pond for cooling which save the animal from heat stress. Hence, there was much demand of ponds renovation and repairs. Ponds as such are the best source of rainwater conservation and ground water recharge.

Gram Panchayats spend meger money on repair and renovation under different schemes but due to paucity of funds, works are taken up in piece meal and main work of retaining wall is ignored. The stakeholders gave high priority for the construction of retaining walls as lot of water was leaking from sides and cutting of banks by waves and animal intervention to reduce capacity of pond. In most villages, the first priority of the entire community is the construction of retaining walls of the ponds as these are considered sacred due to the presence of historic village temples nearby. Some of the works had been covered under entry point activities. It is also stressed to use the labor component from MGNREGA and material from provision from the IWMP so that maximum amount of rainwater is harvested.

7.2 Earthen Embankment

In order to conserve the rain water, the provisions of earthen embankment have been provided along the field boundaries across the slope for in-situ moisture conservation.

Suggested Interventions: In a number of villages, sites have been identified for in-situ moisture conservation and construction of embankments where village paths have got converted in to nalas due to severe erosion. The provision of earthen embankments besides being sustained source of water will help in checking further deterioration due to erosion in the project area.

This phase has been started after the completion of the preparatory phase is by and large complete. It is considered as the heart of the program in which the DPR proposals shall be implemented in participatory mode. In this watershed management program, it was planned to rehabilitate the degraded watersheds by the control of runoff and soil loss by biological and masonry works for conservation measures. In this water stressed project area, rainwater harvesting to reduce soil erosion, recharge ground water, improve moisture regime and use of harvesting water for human and livestock use. This was coupled with land development,

production improvement, and promotion of subsidiary occupations for improved livelihoods. Many village ponds are silted, several are filled with silt and sewage water and giving foul smell. Repair renovation and retaining walls of village ponds has emerged as an important activity. The scope of integrated watershed regeneration/rehabilitation works which emerged from the PRA is now presented.

Sample estimates are as follows:

7.2.1 Activities under NRM (56%) Micro Watershed Wise (IWMP VI Rewari) is given below and the proposed action plan/treatment plan map shown in **Annexure-X.**

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Kharkhara							
Sr. No.	**Nature of Works**	**Location**	**Unit**	**Unit Cost**	**No. of Works**	**Estimated Cost**	**Objective**
					Phy.	**Rs. in Lacs.**	
				(Rs. in Lacs)			
1	Dug Out Pond (New/Renovation)	Bainwala pond, basswala pond	No.	3	2	6.00	For ground water recharging & availability of water for village community animals.
2	Ramp/Ghat Inlet and Outlet	Bainwala pond basswala pond	Cum.	0.0326	102	3.33	For the control of soil erosion, in situ moisture conservation.

3	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum.	0.029	9552	2.77	For the control of soil erosion, in situ moisture conservation.
4	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	0.77+0.20=0.97	4	3.88	For the control of soil erosion, in situ moisture conservation.
5	Roof top rain water recharge structure	Govt. School of village	No.	2	2	4.00	For the conservation of water and ground water recharging.
6	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	12	1.80	Increase biomass and additional income to the farmers
7	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	4	1.00	Proper utilization of uncultivated fields and additional income for farmers.
Total Cost						**22.78**	
Available Fund						**21.37**	
Convergence						**1.41**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Alwalpur							
Sr. No.	**Nature of Works**	**Location**	**Unit**	**Unit Cost**	**No. of Works**	**Estimated Cost Rs. in Lacs.**	**Objective**
					Phy.		

				(Rs. in Lacs)			
1	Dug Out Pond (New/Renovation)	Bainwala pond basswala pond	No.	3	1	3.00	For ground water recharging & availability of water for village community animals.
2	Ramp/Ghat Inlet and Outlet	Bainwala pond basswala pond	Cum.	0.0326	45	1.47	For the control of soil erosion, in situ moisture conservation.
3	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum.	0.029	9533	2.76	For the control of soil erosion, in situ moisture conservation.
4	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	0.77+0.20= 0.97	4	3.88	For the control of soil erosion, in situ moisture conservation.
5	Roof top rain water recharge structure	Govt. School of village	No.	2	2	4.00	For the conservation of water and ground water recharging.

6	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	5	0.75	Increase biomass and additional income to the farmers
7	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	2	0.50	Proper utilization of uncultivated fields and additional income for farmers.
Total Cost						**16.36**	
Available Fund						**15.79**	
Convergence						**0.57**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Kapriwas							
Sr. No.	**Nature of Works**	**Location**	**Unit**	**Unit Cost (Rs. in Lacs)**	**No. of Works Phy.**	**Estimated Cost Rs. in Lacs.**	**Objective**
1	Dug Out Pond (New/Renovation)	South side of the village	No.	3	1	3.00	For ground water recharging & availability of water for village community animals.

2	Ramp/Ghat Inlet and Outlet	South side of the village	Cum.	0.0326	41	1.34	For the control of soil erosion, in situ moisture conservation.
3	Roof top rain water recharge structure	Govt. School of village	No.	2	1	2.00	For the conservation of water and ground water recharging.
4	Water Conveyance System	Minor to shiv mandir pond	Meter	0.007	425	2.98	To insured availability of water during lien period in ponds
5	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum.	0.029	5345	1.55	For the control of soil erosion, in situ moisture conservation.
6	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	0.77+0.20=0.97	2	1.94	For the control of soil erosion, in situ moisture conservation.
7	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	5	0.75	Increase biomass and additional income to the farmers
8	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	2	0.50	Proper utilization of uncultivated fields and additional income for farmers.
		Total Cost				**14.05**	
		Available Fund				**12.23**	
		Convergence				**1.82**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Joniawas

Sr. No.	Nature of Works	Location	Unit	Unit Cost (Rs. in Lacs)	No. of Works Phy.	Estimated Cost Rs. in Lacs.	Objective
1	Dug Out Pond (New/Renovation)	North side of village	No.	3	1	3.00	For ground water recharging & availability of water for village community animals.
2	Roof top rain water recharge structure	Govt. School of village	No.	2	1	2.00	For the conservation of water and ground water recharging.
3	Ramp/Ghat Inlet and Outlet	North side of village	Cum.	0.0326	42	1.37	For the control of soil erosion, in situ moisture conservation.
4	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	2	0.30	Increase biomass and additional income to the farmers
5	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	1	0.25	Proper utilization of uncultivated fields and additional income for farmers.
Total Cost						**6.92**	

Available Fund	**6.72**	
Convergence	**0.20**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Garhi Alawalpur							
Sr. No.	**Nature of Works**	**Location**	**Unit**	**Unit Cost (Rs. in Lacs)**	**No. of Works Phy.**	**Estimated Cost Rs. in Lacs.**	**Objective**
1	Dug Out Pond (New/Renovation)	In village Pond	No.	3	1	3.00	For ground water recharging & availability of water for village community animals.
2	Roof top rain water recharge structure	Govt. School of village	No.	2	2	4.00	For the conservation of water and ground water recharging.
3	Ramp/Ghat Inlet and Outlet	In village Pond	Cum.	0.0326	75	2.45	For the control of soil erosion, in situ moisture conservation.
4	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	0.029	8620	2.50	For the control of soil erosion, in situ moisture conservation.
5	Earthen Embankment with pucca outlet	common Land and undulated	No.	0.77+0.20 =0.97	4	3.88	For the control of soil erosion, in situ moisture

		Agriculture fields					conservation.
6	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	10	1.50	Increase biomass and additional income to the farmers
7	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	3	0.75	Proper utilization of uncultivated fields and additional income for farmers.
Total Cost						**18.07**	
Available Fund						**17.47**	
Convergence						**0.60**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Maheshwari							
Sr. No.	**Nature of Works**	**Location**	**Unit**	**Unit Cost**	**No. of Works**	**Estimated Cost Rs. in Lacs.**	**Objective**
					Phy.		
				(Rs. in Lacs)			

1	Dug Out Pond (New/Renovation)	In village Pond	No.	3	2	6.00	For ground water recharging & availability of water for village community animals.
2	Roof top rain water recharge structure	Govt. School of village	No.	2	2	4.00	For the conservation of water and ground water recharging.
3	Ramp/Ghat Inlet and Outlet	In village Pond	Cum.	0.0326	79	2.58	For the control of soil erosion, in situ moisture conservation.
4	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	0.029	8557	2.48	For the control of soil erosion, in situ moisture conservation.
5	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	0.77+0.20=0.97	5	4.85	For the control of soil erosion, in situ moisture conservation.
6	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	5	0.75	Increase biomass and additional income to the farmers
7	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	3	0.75	Proper utilization of uncultivated fields and additional income for farmers.
Total Cost						**21.41**	

Available Fund	**19.49**	
Convergence	**1.92**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Malpura

Sr. No.	Nature of Works	Location	Unit	Unit Cost (Rs. in Lacs)	No. of Works Phy.	Estimated Cost Rs. in Lacs.	Objective
1	Dug Out Pond (New/Renovation)	In village Pond	No.	3	2	6.00	For ground water recharging & availability of water for village community animals.
2	Roof top rain water recharge, Structure	Govt. School of village	No.	2	2	4.00	For the conservation of water and ground water recharging.
3	Ramp/Ghat Inlet and Outlet	In village Pond	Cum	0.0326	58	1.89	For the control of soil erosion, in situ moisture conservation.
4	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	0.029	8345	2.42	For the control of soil erosion, in situ moisture conservation.
5	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	0.77+0.20=0.97	4	3.88	For the control of soil erosion, in situ moisture conservation.
6	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	3	0.45	Increase biomass and additional income to the farmers

7	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	1	0.25	Proper utilization of uncultivated fields and additional income for farmers.
Total Cost						**18.89**	
Available Fund						**17.2**	
Convergence						**1.69**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Alamgirpur

Sr. No.	Nature of Works	Location	Unit	Unit Cost (Rs. in Lacs)	No. of Works Phy.	Estimated Cost Rs. in Lacs.	Objective
1	Dug Out Pond (New/Renovation)	In village Pond	No.	3	2	6.00	For ground water recharging & availability of water for village community animals.
2	Roof top rain water recharge structure	Govt. School of village	No.	2	2	4.00	For the conservation of water and ground water recharging.
3	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum.	0.029	10566	3.06	For the control of soil erosion, in situ moisture conservation.
6	Ramp/Ghat Inlet and	In village Pond	Cum	0.0326	55	1.79	For the control of soil erosion, in situ moisture

	Outlet						conservation.
7	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	0.77+0.20=0.97	3	2.91	For the control of soil erosion, in situ moisture conservation.
	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	5	0.75	Increase biomass and additional income to the farmers
	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	2	0.50	Proper utilization of uncultivated fields and additional income for farmers.
Total Cost						**19.02**	
Available Fund						**17.27**	
Convergence						**1.75**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Masani							
Sr. No.	**Nature of Works**	**Location**	**Unit**	**Unit Cost (Rs. in Lacs)**	**No. of Works Phy.**	**Estimated Cost Rs. in Lacs.**	**Objective**

1	Dug Out Pond (New/Renovation)	North side of village	No.	3	1	3.00	For ground water recharging & availability of water for village community animals.
2	Roof top rain water recharge structure	Govt. School of village	No.	2	1	2.00	For the conservation of water and ground water recharging.
3	Ramp/Ghat Inlet and Outlet	South side of the village	Cum.	0.0326	48	1.56	For the control of soil erosion, in situ moisture conservation.
4	Water Conveyance System	Minor to Shiv Mandir pond south to north side of village	Mtr.	0.007	690	4.83	To insured availability of water during lien period in ponds
5	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum.	0.029	5866	1.70	For the control of soil erosion, in situ moisture conservation.
6	Earthen embankment with pucca outlet	Agriculture field near road crossing along Sahibi river course	No.	0.77+0.20=0.97	3	2.91	For the control of soil erosion, in situ moisture conservation.
6	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	5	0.75	Increase biomass and additional income to the farmers
7	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	2	0.50	Proper utilization of uncultivated fields and additional income for

							farmers.
Total Funds						**17.26**	
Available Fund						**14.85**	
Convergence						**2.41**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Nikhari							
Sr. No.	**Nature of Works**	**Location**	**Unit**	**Unit Cost (Rs. in Lacs)**	**No. of Works Phy.**	**Estimated Cost Rs. in Lacs.**	**Objective**
1	Dug Out Pond (New/Renovation)	North side of village	No.	3	1	3.00	For ground water recharging & availability of water for village community animals.
2	Ramp/Ghat Inlet and Outlet	a) South side of the village	Cum.	0.0326	44	1.43	For the control of soil erosion, in situ moisture conservation.
3	Roof top rain water	Govt. School of village	No.	2	2	4.00	For the conservation of

	recharge structure						water and ground water recharging.
4	Rainfed/Horticulture	Boundary of Agriculture fields	Ha.	0.25	3	0.75	Proper utilization of uncultivated fields and additional income for farmers.
5	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	0.029	8690	2.52	For the control of soil erosion, in situ moisture conservation.
6	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	0.77+0.20=0.97	4	3.88	For the control of soil erosion, in situ moisture conservation.
7	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	5	0.75	Increase biomass and additional income to the farmers
Total Cost						**16.33**	
Available Fund						**14.31**	
Convergence						**2.02**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Khijuri							
Sr. No.	**Nature of Works**	**Location**	**Unit**	**Unit Cost (Rs. in Lacs)**	**No. of Works Phy.**	**Estimated Cost Rs. in Lacs.**	**Objective**
1	Ramp/Ghat Inlet and Outlet	South side of the village	Cum.	0.0326	78	2.54	For the control of soil erosion, in situ moisture conservation.
2	Water Conveyance System	Minor to village pond	Meter	1000	0.007	7.00	To insured availability of water during lien period in ponds
3	Roof top rain water recharge structure	Govt. School of village	No.	2	1	2.00	For the conservation of water and ground water recharging.
4	Dug Out Pond (New/Renovation)	North side of village	No.	3	1	3.00	For ground water recharging & availability of water for village community animals.
5	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	2	0.50	Proper utilization of uncultivated fields and additional income for farmers.
6	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	3	0.45	Increase biomass and additional income to the farmers
7	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	0.029	5483	1.59	For the control of soil erosion, in situ moisture conservation.

8	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	0.77+0.20=0.97	2	1.94	For the control of soil erosion, in situ moisture conservation.
Total Cost						**19.02**	
Available Fund						**18.01**	
Convergence						**1.01**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Niganiawas							
Sr. No.	**Nature of Works**	**Location**	**Unit**	**Unit Cost** (Rs. in Lacs)	**No. of Works** Phy.	**Estimated Cost Rs. in Lacs.**	**Objective**
1	Roof top rain water recharge structure	Govt. School of village	No.	2	1	2.00	For the conservation of water and ground water recharging.
2	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	1	0.25	Proper utilization of uncultivated fields and additional income for

							farmers.
3	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	2	0.30	Increase biomass and additional income to the farmers
4	Dug Out Pond (New/Renovation)	North side of village	No.	3	1	3.00	For ground water recharging & availability of water for village community animals.
5	Ramp/Ghat Inlet and Outlet	South side of the village	Cum.	0.0326	78	2.54	For the control of soil erosion, in situ moisture conservation.
6	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	0.029	12745	3.70	For the control of soil erosion, in situ moisture conservation.
7	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	0.77+0.20=0.97	2	1.94	For the control of soil erosion, in situ moisture conservation.
Total Cost						**13.73**	
Available Fund						**12.77**	
Convergence						**0.96**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Jeetpura

Sr. No.	Nature of Works	Location	Unit	Unit Cost (Rs. in Lacs)	No. of Works	Estimated Cost Rs. in Lacs.	Objective
					Phy.		
1	Dug Out Pond (New/Renovation)	West side of village	No.	3	2	6.00	For ground water recharging & availability of water for village community animals.
2	Roof top rain water recharge structure	Govt. School of village	No.	2	1	2.00	For the conservation of water and ground water recharging.
3	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	2	0.50	Proper utilization of uncultivated fields and additional income for farmers.
4	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	5	0.75	Increase biomass and additional income to the farmers
5	Water Conveyance System	Minor to village pone	Meter	0.007	350	2.45	To insured availability of water during lien period in ponds
6	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum.	0.029	12142	3.52	For the control of soil erosion, in situ moisture conservation.
7	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	0.77+0.20=0.97	5	4.85	For the control of soil erosion, in situ moisture conservation.

8	Ramp/Ghat Inlet and Outlet	West side of village	Cum	0.0326	50	1.63	For the control of soil erosion, in situ moisture conservation.
Total Cost						**21.70**	
Available Fund						**19.15**	
Convergence						**2.55**	

Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village : Majra Gurdas							
Sr. No.	**Nature of Works**	**Location**	**Unit**	**Unit Cost (Rs. in Lacs)**	**No. of Works Phy.**	**Estimated Cost Rs. in Lacs.**	**Objective**
1	Roof top rain water recharge structure	Govt. School of village	No.	2	1	2.00	For the conservation of water and ground water recharging.
2	Dug Out Pond (New/Renovation)	South side of the village	No.	3	1	3.00	For ground water recharging & availability of water for village community animals.

3	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	5	0.75	Increase biomass and additional income to the farmers
4	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	2	0.50	Proper utilization of uncultivated fields and additional income for farmers.
5	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum.	0.029	7842	2.27	For the control of soil erosion, in situ moisture conservation.
6	Ramp/Ghat Inlet and Outlet	South side of the village	Cum	0.0326	55	1.79	For the control of soil erosion, in situ moisture conservation.
7	UGP Line	Road to pond	Mtr.	0.01	54	0.54	
Total Cost						**10.86**	
Available Fund						**9.68**	
Convergence						**1.18**	

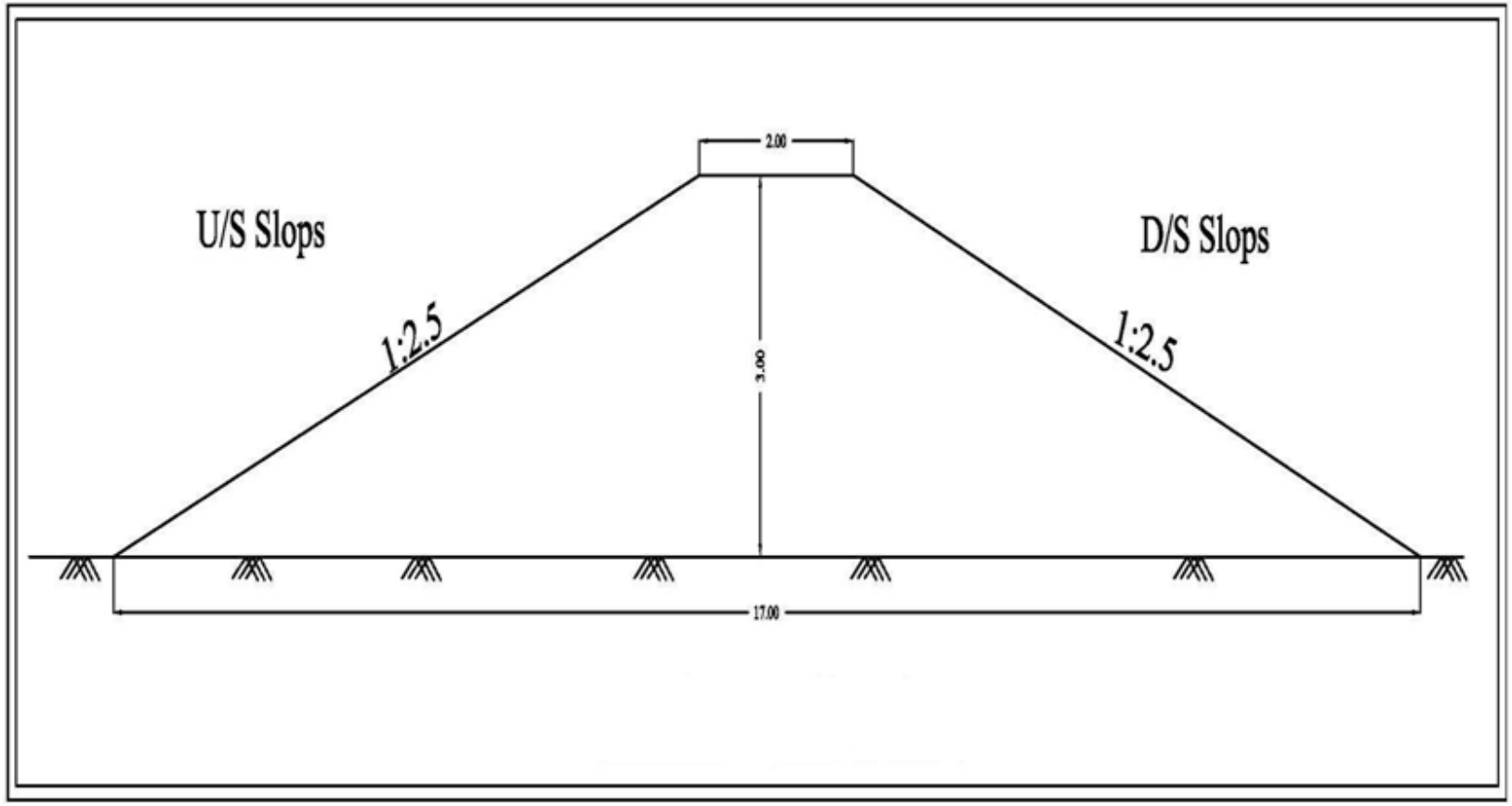
Name of Project IWMP VI Name of Watershed :Kharkhara Name of Village :Majra Shoeraj							
Sr. No.	**Nature of Works**	**Location**	**Unit**	**Unit**	**No. of**	**Estimated Cost Rs. in**	**Objective**

				Cost (Rs. in Lacs)	Works Phy.	Lacs.	
1	Roof top rain water recharge structure	Govt. School of village	No.	2	1	2.00	For the conservation of water and ground water recharging.
2	Agro Forestry/Afforestation	Boundary of Agriculture fields	Ha.	0.15	5	0.75	Increase biomass and additional income to the farmers
3	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	0.25	3	0.75	Proper utilization of uncultivated fields and additional income for farmers.
4	Dug Out Pond (New/Renovation)	West side of village	No.	3	1	3.00	For ground water recharging & availability of water for village community animals.
5	Ramp/Ghat Inlet and Outlet	West side of village	Cum	0.0326	65	2.12	For the control of soil erosion, in situ moisture conservation.
6	Water Conveyance System	West North side	Cum.	0.007	300	2.10	To insured availability of water during lien period in ponds
7	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum.	0.029	10425	3.02	For the control of soil erosion, in situ moisture conservation.
Total Cost						**13.74**	

Available Fund	**13.51**	
Convergence	**0.23**	

Table 1. DETAILED ESTIMATE OF EARTHEN EMBANKMENT

	Let the Average length =	40 meters			
	Let the Average Height =	3.0 meters			
	Up Stream Slope =	1 : 2.5			
	Down Stream Slope =	1 : 2.5			



Earthen Embankment

Leads Statement :-					
Cross Section Area = (Base + Top) ÷ 2 x Height i.e {(17.00 +2.00) ÷ 2} x 3.00 = 28.50 Square meters					
Horizontal leads = (Base/2) + (Cross section area/ 2 x 0.6) i.e. (17.00/2) + [{28.50}/(2 x 0.6)] =32.25 meters					
Vertical leads = (Height +0.60) x 0.4 x 10 i.e. (3.00 +0.60) x 0.4 x 10 = 14.40 meters					
Total leads = 32.25 meters + 14.40 meters = 46.65 meters					
Number of leads = (46.65 - 15.00) / 7.5 = 4.22 leads Or Say 5 No. of Leads					
Area of Jungle Clearance :-					
Area to be covered by the body of Dam = Length x Average base i.e. 40.00 x 17.00 = 680.00 Sq. meters					
Area from where E/W is to be excavated = Av. Length x leads i.e. 40.00 x 46.65 = 1866.00 Sq. meters					
Total Area = 680.00 + 1866.00 =	2546.00	Sq. meters.			
Volume of Loose soil to be removed :-					
Area to be covered by the body of Dam X Depth of loose soil i.e (680.00 x 0.30) =				204.00	cum

Volume of Earthwork in bund filling :-					
(Cross Section Area X Length) + Loose soil to be removed i.e.(28.50 x 40.00)+ 204.00 =				1344.00	cum
ABSTRACT OF COST					
S.No.	**Item of Work**	**Quantity**	**Rate**	**Unit**	**Amount**
1	Jungle clearance including uprooting of rank vegetarian, grass, bush woods etc H.S.R.6.26	2546.00 sq.m	Rs.66.80 + 300% C. Prem. =267.20	100 sq.m	6802.91
2	Removal of loose soil up to 0.3 m below Natural surface level H.S.R. 6.2 (b)	204.00 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	5384.99
3	E/work excavation for making embank-ment undressed including breaking of Clods. H.S.R. 6.2 (b)	1344.00 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	35477.57
4	Extra for admixture for single or kanker Exceeding 30% but up to 40%. H.S.R. 6.2 (h) ii	1344.00 cum	Rs. 318.55 + 350% C. Prem.= 1433.48	100 cum	19265.97
5	Extra for every 7.5 meter additional lead beyond 60mt but up to 255 m by the animal or animal driven cart (5 leads) H.S.R. 6.2 (c) (ii)	1344.00 cum	[(15.00 x 5 No.)+ 350% C. Prem.= 337.50	100 cum	4536.00

6	Dressing of earthwork H.S.R. 6.3 (i)	1344.00 cum	Rs.45.90 + 350 % C. Prem.= 206.55	100 cum	2776.03
Total =					**74243.4712**
Add Contingency at the rate of 3% =					2227.30
Grand Total =					**76470.78**

Table. 2. Detail Estimate of Cement Stone Masonry Structure

S.No.	**Description**	**No.**	**Length (mts)**	**Breadth (mts)**	**Height (mts)**	**Content (cums)**
1	**Excavation of earthwork in foundation And plinth H.S.R 6.6**					
	Crest wall with extensions	1	8.00	2.00	1.20	19.20
	Side walls	2	1.50	1.00	1.20	3.60
	Wing walls	2	2.00	1.00	1.20	4.80
	Toe wall with extensions	1	6.00	1.00	1.20	7.20
	Appron	1	4.00	1.50	0.30	1.80
				Total =		**36.60**
2	**Cement concrete work 1 : 4 : 8 in the Foundation and plinth H.S.R 10.39**					

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
	Crest wall with extensions	1	8.00	1.70	0.20	2.72
	Side walls	2	1.50	0.70	0.20	0.42
	Wing walls	2	2.00	0.70	0.20	0.56
	Toe wall with extensions	1	6.00	0.70	0.20	0.84
	Appron	1	4.00	1.50	0.20	1.20
				Total =		**5.74**
3	**Square rubble stone masonry course1: 5 in foundation and plinth H.S.R 12.23**					
	Crest wall with extensions	1	8.00	(1.5+1.0)/2= 1.25	1.00	**10.00**
	Side walls	2	1.50	0.50	1.00	**1.50**
	Wing walls	2	2.00	0.50	1.00	**2.00**
	Toe wall with extensions	1	6.00	0.50	1.00	**3.00**
				Total =		**16.50**
4	**Square rubble stone masonry course1: 5 above G.L. H.S.R 12.23 and 12.31**					
	Crest wall with extensions	1	8.00	(1.0+0.5)/2= 0.75	1.20	7.20
	Side walls	2	(1.5+2.0)/2= 1.75	0.50	(1.7+0.5)/2= 1.1	1.93
	Wing walls	2	2.00	0.50	1.70	3.40

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
	Toe wall with extensions	1	6.00	0.50	0.20	0.60
	Toe wall extensions	1	1.00	0.50	0.50	0.25
				Total =		**13.38**
5	**Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41**					
	On the top of crest wall	1	4.00	(1.0+0.5)/2= 0.75	0.05	0.15
	On the top of crest wall extensions	2	2.00	0.50	0.05	0.10
	On the top of side walls	2	1.50	0.50	0.05	0.08
	On the top of wing walls	2	2.00	0.50	0.05	0.10
	Toe wall with extensions	1	6.00	0.50	0.05	0.15
	Apron	1	4.00	1.50	0.10	0.60
				Total =		**1.18**
6	**Cement plastering work 1:4 on the**					
	Crest wall both side	2	4.00	_	1.20	9.60
	Crest wall extensions	2 x 2	2.00	_	0.50	4.00
	Side walls	2	(1.5+2.0)/2= 1.75	_	(1.7+0.5)/2= 1.1	3.85
	Wing walls	2	2.00	_	1.70	6.80

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
	Toe wall with extensions	1	6.00	_	0.20	1.20
	Toe wall extensions	2 x 2	1.00	_	0.50	2.00
				Total =		**27.45**

Table. 3. MATERIAL STATEMENT AND COST OF MATERIAL

S.No.	Item of work Quantity		Cement	Sand	Stone blast	Bajri 20 mm	Stone boulders
		(cum)	(bags)	(cum)	(cum)	(cum)	(cum)
1	C.C work 1 : 4 : 8	5.74	19.516	2.7552	5.5104	_	_
2	Sq. stone masonry work	16.50	28.38	4.95	_	_	18.15
	1: 5 in foundation.						
3	Sq. stone masonry work	13.38	23.005	4.0125	_	_	14.7125
	1: 4 above ground level.						
4	C.C work 1 : 2 : 4	1.18	7.4025	0.517	_	1.034	_
5	C. plastering work 1 : 4	27.45 sqm	3.02	0.41	_	_	_

	Total =	**81.323**	**12.64645**	**5.5104**	**1.034**	**32.8625**
	Rates of material	245.00 per bag	950.00 per cum	965.00 per cum	985.00 per cum	945.00 per cum
	Cost of Materials	**19924**	**12014**	**5318**	**1018**	**31055**
	Total Cost of Materials =	**Rupees**	**69329**	**/-only**		

Table. 4. LABOUR COST

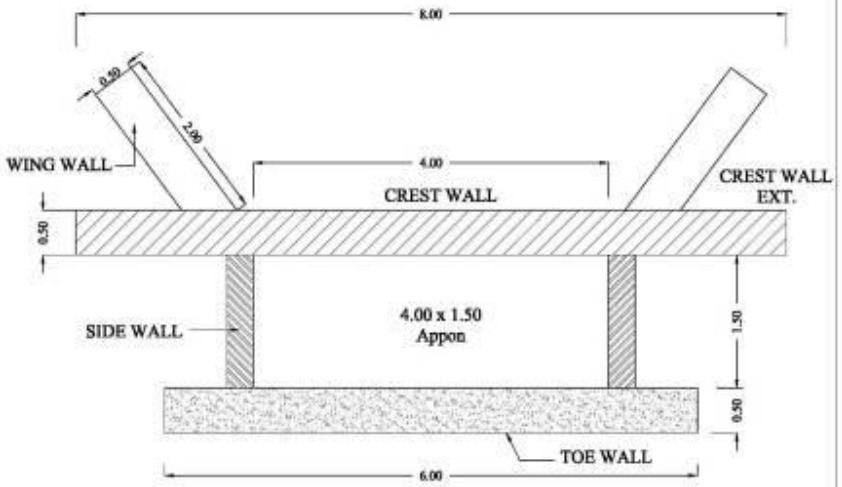
S. No.	**Item of work Quantity**		**Rate**	**Unit**	**Amount**
1	Excavation of earthwork in foundation and plinth H.S.R 6.6	36.60 cum	1108.10 +350% C. Prem. =4986.45	100 cum	**1825.04**
2	Cement concrete work 1 : 8 : 16 in the Foundation and plinth H.S.R 10.39	5.74 cum	64.95 +370% C. Prem. =305.27	cum	**1752.25**
3	Square rubble stone masonry course1: 5 in foundation and plinth H.S.R 12.23	16.50 cum	(160.35+26.00) +250% C. Prem. =652.22	cum	**10761.63**
4	Square rubble stone masonry course1: 5 above G.L. H.S.R 12.23 and 12.31	13.38 cum	(160.35+26.00+27.20) +200% Prem.= 747.42	cum	**9996.74**
5	Cement concrete work 1 : 2 : 4 in the	1.18	64.95 +370% C.	cum	**358.69**

S. No.	Item of work Quantity		Rate		Unit	Amount
	Foundation and plinth H.S.R 10.41	cum	Prem. =305.27			
6	Cement plastering work 1:4 on the stone walls H.S.R 15.5	27.45 sqm	5.50 +340 % C. Prem. =24.2		cum	**664.29**
	Total =	29.875 cum				**25358.64525**
					or say Rs.25359/- only	

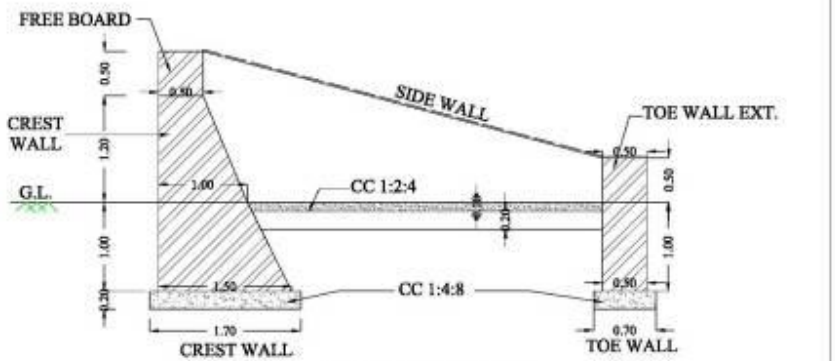
Table. 5. ABSTRACT OF COST

Labour cost	25359.00
Cost of Materials as per detail attached	69329.00
Total =	**94688.00**
Add contingency at the rate of 3%	2841.00
Grand Total =	**97529.00**
Per cum Rate = 97529 /29.88 = 3264.02 or say Rs.3260/- only	

WORK PLAN OF CEMENT STONE MASONRY STRUCTURE



PLAN



X-SECTION

* Not to Scale
*All Dimension in m.

X-section of Masonry Structure

Table. 6. Detailed estimate of Pond

Detail Estimate of village Pond						
	Volume of Pond		=	A+AB+C x D		
				6		

			=	(50x50)+4(41x41)+(32x32)		X 3.00	
				6			
			=	5124 cum			
Volume of Stone Pitching			=	Area X Depth/ Height			
			=	3824 X 0.15			
			=	423.60 cum			
				or say - 1461.55 cft.			
Leads Statement							
	Horizontal Leads		=	(length/2) +(cross section area/2 x 0.60)			
			=	80/2 + {(16.50 + 3)/2 x 2.25}/2 x0.60			
			=	61.94 mtr.			
	Vertical Leads		=	(Depth + Height) x 0.4 x 10			
			=	21.00 mtr.			
	Total Leads		=	{(61.94 + 21.00) - 15.00}/7.5			
			=	9 Leads			

Table. 7. Abstract of cost of estimate for Digging Village Pond

S.No.	Particulars	H.S.R. No.	Quantity	Rates	Unit	Amount
1	Excavation of earth work for digging of the vill. Pond	6.2 (b)	5124.00	2243.75	100 cum	114969.75
2	Extra for every 7.50 mtr. Additional lead upto 60 mtr. For 6 No. leads	6.2 (c')(i)	5124.00	496.29	100 cum	25429.90
3	Extra for admixture of shingle or Kanker upto 30%-40%		5124.00	1218.45	100 cum	62433.38
4	Extra for compaction in 25 cm layers but excluding rolling	6.2 (g_(i)	5124.00	260.48	100 cum	13347.00
5	Extra for watering in 25 cm layers as per specifications for compaction	6.2 (g_(ii)	5124.00	286.88	100 cum	14699.73
6	Extra for rolling in 25 cm layers as per specifications by sheep foot roller	6.2 (g)(v)	5124.00	401.62	100 cum	20579.01
					Total	**251458.76**
					Add. Contigency @2%	**5029.1753**
					Grand Total	**256487.94**
					Or say `	**2.60 Lac**

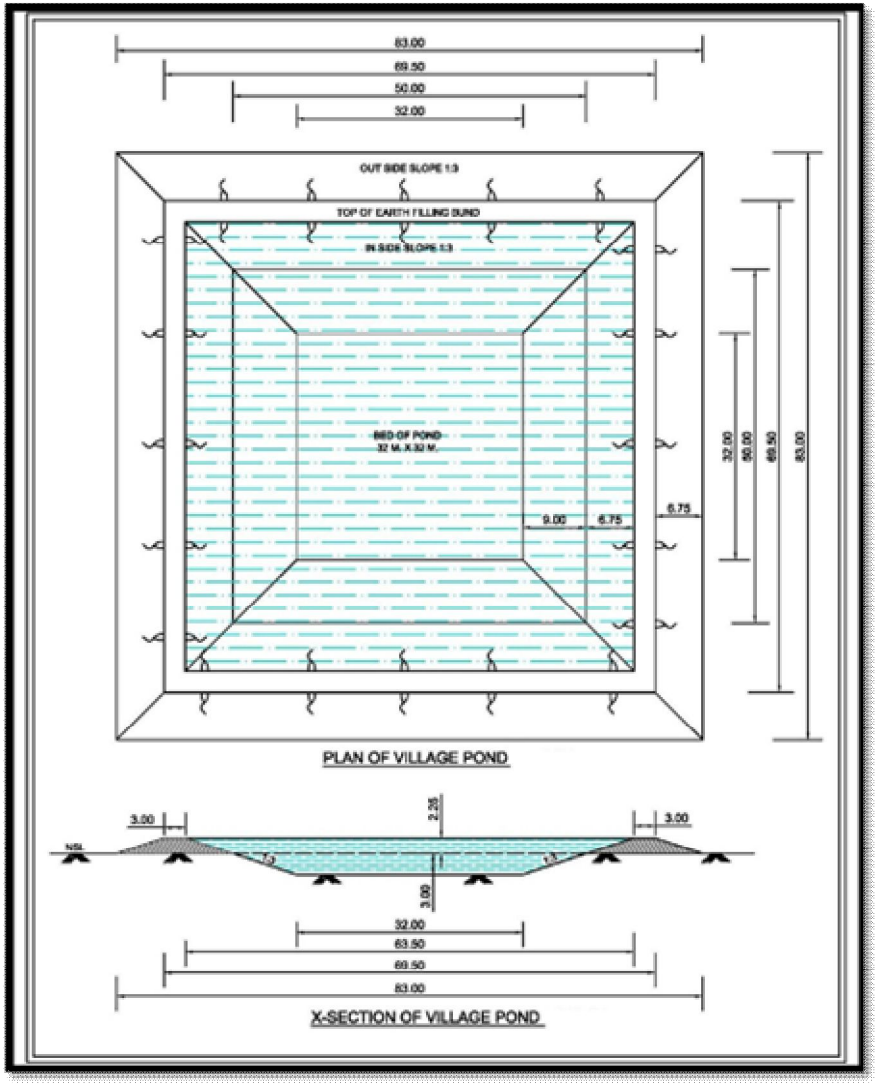

83.00
69.50
50.00
32.00
OUT SIDE SLOPE 1:3
TOP OF EARTH FILLING SUND
IN SIDE SLOPE 1:3
BED OF POND
32 M. X 32 M.
9.00
6.75
6.75
32.00
50.00
69.50
83.00
PLAN OF VILLAGE POND
3.00
2.25
3.00
NSL
1:3
1:3
3.00
32.00
63.50
69.50
83.00
X-SECTION OF VILLAGE POND

Table. 8. Estimate of Orchard Development in the Watersheds Per Hectare (Lemon, Kinnoo)

A. Horticulture

Sr. No.	Particulars	Quantity	Unit	Rate	Amount
1	Soil working 1m x 1m x 1m size pits (390 Nos.) including cost of refilling(At the distance 15'x15')	390.00	cum	36.66	14297.40
2	Application of Farmyard Manure, including cost			L.S.	750.00
3	Cost of fertiliser/ pesticide @250gm/plant			L.S.	750.00
4	Cost of plants (including 15% etc. for mortality) including transportation and planting	450.00	Nos.	15/Plant	6750.00
5	Casualty replacement @ 10% of item No. 4 & 5				465.00
6	Cost of 2 weedings and hoeing			1.00/Pant	540.00
7	Contingency and unforeseen (3%)				492.00
				Total	**24044.40**
				Say `	**24000.00**
	Maintenance cost 2nd year			**L.S.**	**1000.00**
	For next 5 years i.e. , ` 1000 x 5				**5000.00**
				Total	**30000.00**
				Say `	**30000.00**

Estimate of Orchard Development in the Watersheds Per Hectare (Guava ,Amla & Ber)

A. Horticulture

Sr. No.	Particulars	Quantity	Unit	Rate	Amount
1	Soil working 1m x 1m x 1m size pits (225 Nos.) including cost of refilling(At the distance 20'x20')	225.00	cum	36.66	8248.50
2	Application of Farmyard Manure, including cost			L.S.	450.00
3	Cost of fertiliser/ pesticide @250gm/plant			L.S.	450.00
4	Cost of plants (including 15% etc. for mortality) including transportation and planting	260.00	Nos.	30/Plant	7800.00
5	Casualty replacement @ 10% of item No. 4 & 5				465.00
6	Cost of 2 weedings and hoeing			1.00/Pant	540.00

7	Contingency and unforeseen (3%)				492.00
				Total	**18445.50**
				Say `	**18500.00**
8	Maintenance cost 2nd year			L.S.	**1000.00**
	For next 5 years i.e. , ` 1000 x 5				**5000.00**
				Total	**24500.00**
				Say `	**24500.00**

Table. 9. Estimate of Agro- Forestry/ Afforestation

Plantation Model

Cost statement of 1 Ha. Of activities of Plantation for 1st year (wage rate Rs. 94.13/-)						
Sr. No.	**Item of work**	**Unit**	**Qty.**	**SOR**	**Man days**	**Cost**
B	**Nursery**					
i	Raising of Plants in nursery	Nos.	660	18	5601.00	**11880.00**

C	**Carriage**					
i	Loading/ Unloading of plants up to 100 mtr.	Nos.	605	21.18	1.36	128.139
ii	Multistage carriage of plants					
a)	By tractor up to 10 km.	Nos.	605	18.83	12.10	1139.22
c)	By manual labour in plantation area	Nos.	605	42.36	2.72	256.28
					Total	**1523.63**

D	**Planting**					
ii	Soil working for patch sowing	M3	31.25	61.18	20.31	1911.88
	500 x 0.50 x 0.50 x 0.25					
iii	Planting of seeding including 10% replacement 20 x 30 cm.	Nos.	550	188.26	10.99	1035.43
					Total	**2947.31**

E	**Cultural operations & chemical treatment**					
i	Fertilizer application	Nos.	500	9.41	0.50	47.05
ii	Insecticide application	Nos.	500	9.41	0.50	47.05
iii	First Weeding & hoeing	Nos.	500	141.2	7.5	706.00
vi	Subsequent weeding & hoeing two time	Nos.	1000	94.13	10.00	941.30
					Total	**1741.40**

G	**Material**					
ii	Spade and pick axes	----	----	----	----	135.00
iii	Basket/Bucket	----	----	----	----	135.00
v	Fertilizer	----	----	----	----	135.00
vi	Insecticide	----	----	----	----	270.00
					Total	**675.00**

	G. Total =	**18767.34**
	or Say =	**18767.00**

PRODUCTION SYSTEM- 10%

7.3 PRODUCTION SYSTEM

7.3.1 Crop Production

Present Status: Agriculture is the mainstay of the inhabitants of the project area which is mainly rainfed and people gamble with the uncertain rains. The fertility of the soil is very poor especially in available nitrogen is low and available phosphorus is low to medium because the organic carbon contained in the soil is very low and the available potash in the soil is medium to high. Mustard, Wheat and Bajra are the main crops. Due to frequent droughts, crop failures are common, and yield levels are low. Farmers maintain fodder plants on the field bunds. Because of extensive damage by wildlife, farmers are gradually shifting towards dairy farming. But there is acute shortage of green and dry fodder. Still traditional farm practices are followed such as manual weeding and hoeing, use of desi ploughs and bullock power in tillage operations. The systematic and regular soil testing has not been done. Only farm yard manure is added to maintain yield levels. Food grains are hardly sufficient for 6 to 8 months with small farmers. Post-harvest gain storage, food processing and value addition techniques are not prevalent.

Scope of Improvement: There appears tremendous scope in improving production systems of the project area. The following practices are suggested for better harvests.

- Conservation farming concept based on getting highest yield per drop of water shall be introduced.
  This would also include better tillage practices for in-situ rain water conservation.
- Weather related contingent crop planning shall be introduced to reduce the impact of droughts.
- The varieties of wheat are old and shall be replaced with latest varieties.
- There is a good scope of introducing hybrid varieties of Bajra. Intercropping of Moong and Urad is suggested with Bajra.

- The application of fertilizers on soil test basis and minimum use of chemicals for weed and disease control shall be promoted.
- Farmers would be linked to farm advisory services and Krishi Vigyan Kendras.
- The dry land farming techniques should be adopted for better production.
- Agro-forestry with integration of trees like Neem, Acacia, Shisham would be promoted on large scale.
- Leguminous crops mainly Moong and mash short duration varieties needs to be introduced

7.3.2 Horticulture

Existing System: Ber, Amla and Guava are the most preferred fruit crop of the farmers and scattered plants of local citrus fruits are seen in farm lands. Some farmers have started raising Guava and Kinnow where irrigation facilities are available. Citrus fruits also raised but mostly for domestic use. Well organized marketing system in fruit plants.

Proposed System: The average annual rainfall is 702 mm in the project area. The project areas are well connected by roads and the economic condition of the locals can be improved by introducing improved cultural practices of fruit plants coupled with rain water harvesting and efficient use of water. Large number of farmers are interested to increase area under Guava, Ber and Kinnow requested for supply of good quality nursery raised plants. Several families have shown interest in raising Citrus fruits and Amla. The following activities are proposed to promote horticulture in the area.

- Supply of quality seedlings arranged from approved nurseries as per choice of farmers.
- Soil testing up to a depth of 180 cm depth to ensure suitability of soil for fruit plants.

- Proper back up technical support on orchard management by involving HAU Farm Advisory Service and department of horticulture.
- Appropriate safeguards from wildlife damage, frost damage and wind breaks.
- Arrangements for limited irrigation at least for first few years.
- Organizing SHGs around horticulture and joint purchase of inputs and marketing.

7.3.3 Vegetable cultivation

Present status: Vegetable cultivation as such for market purpose is not followed mainly because of the limitation of irrigation facilities. Most farmers raise vegetable crops in back yards for domestic use. Some poly houses have come up in the area with financial support from National Horticulture Mission and have started commercial cultivation of off season vegetables.

7.3.4 Promotion of Farm Forestry and Agro-forestry

Most of the privately owned non-arable the area is under mix of trees and bushes. Lantana, sarkanda and parthenium, the most obnoxious weeds have invaded such area.

- Planting of improved cultivars of Neem in the project as single rows on field bunds and also as blocks has been proposed to promote agro-forestry as an alternate source of income.

7.3.5 Livestock Improvement Including Fodder Production

Livestock rearing is the most important subsidiary occupation of the project villagers. In addition to selling milk for regular daily income, farm yard manure is most needed to maintain fertility and moisture retention of soils. Even landless families also maintain few numbers of animals. The animal breed improvement work was initiated in these villages under Aravali, DDP, DPAP projects and it is a regular program of the Animal Husbandry Department. However, the availability of animal health services at the door step is grossly lacking. The programs proposed under the project for livestock improvement include:

- In order to promote animal health care camps shall be organized and medicines for de-worming, mineral mixture shall be supplied in addition to awareness generation about prevention of animal diseases.
- Provision of quality seed of fodder crops and demonstration.

7.3.6 Marketing Arrangements and Proposal for Improvement

There is no organized system of marketing although market surplus is limited. The marketing of Wheat, Mustard and Bajra is not a problem because of fixed prices and government controlled procurement system. There is no organized system of marketing of vegetables and milk though both are source of income with many families.

The efforts through the project are made towards diversification of agriculture to include fruit and vegetable crops and dairy development. The transfer of area to these high value crops would depend on development of irrigation facilities, facilitation in input supplies, transfer of production technology, easy credit and market linkages. Efforts have been made to reactivate the non-functional

SHGs and UGs. New watershed committees have been formed in each village. Farmers have shown interest in joint management of resources and join hands for processing, value addition and marketing.

Fortunately, the involvement of Rural Development Department means regular interaction with the district administration whose good offices would be used to involve rural banking institutions in funding support for SHGs, User Groups and other interest groups.

7.3.7 Detail of production system to be promoted

Based on the discussions during PRA, the scope of production systems was worked out and as per the provision of funds @ 10% of the budget, the following activities were finalized.

Table 10.Detail of Production System proposed to be promoted in the project village

S. No.	Particulars	Contents	No. of micro watershed	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total

S. No.	Particulars	Contents	No. of micro watershed	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
1	Agriculture	To introduce Summer Moong or Mash, gwar and groundnut as a third crop in bajra-wheat rotation. Supply of mini- kits to 50 farmers of each micro watershed/year @ Rs.200/ kit as assistance is provided.	6	300(farmers)	1500 (mini kits)	200 per mini kits	300000
	Agriculture	Application of farm inputs like Zinc Sulphate or Sulphur or weedicides or pesticides. 50 farmer of each micro watershed/ year @ Rs.200/ kits as assistance is provided.	6	300(farmers)	1500 (mini kits)	200 per mini kits	300000
	Agriculture	Supplying of Agriculture implements – 10 farmers (average) per micro watershed @ Rs. 1000/ units as assistance is provided.	6	60(farmers)	300	1000	300000
	Agriculture	Agro Forestry: Neem on 50% subsidy @ Rs. 10/ plant as assistance is provided.	6	4800(plants)	24000 plants	Rs. 10 per plant	240000
2	Horticulture	Potential for Grafted Horticulture plants. Supply of plants at 50 % cost share for cultivation of fruits like Citrus fruits, Guava, Amla, Ber floriculture and vegetables (especially, turmeric, garlic, onion and tomato)	6	480 plants	2400 plants	Rs.40 per plant	96000
	Horticulture	Kitchen gardening Packets distributed to 70 farmers in each micro watershed/ year @ Rs.25/ packet.	6	420	2100	Rs. 25 Per packet	52500
	Horticulture	Three units of Bee keeping in each micro watershed @ 3000/ unit as assistance are provided.	6	18	90	3000	270000

S. No.	Particulars	Contents	No. of micro watershed	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
	Horticulture	Two units of Vermi compost in each micro watershed per year @ Rs. 10000 per unit as assistance is provided.	6	12	60	10000	600000
3	Animal Husbandry	Problems being faced due to some diseases in the animals and low yield of milk. Production of free life saving medicines/ minerals for animals – the provision for 45 farmers of each micro watershed/year @ Rs.225 has been provided.	6	270	1350	225	303750
	Animal Husbandry	Livestock Management supply of feed supplements to improve health of cattle's. The provision to benefit 45 farmers of each micro watershed/year @ Rs.225 has been kept in the project proposals.	6	270	1350	225	303750
	Animal Husbandry	Supply of mini- kits of high yielding variety green fodder seeds to 20 farmers in each micro watershed/year @ Rs.200/- mini kits.	6	120(farmers)	600 Seeds of mini kit	200 per mini kit of seeds	120000
4	Joint camps with Line Departments	Two training camps to beneficiaries on Proven technology in agriculture are provided (during pre kharif and rabi season).	6	12	60	20000	1200000
		Contingency					18000

Total: Rs. 4104000/-

Note. The development of Horticulture, Animal Husbandry and Agro forestry has limited scope because of scattered & small land holding, wild life problems and drought conditions. The National Horticulture Mission has already implementing various schemes in the project area. The beneficiaries are taking advantages under their ongoing schemes.

In order to manage the fodder scarcity the latest rain fed varieties of fodder crop will be introduced on the recommendation of experts of Haryana Agriculture University and Central Soil and Water Conservation Research Institute, Chandigarh. Necessary provision for organizing the various training programme / exposure visits has been provided in the Capacity Building activity.

7.3.8. Vermin Compost

The vermin compost is one of the very useful organic manure. The vermin compost prepared by induction of various types worms (Earth Worm), to de compost and converted from raw animal dung to well de compost highly nutritive organic manure.

One of the important occupations of villagers is the animal husbandry. At present, the animal wastes are not being used by the villagers. This waste can be utilized as vermin- compost on the farm where the productivity and physical condition of the soil can be increased manifold. The animal waste can be used for preparation of vermin- compost. The available nutrients in vermin- compost are higher than country type farmyard manure. As per NHM guideline, the installation cost of structure of 1 vermin compost unit (size) 500 Sq. ft., the total cost of the unit would be is Rs. 60000/-. Out of this the 50% subsidy i.e. Rs.30000/- is met from the ongoing programme of horticulture department. The additional amount i.e. Rs. 10000/- will be form under IWMP Programme. The nutrition value of vermin compost is more than Farm Yard Manure and compost i.e. nitrogen- 1.2 to 1.6%, Phosphorous 1.5 to 1.8%, Potash 1.2 to 2% are just double.

Table 11: Model/ Estimate for a Vermin Compost Unit

Sr. No	Component	Expenditure to be incurred
1	Construction of shed of size 500 Sq. ft.@ Rs. 100 per Sq. ft. with pacca floor, beds and coverings etc.	50000/-
2	Cost on breeding material and purchase of worms etc.	8000/-
3	Tools and equipments etc.	2000/-
	Total	**60000/-**

Components of Vermin Compost Unit

1. **Shed**

Due to the high temperature in summer, shed structure is needed for vermin compost unit. It can be made by use of bricks/ concrete pillars. While designing the shed adequate room has to be left around the beds for easy movements of labours attending to the filling and harvesting the beds.

2. **Vermin- beds**

Scientific bed side depending upon the provision of filtered for drainage of excess water is prepared of about 75- 90 cm thick. The whole bed should be above the ground, the proper bed width to be not more than 1.5 m to allow easy access to the centre of the bed is constructed.

3. Land

About 125 sq. m. land is required to set up the vermin compost production. It should have 2- 3 sheds each of 180- 200 sq. ft. Good watering arrangement is required as the moisture is very essential for vermin compost production.

4. Seed Stock

This is important because worms multiply at the rate of 350 worms per cubic meter of bed space over a period of six months in a year.

5. Machinery

Farm machinery and implements are required for cutting the raw material in small pieces, conveying shredded raw material to the out sheds, loading, unloading, collection of compost, loosening of beds for aeration, shifting of the compost. Costs of providing necessary implements and the machinery have to be included in the project cost.

LIVELIHOOD ACTIVITIES FOR THE ASSET LESS PERSONS-9%

7.4 LIVELIHOOD SUPPORT TO SHG'S

The key issue of inclusion of this chapter is that about 70% of the population in the proposed villages depends on agriculture and allied activities, but it rarely provides sufficient means of survival to small and marginal farmers. During the base line survey, this aspect was discussed with the existing Self Help Group/ Gram Sabha members. The representative of WAPCOS, Sociologist of the team held comprehensive discussions on the possibilities of livelihood in the rain fed areas. The main objectives of these discussions were:

1. Assure one livelihood option to poor families.
2. Assured livelihood for at least 300 days in a year including MGNREGA.
3. At least one daily job per family mainly SCs/BPL/very poor families.

SHGs would be imparted Skill Training on identified Economic Activities and it is proposed to impart them trainings at Krishi Vigyan Kender (CCSHAU) Rewari and Haryana Institute of Rural Development, Nilokheri, Agriculture University, Hisar, Central Soil and Water Research and Training Institute, Chandigarh. It is proposed to lend revolving fund of Rs. 25000/- to each SHG/individual formed in the watershed villages. Since the members from SHGs/landless are very poor, they do not have resources to start micro enterprises, it is envisaged that they should be assisted and given loan of this amount in the shape of Revolving Fund Assistance (RFA) so that they do not get trapped by money lenders. Funds thus given on loan are recoverable from SHGs/individuals in easy installments. It is also proposed to impart skill training to at least 10 unemployed youth from each village and give them trainings of their choice so that they establish some small enterprises. It is further proposed to give them interest free loan of Rs. 12000/- each as Revolving Fund Assistance to meet their urgent needs of funds for establishing micro enterprises. Such funds recovered could either be given back to SHGs/individual or some other SHGs/individuals depending upon assessment of their respective needs. It is

proposed to form 2 SHGs in each village and identify at least 10 youths in each village for imparting training and giving Revolving Fund.

7.4.1 Activities those are likely to be taken up by SHGs/individuals

1. Cutting and Tailoring
2. Embroidery
3. Mushroom cultivation
4. Plumbing
5. Carpentry
6. Bee keeping
7. Animal husbandry
8. Vermi composting
9. Cattle rearing and selling milk
10. Household wiring, Motor winding
11. Backyard poultry
12. Skill Development in Computer

The details of funds proposed to be utilized under this component are as under:

Table 12. Revolving Fund Assistance for SHGs

S.No.	Name of micro watersheds	No. of villages	Total SHGs	Amount of RFA per SHG	Total
1	Kharkhara	2	2	25000	50000
2	Malpura	3	3	25000	75000
3	Garhi alawalpur	2	2	25000	50000
4	Khijuri	3	3	25000	75000
5	Jeetpura	3	3	25000	75000
6	Majra Sheoraj	2	2	25000	50000
		15	**15**		**375000**

Table 13. Skill Trainings/Skill up gradation for SHGs

S.No.	Name of micro watersheds	No. of villages	Total SHGs	Amount of Training per SHG	Total
1	Kharkhara	2	2	35000	70000
2	Malpura	3	3	35000	105000
3	Garhi alawalpur	2	2	35000	70000

4	Khijuri	3	3	35000	105000
5	Jeetpura	3	3	35000	105000
6	Majra Sheoraj	2	2	35000	70000
		15	**15**		**525000**

Note: This training cost includes Travel, boarding/lodging, cost of training and faculty support for different discipline e.g. Bakery Product, Soap and detergent making, fisheries, Bee keeping, Vermi Compost, Domestic poultry, Mushroom cultivation, Plumbing, Carpentry, Food Processing, Animal Husbandry, Product Processing etc.

Table 14. Computer Training (6 months) for unemployed youth above 12th passed male and female both recommended by Watershed Development Committee

S.No.	Name of micro watersheds	No. of villages	No. of Persons in micro	Amount of Training per trainee for 6	Total

			watershed	month	
1	Kharkhara	2	10	10000	100000
2	Malpura	3	10	10000	100000
3	Garhi alawalpur	2	10	10000	100000
4	Khijuri	3	10	10000	100000
5	Jeetpura	3	10	10000	100000
6	Majra Sheoraj	2	8	10000	80000
		15	**58**		**580000**

Note: The beneficiaries will contribute 10% as cost sharing of the livelihood support programme Rs. 580000 @ 10% cost sharing.

= 580000- 58000

= 522000/-

Table 15. One time assistance as Revolving Fund to unemployed youth who have successfully completed Computer Training for setting up a computer centre

S.	Name of micro	No. of villages	No. of Persons in micro	Amount of Training per	Total

No.	watersheds		watershed	Trainee	
1	Kharkhara	2	10	20000	200000
2	Malpura	3	10	20000	200000
3	Garhi alawalpur	2	10	20000	200000
4	Khijuri	3	10	20000	200000
5	Jeetpura	3	10	20000	200000
6	Majra Sheoraj	2	8	20000	160000
		15	**58**		**1160000**

Note: This training cost includes Travel, boarding/lodging, cost of training and faculty support.

Note: The beneficiaries will contribute 10% as cost sharing of the livelihood support programme Rs. 1160000 @ 10% cost sharing.

= 1160000- 116000

= 1044000/-

Table 16. Cutting and Tailoring Centre for female beneficiaries

S. No.	Name of micro watersheds	No. of villages	No. of centre's	Requirement for sewing machines per village (2 No.)	Payment to trainer per months	Period of training for each centre	Total payment to trainer
1	Kharkhara	2	2	4	2000	6	24000
2	Malpura	3	2	4	2000	6	24000
3	Garhi alawalpur	2	2	4	2000	6	24000
4	Khijuri	3	3	6	2000	6	36000
5	Jeetpura	3	2	4	2000	6	24000
6	Majra Sheoraj	2	2	4	2000	6	24000
	Total	**15**	**13**	**26**			**156000**

Total cost for 13 Centres

1. Payment to trainers 156000/-

2. Sewing Machine Cost 60000/- (lump sum)

Table 17. Embroidery Centre for female beneficiaries

S.No.	Name of micro watersheds	No. of villages	No. of centers	Payment to Trainer per Month	Period months	Payment to trainer for 6 months @ Rs. 2000 p.m	Total trainers	Grand Total
1	Kharkhara	2	2	2000	6	12000	2	24000
2	Malpura	3	2	2000	6	12000	2	24000
3	Garhi alawalpur	2	2	2000	6	12000	2	24000
4	Khijuri	3	3	2000	6	12000	3	36000
5	Jeetpura	3	2	2000	6	12000	2	24000
6	Majra Sheoraj	2	2	2000	6	12000	2	24000
	Total	**15**	**13**					**156000**

Total Cost:

Payment to trainer: Rs. 156000/-

Table 18. Livelihood Support

S.No.	Name of micro watersheds	No. of villages	Revolving fund assistance to individuals unemployed youth/ landless, women	
			Dairy Unit	Bee Keeping, Mushroom Cultivation, Vermi compost etc.
1	Kharkhara	2	3	3
2	Malpura	3	3	3

3	Garhi alawalpur	2	4	4
4	Khijuri	3	5	5
5	Jeetpura	3	4	4
6	Majra Sheoraj	2	3	3
	Total	**15**	**22**	**2**
	Rate (Rs)		**25000**	**10000**
	Cost (Lakh Rs)		**5.50**	**2.20**

Contingency, printing material and other unseen items: Rs. 85600/-

Total funds available under this component are Rs. 3693600/-

In addition to HAU, the following institutions are also identified for imparting trainings:

i. HIRD, Nilokheri
ii. Agriculture, Technology and Extension, Hisar Agriculture University
iii. Central Soil and Water research and training Institute, Chandigarh
iv. Mushroom Training Centre, Sonipat and Solan
v. NIRD, Hyderabad
vi. Krishi Vigyan Kender (CCSHAU), Rewari

There appears to be great potential for these activities and these activities are likely to generate income of Rs. 2000/- to Rs. 2500/- per member per month. However no activities would be forced upon on any SHGs and they would be free to decide the activity they

would like to opt for their additional income. The PIA can take up the activities as per the need and approval of the Watershed Committee. Based on their choice, Project report for the specified activity would be prepared and revolving fund of Rs. 20000/ Rs. 25000/- per SHG would be given for running their respective micro enterprise. If need arises for more funds for their Income Generation Activities at later stage, they would be assisted in getting loan from banks. SHGs thus formed would be provided all possible assistance to uplift for their Socio- Economic conditions.

CONVERGENCE

7.5 INTRODUCTION

The National Rural Employment Guarantee Act (NREGA), notified on September 7, 2005, marked a paradigm shift from the previous wage employment programmes with its rights-based approach that makes the Government legally accountable for providing

employment to those who demand it. The act aims at enhancing livelihood security households in rural areas of the country by providing at least one hundred days of guaranteed wage employment in a financial year to every household whose audit members volunteer to do unskilled manual work. Such Inter sectoral convergence becomes instrumental towards.

- Establishing synergy among different government programmes in planning and implementation to optimize use of public investments
- Enhancing economic opportunities
- Strengthening democratic Processes
- Mitigating the effects of Climate Change
- Creating conditions for sustainable development.
- One of the significant areas for convergence is the Watershed Management Programme of the Dept. of Land Resources (DoLR) in the Ministry of Rural Development (MoRD),
- Convergence is an evolving process and while broad principles can be laid out at the centre, the actual contours of convergence will be determined by the resources at the Central, State, District and the project level. Also, to fully identify the possibilities of convergence, it may be necessary to make a beginning with select programmes, so that the experience of implementation may further inform and refine strategies for convergence.

7.5.1 Convergence between MGNREGA and Watershed Programmes

Most of the activities under watershed development are covered under MGNREGA and there is a need for convergence to meet gap in requirement under IWMP. The labour component would be met out of funds made available under MGNREGA. The village wise details of the fund requirement are exhibited below (table. 35)

Detail of Convergence of IWMP and other schemes

Table 19. GAPS IN FUNDS REQUIREMENT – MICRO WATERSHED WISE

S.No	Name of micro watersheds	Total cost requirement for works	Total funds available under IWMP for works	Gap in funds requirement for works	Convergence with MGNREGA
1	Kharkhara	39.14	37.16	1.98	1.98
2	Malpura	39.86	36.15	3.71	3.71
3	Garhi alawalpur	39.48	36.96	2.52	2.52
4	Khijuri	49.08	45.09	3.99	3.99
5	Jeetpura	57.98	51.27	6.71	6.71
6	Majra Sheoraj	24.60	23.18	1.42	1.42
	Total	**250.14**	**229.81**	**20.33**	**20.33**

- Under NREGA almost all the activities required for watershed development are permitted. Convergence between NREGA and Watershed Programmes of DoLR will be mutually beneficial for rain fed areas.

7.5.2 Non-Negotiable for works executed under MGNREGA

- Only Job Card holders to be employed for MGNREGA component.
- Muster rolls will be maintained on work site, with copies in the Gram Panchayat and to be electronically maintained on nrega.nic.in
- Wage payments will be through no-frills accounts in banks/post offices.

Need for Convergence: Since more than 56% of activities related to Watershed development are covered under MGNREGA, there is need for convergence to meet gap in Funds requirements under IWMP. Detailed survey had been conducted in Watershed villages and it has emerged that there is need for more funds to augment and strengthen the activities under IWMP. All six micro watersheds need more funds to meet the gap. Therefore, some of the works are proposed to be converged with MGNREGA. The labour component would be met out of funds made available under MGNREGA.

7.5.3 Convergence with Forest Department

The unit cost of agro- forestry component for 1 ha area (1100 plant) for plantation and other activity is Rs. 18767/-. The provision of Rs. 15000/- per ha has given in IWMP programme. The rest amount of Rs. 3767/- will be convergent from lined department from departmental schemes or MGNREGA.

7.5.4 Convergence with Horticulture Department

National Horticulture Mission is implementing the horticulture development programme which includes construction of water harvesting structures, drip and sprinkler irrigation activities which would be undertaken in convergence with the horticulture department. Under this activity 33 ha horticulture development programme with the financial assistance of Rs. 8.25 lakh has been provided in the project proposals. This would also be undertaken by convergence with the horticulture department.

7.5.5 Convergence with Agriculture Department

The activities under NRM like Water Conveyance System, UGP Line, Dug Out Pond (New/Renovation), Ramp/Ghat Inlet and Outlet, Small Earthen Embankment with vegetative support, Earthen Embankment with pucca outlet, Roof top rain water recharge structures etc. where the machinery and material component is required and the unit cost exceeds for completion exceeds to the project provision, the same will be met in convergence with the similar activities of the agriculture.

7.5.6 Convergence with Animal Husbandry Department

The watershed falls in the water deficit conditions for production of fodder and depends upon the rain. The rainfall pattern is erratic. There is deficiency of green fodder and nutrients for the animals. The provision has been kept for providing mini kits for of life saving medicines/ mineral mixture, concentrate feed and fodder seeds. Since the provision of these kits is less than the required, hence this would be met with the lined department who has a provision under their ongoing programmes.

CHAPTER – 8

QUALITY AND SUSTAINABILITY

8.1 Monitoring and Evaluation

8.1.1 Plans for Monitoring and Evaluation:

Web based GIS system is being developed for Monitoring and Evaluation at various stages of project while in progress and post project stage. The satellite imageries are also helpful in monitoring all activities of the watershed area (Pre project, during project and post project). All the details relating to Watershed Activities would be available on website. The system is very useful to know the progress of the project at the click of the button. The higher officials would be able to monitor the progress and could generate the desired reports. The system would also help beneficiaries to know the area of importance, already treated area/ area to be treated. The system would serve an aiding tool to the planners and evaluators for judging the efficacy of the project.

8.1.2 Monitoring

Regular Monitoring of the project will have to be carried out at each stage to monitor the progress of the project. Different streams of monitoring are proposed as under:

1. Internal Monitoring by PIA/ WCDC
2. Progress and Process monitoring
3. GIS/ On line Monitoring
4. Sustainability monitoring
5. Self Monitoring by communities
6. Social Audits
7. Independent and external monitoring

Monitoring of watershed related activities will be carried out after completion of each phase. 1% amount of the project is earmarked under this component. Micro Watershed wise details are given below:

Table 1. Micro Watershed wise details

S.no	Name of the Micro Watersheds	Effective Area	Total Cost	Monitoring 1%
1	Kharkhara	553	66,36,000	66,360
2	Malpura	538	64,56,000	64,560
3	Garhi alawalpur	550	66,00,000	66,000
4	Khijuri	671	80,52,000	80,520
5	Jeetpura	763	91,56,000	91,560
6	Majra Sheoraj	345	41,40,000	41,400

8.2 EVALUATION

Each evaluation will include physical, financial, and social audit of all work done. The objective of evaluation of the project is to assess the status of watershed related interventions in the project. The evaluation will be taken up in three stages of the project. The Evaluation will be done by agencies empanelled on SLNA.

1% amount of the project is earmarked under this component. Micro Watershed wise details were as under:

Table 2. Micro Watershed wise details

S.no	Name of the Micro Watersheds	Effective Area	Total Cost	Evaluation 1%
1	Kharkhara	553	66,36,000	66,360
2	Malpura	538	64,56,000	64,560
3	Garhi alawalpur	550	66,00,000	66,000
4	Khijuri	671	80,52,000	80,520
5	Jeetpura	763	91,56,000	91,560
6	Majra Sheoraj	345	41,40,000	41,400

CONSOLIDATION PHASE- 3 %

Consolidation Phase = Rs. 12, 31,200 /-

8.3 CONSOLIDATION PHASE

This is another important activity under the project. In this phase, the resources augmented and economic plans developed in Phase II are made the foundation to create new nature based, sustainable livelihoods and raise productivity levels. There needs to be some mechanism at Watershed Level for the following crucial Activities as detailed below:

I. Managing/upgrading of all activities taken up under the Project.

II. Preparation of Project completion report and

III. Documentation of success stories

IV. Management of proper utilization of WDF

V. Mechanism for Quality and sustainability issues under the Project.

VI. Mechanism for fixation and collection of User Charges.

VII. Consolidation of works

VIII. Building the capacity of community based organizations to carry out the new agenda – post project period.

IX. Intensification of farm production systems/off farm livelihoods

X. Project Management related aspects

To take up these activities, it is proposed In the DPR as under:

Name of Micro watershed: Kharkhara

Table 3. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. in lacs)
1	Managing/ upgrading of all activities taken up under the project	0.40
2	Preparation of Project completion report	0.10
3	Documentation of success stories	0.10
4	Management of proper utilization of WDF	0.30
5	Mechanism for quality and sustainability issues under the Project	0.10
6	Watershed activities	0.99

Total: 1.99 lacs

Name of Micro watershed: Malpura

Table 4. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. in lacs)
1	Managing/ upgrading of all activities taken up under the project	0.39
2	Preparation of Project completion report	0.10
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.29
5	Mechanism for quality and sustainability issues under the Project	0.10
6	Watershed activities	0.97

Total: 1.94 lacs

Name of Micro watershed: Garhi alawalpur

Table 5. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. in lacs)
1	Managing/ upgrading of all activities taken up under the project	0.39
2	Preparation of Project completion report	0.10
3	Documentation of success stories	0.10
4	Management of proper utilization of WDF	0.30
5	Mechanism for quality and sustainability issues under the Project	0.10
6	Watershed activities	0.99

Total: 1.98 lacs

Name of Micro watershed: Khijuri

Table 6. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. in lacs)
1	Managing/ upgrading of all activities taken up under the project	0.48
2	Preparation of Project completion report	0.12
3	Documentation of success stories	0.12
4	Management of proper utilization of WDF	0.36
5	Mechanism for quality and sustainability issues under the Project	0.12
6	Watershed activities	1.21

Total: 2.41 lacs

Name of Micro watershed: Jeetpura

Table 7. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. in lacs)

1	Managing/ upgrading of all activities taken up under the project	0.55
2	Preparation of Project completion report	0.14
3	Documentation of success stories	0.14
4	Management of proper utilization of WDF	0.41
5	Mechanism for quality and sustainability issues under the Project	0.14
6	Watershed activities	1.37

Total: 2.75 lacs

Name of Micro watershed: Majra Sheoraj

Table 8. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. in lacs)
1	Managing/ upgrading of all activities taken up under the project	0.25
2	Preparation of Project completion report	0.06
3	Documentation of success stories	0.06
4	Management of proper utilization of WDF	0.19
5	Mechanism for quality and sustainability issues under the Project	0.06
6	Watershed activities	0.62

Total: 1.24 lacs

As per the common guideline the management of developed natural resources would involve the following features:

- Improving the sustainability of various structures and equitable distribution. The watershed committee will fix the charges of water and the funds generated would be utilized O& M Structures. These users charges account will be maintained separately.
- Involvement of Gram Panchayat for repair, maintenance and protection of created structures.

CHAPTER – 9

EXPECTED OUTCOME

EXPECTED OUTCOMES

The effective area is 3420 ha and the Project Cost is 410.40 lacs covering 6 no. micro watersheds and in all 15 villages. Benefits will be much more than the project cost as detailed below:

With the several interventions under IWMP VI project such as Livelihood support, Farm production system, various types of activities relating to soil conservation measures for diversification of crops, Protection to field by constructing the structures etc, it is expected that these Watershed villages shall be benefited. This intervention will have multiple benefits available to communities in terms of employment, check in migration, improvement in water table, more area under agriculture and horticulture, check in soil loss and decrease in Flood and drought incidences, improvement in crop yield, milk yield, check in degradation of land etc. The benefits thus accrued would be short term and long term. With the judicious use of funds available under IWMP and with convergence from MGNREGA and other schemes of Departments, this project of Kharkhara Watershed VI will prove to be very beneficial in improving socio – economic status of people residing in Project villages.

Expected outcomes as mentioned above are given in the following tables:

9.1 EMPLOYMENT

Employment has always been a problem in the village. The principal occupations of the people are rain fed agriculture, animal husbandry and casual labour work. However, rainfall being limited and erratic, agriculture suffers, i.e. thus limiting them for a single crop, which keeps them partially engaged for 4 to 5 months. Similarly due to lack of fodder animal husbandry does not keep them fully engaged. Thus the people mainly depend upon casual labour either in the villages is in Delhi, Gurgaon, Bhiwadi and Dharuhera Industrial Complex**.**

Table 1. Expected Employment Generation in the Project area

S. No.	Name of micro watersheds	Wage employment						Self employment			
		No of man days			No. of Beneficiaries			No. of Beneficiaries			
		SC	others	Total	SC	others	Total	SC	others	Women	Total

1	Kharkhara	400	6514	6914	70	488	558	11	-	11	22
2	Malpura	357	6369	6726	102	716	818	11	11	11	33
3	Garhi alawalpur	421	6455	6876	183	1278	1461	-	11	11	22
4	Khijuri	227	8162	8389	50	353	403	11	11	11	23
5	Jeetpura	336	9203	9539	54	377	431	11	11	11	33
6	Majra Sheoraj	136	4177	4313	31	217	248	11	-	11	22
	Total	**1877**	**40881**	**42758**	**490**	**3429**	**3919**	**55**	**44**	**66**	**155**

42758 man days would be generated with the implementation of the project in Kharkhara Watershed (IWMP VI), which means 86 person for 100 days per year would be employed for the period of five years. In addition to this cropped area/ productivity would be increased and will also generate employment.

9.2 MIGRATION PATTERN

Table 2. Pre and Post Migration in Kharkhara Watershed (IWMP VI)

S. No	Name of micro watersheds	No. of persons migrating		No. of days per year of migration		Comments
		Pre Project	Expected post project	Pre Project	Expected post project	

1	Kharkhara	74	37	150	75	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
2	Malpura	34	17	210	105	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
3	Garhi alawalpur	20	10	150	75	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
4	Khijuri	44	22	270	135	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
5	Jeetpura	30	15	180	90	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
6	Majra Sheoraj	54	27	210	105	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%

A comparison of above table with expected migration of table 19 of the Chapter 3 reveals that there will be about 50% reduction in the migration.

9.3 GROUND WATER TABLE (Drinking Water)

The Drinking Water supply is managed by Public health Department by Installing Tube well and Canal water supply in the area. The area is facing scarcity of water during May and June.

The area in this Watershed comes under fresh and falls in over exploited category. The present water level varies from 8.2 to 32.5m. The water table of such area is depleting from 0.38 to 1.15 m/year in block falling in Rewari. The provision of water harvesting/ recharging has been provided in the project proposal.

Table 3. Detail of average pre- post ground water table depth in the project area (in meters)

S. No.	Name of Micro Watersheds	Name of Villages	Source	Pre- Project level (m)	Remarks
1	Kharkhara	Kharkhara	Open wells	17.4	The area experiences falling water table due to over exploitation so the provision of rain water harvesting/recharging has been provided in the project proposals through construction of percolation tank/ ponds.
		Alwalpur	Open wells	18.4	
2	Malpura	Malpura	Open wells	32.5	
		Kapriwas	Open wells	25.9	
		Joniawas	Open wells	16.9	
3	Garhi alawalpur	Garhi Alawalpur	Open wells	17	
		Maheshwari	Open wells	17.2	
4	Khijuri	Khijuri	Open wells	17.1	
		Nikhri	Open wells	17.2	
		Niganiawas	Open wells	16.9	
5	Jeetpura	Jeetpura	Open wells	17	

S. No.	Name of Micro Watersheds	Name of Villages	Source	Pre- Project level (m)	Remarks
		Masani	Open wells	17	
		Alamgirpur	Open wells	16.9	
6	Majra Sheoraj	Majra Sheoraj	Open wells	8.2	
		Majra Gurdass	Open wells	16.9	

Source: Ground Water Cell, Haryana

9.4 CROPS

Agriculture primary depends upon water, Due to lack of proper canal system and deeper ground water there is a struggle in irrigating crops all this can change with the integrated land and water management during the watershed project. The planned Water Conveyance System, UGP Line, Dug Out Pond (New/Renovation), Ramp/Ghat Inlet and Outlet, Small Earthen Embankment with vegetative support, Earthen Embankment with pucca outlet, Roof top rain water recharge structures etc. can preserve sub moisture in the soil. This will help in additional area coming under cultivation and increasing productivity too. The crop yield pre project and expected and post project is presented in table 4**.**

Table 4. Increase in Expected Yield in Kharkhara Watershed (IWMP VI)

Name of Micro-	Name of Crops	Pre project	Total Productio	Total Value	Expected post project	Total Production	Total Value Rs

Watersheds		Area ha	Average yield kg Per ha	n (in Kg)	Rs (in lacs)	Area ha	Average yield kg Per ha	(in Kg)	(in lacs)
Kharkhara	Wheat	156	1500	234000	31.59	172	1620	278640	37.62
	Mustard	79	1200	94800	28.44	87	1260	109620	32.89
	Bajra	306	2300	703800	87.97	337	2484	837108	104.64
Malpura	Wheat	164	1575	258300	34.87	180	1701	306180	41.33
	Mustard	65	1102	71630	21.48	72	1157	83304	24.99
	Bajra	233	2150	500950	62.61	256	2322	594432	74.30
Garhi alawalpur	Wheat	138	1585	218730	29.52	152	1712	260224	35.13
	Mustard	144	1274	183456	55.03	158	1338	211404	63.42
	Bajra	257	2175	558975	69.87	283	2349	664767	83.10
Khijuri	Wheat	130	1550	201500	27.20	143	1674	239382	32.32
	Mustard	147	1350	198450	59.53	162	1418	229716	68.91
	Bajra	301	2675	805175	100.64	331	2889	956259	119.53
Jeetpura	Wheat	225	1850	416250	56.19	248	1998	495504	66.89
	Mustard	189	1375	259875	77.96	208	1444	300352	90.11
	Bajra	368	2685	988080	123.51	405	2900	1174500	146.81
Majra Sheoraj	Wheat	61	1575	96075	12.97	67	1701	113967	15.39

	Mustard	104	1075	111800	33.54	114	1129	128706	38.61
	Bajra	96	2285	219360	27.42	106	2468	261608	32.70
Total		**3163**			**940.34**	**3479**			**1108.69**

Source: Revenue Department and Department of Agriculture, Rewari (Haryana)

9.5 HORTICULTURE

Table 5. Pre and post project area under Horticulture

S.No.	Name of Micro Watersheds	Existing area under horticulture (ha)	Additional Area under horticulture proposed to be covered through IWMP	Total area in ha – Post Project
1	Kharkhara	3	6	9
2	Malpura	1	4	5
3	Garhi alawalpur	2.5	6	8.5
4	Khijuri	3	6	9
5	Jeetpura	2	6	8
6	Majra Sheoraj	2	5	7

	Total	**13.5**	**33**	**46.5**

9.6 AFFORESTATION/ VEGETATIVE COVER

Table 6. Pre and post project forest and vegetative cover

S.No.	Name of micro watersheds	Existing area under tree covered, ha	Area under tree cover proposed ha	Total
1	Kharkhara	22	17	39
2	Malpura	11	10	21
3	Garhi alawalpur	12	15	27
4	Khijuri	9	10	19
5	Jeetpura	13	15	28
6	Majra Sheoraj	8	10	18
	Total	**75**	**77**	**152**

9.7 LIVESTOCK

Table 7. Details of livestock in the project area

S. No.	Name of micro watershed	Type of Animals	Pre project			Post project			Remarks
			No.	Yield Kg/ day	Income In Rs per day	No.	Yield Kg/ day	Income In Rs per day	
1	Kharkhara	Buffalo	1442	7-8	238-272	1658	8-9	320-360	Increase in milk yield and number of animals by approx. 15%
		Cow	665	3-4	75-100	764	5-6	150-180	Increase in milk yield and number of animals by approx. 15%
2	Malpura	Buffalo	988	7.5- 8.5	255-289	1136	9.5- 10.5	380-420	Increase in milk yield and number of animals by approx. 15%
		Cow	370	3.5- 4.5	87-112	425	5.5- 6.5	165-195	Increase in milk yield and number of animals by approx. 15%
3	Garhi alawalpur	Buffalo	881	8-9	272-306	1013	10-12	400-480	Increase in milk yield and number of animals by approx. 15%
		Cow	311	4.5- 5.5	87-112	357	6-8	180-240	Increase in milk yield and number of animals by approx. 15%
4	Khijuri	Buffalo	832	7-8	238-272	957	9-11	360-440	Increase in milk yield and number of animals by approx. 15%
		Cow	293	4-5	100-125	337	6.5- 8.5	195-255	Increase in milk yield and number of animals by approx. 15%
5	Jeetpura	Buffalo	768	7.5 –	255-289	883	10-12	400-480	Increase in milk yield and number of

S. No.	Name of micro watershed	Type of Animals	Pre project			Post project			Remarks
			No.	Yield Kg/ day	Income In Rs per day	No.	Yield Kg/ day	Income In Rs per day	
				8.5					animals by approx. 15%
		Cow	141	4.5- 5.5	87-138	162	6-8	180-240	Increase in milk yield and number of animals by approx. 15%
6	Majra Sheoraj	Buffalo	718	7.5- 8.5	255-289	825	9.5- 10.5	380-420	Increase in milk yield and number of animals by approx. 15%
		Cow	275	3.5- 4.5	87-112	316	5.5- 6.5	165-195	Increase in milk yield and number of animals by approx. 15%

9.8 LINKAGES

The direct livelihood activities need good forward and backward support system. The activities may fail to deliver the desired results. These linkages would involve credit, machinery, input supply, marketing etc.

The backward forward linkages will involved the extension services which are brought available in the project proposal as capacity building and the provision have been kept. 20 kits of agriculture implement have been provided. Milk and other collection centre would be constituted with increased milk production under the project.

Table No. 8: Backward-Forward Linkages

Sr. No.	Project	Type of Marketing Facility	Pre-Project (no.)	During the Project (no.)	Post-project (no.)
1	Kharkhara Watershed (IWMP VI)	Backward linkages	-	-	-
		Seed certification	Moderate	Extension and Training	Improved
		Seed supply system	Moderate	Extension and Training	Improved
		Fertilizer supply system	Moderate	Extension and Training	Improved
		Pesticide supply system	Moderate	Extension and Training	Improved
		Credit institutions	Banks	Coordinate to lead banks	Bank intensity increased
		Water supply for irrigation	Scarcity	Promote rain water harvesting	Would be promoted
		Extension services	KGK& Agriculture deptt.	Extension & Training in village level	Improved
		Nurseries	Horticulture and forest	To be promoted	Improved
		Tools/ machinery suppliers	Subsides	Educate by Extension & Training	Supplies would be improved
		Price support system	Major crops	-	Needs for all crops
		Labour	-	Employment generate through works activities	Migration reduce

		Any other (please specify)	-	-	-
		Road network	Available	Coordinate with lined department	Would be strengthen
		Transport facilities	Moderate	Coordinate with lined department	Would be promoted
		Markets / Mandies	Exists	Coordinate with lined department	Intensity would be increased
		Agro and other industries	-	Coordinate with lined department to establish Cottage industries (Kutir Udyog) for landless and unemployed youth	Would be strengthen
		Milk and other collection centres	Milk collection centre in long distance	Coordinate with lined department	For installation on nearest door steps
		Any other (please specify)	-	-	-
			Vermi-compost unit	Convergence with NHM (Horticulture) department	To be increased
			Mushroom Cultivation	Convergence with NHM (Horticulture) department	To be increased
			Animal vitamins/ Minerals Deficit	Coordinate with lined department, to organize camps in watershed area	Animal vitamins feeds Would be promoted

9.8.1 LOGICAL FRAMEWORK ANALYSIS

Table 9. Logical Framework Analysis

Components	Activities	Outputs	Effect	Impact
Village Institution Formation	Formation of Watershed Community, User Groups	• Watershed Committee each village • Number of user groups depending on the coverage of particular intervention	Project can be implemented and managed in a democratic and Participatory way ensuring equity and transparency.	• Unity and prosperity in the village management. • People's Participation and positive perception towards the programme.
Strengthening Village operations	• Organizing training and awareness programme for village institutions (I.E.C. Activities). • Capacity Building workshops and exposure visits for User Group	• Awareness camps to be organized • Trainings and exposure visits UGs and WCs to be held Capacity building workshops to be organized one. • Federations of UGs and WC to be formed.	• Quality of management of common resources improved. • Quality of distribution of benefits between people improved. • Increased awareness amongst women about village resources • Women participation	

Components	Activities	Outputs	Effect	Impact
	and Watershed Community • Facilitating and monitoring the functioning of UGs and WCs Strengthen linkages between UGs and WCs and Panchayat Institutions • Gender sensitization of UGs and WCs to increase inclusiveness of Samuh (Joint) decision making. • Sensitize Village communities to involve children and youth in development		enhanced in decision-making of GVCs. • Involvement of youth and children in village development.	
Fund	• Improve	UGs and WCs operating	• Purpose, frequency	

Components	Activities	Outputs	Effect	Impact
Management	management and utilization of UGs and WCs • Prepare communities to explore other sources of income for UGs and WCs.	bank account and managing resources on their own.	and volume of use of the fund enhanced • Volume of funds generated for UGs and WCs from other sources of income increased	
Ecological restoration	• Protection, Treatment and regeneration of common and private lands. • Protection, treatment and regeneration of forest lands. • Plantation of fruits and forest species. • Input trainings, conduct meetings and organize exposure visits	• Common and private lands to be brought under new plantations and agro-horti- forestry like Neem, Adussa, prosopis, Banyan and Peepul. • Forest lands to be brought under new plantations and protection. • Trainings, exposure visits and meetings to be organized for communities, village volunteers and staff.	• Fodder availability from common and private land increased. • Accessibility to common and forest lands increased with removal of encroachments and resolution of conflicts	• Better Ecological order in the area. • Increase in the proportion of households having more security of fodder. • Reduction in drudgery of fodder and fuel collection, especially women

Components	Activities	Outputs	Effect	Impact
	for communities, village volunteers and staff to effectively plan, execute and monitor activities. • Identification and promotion of non-timber forest produce based income generation activities.	• Income generation intervention promoted		
Rainfed Area Development	• Treatment of land through improved soil and moisture conservation practices on watershed basis. • Promotion of good agricultural	• Land to be brought under improved soil moisture conservation practices. • Good agricultural practices to be promoted. • Organic farming to be promoted. Fodder banks to be	• Improved productivity of treated land. • Increased availability of water in cells. • Increase in annual agricultural production. • Farmers adopt organic farming	Increase in proportion of households having more security of food Increase in contribution of agricultural income to the household income

Components	Activities	Outputs	Effect	Impact
	practices-horticulture, improved crop and vegetable. • Promotion of organic farming practices. • Formation of Fodder banks to increase fodder security and promote dairy development among communities. • Identification and promotion of agri-produce based income generation activities like grading, processing and packaging. • Promotion of better irrigation	established. • Agriculture based livelihood income generation activities to be promoted • Water harvesting structures to be constructed. • Drip irrigation facilities to be distributed among farmers. • Approx 15000 person days of employment to be generated. • Trainings, exposure visits and meetings to be organized for communities, village volunteers.	practices. • Fodder security of farmers enhanced. • Increased availability of water for 9 to12 months. • Increased availability of water for livestock • Increase in agricultural productivity of land. • Augmentation of drinking water supply.	

Components	Activities	Outputs	Effect	Impact
	practices like drip irrigation • Impart trainings, conduct meetings and organize exposure visits of communities.			
Women's socio-political and economic empowerment	• Formation and strengthening of women' SHG groups • Capacity building of women folk. • Capacity building of SHG leaders and accountants Linking SHGs with external financial institutions	• Women's SHG groups to be formed. • Federation of Women's SHGs to be formed. • Trainings to be conducted for preparation of woolen products from sheep and goats	• Enhanced capacities of leaders of women's group in taking initiatives to solve problems at different levels. • Improved access to credit for livelihood purposes Increased household income.	• Position of women in household, community, society (politically, socially and economically) as perceived by women and community at large. • Performance enhancement of SHGs in terms of participation, decision-making, leadership and fund management. • Equality and equity in gender relations at home (decision making, expenditure,

Components	Activities	Outputs	Effect	Impact
				children's education, health)

The adoption of soil and water management practices, renovation of village ponds and plantations not only improve productivity but also improve village environment. The investments made in water resources development would ease shortage of water both for domestic use and livestock and also make water available for supplemental irrigation.

The introduction of improved production technologies would stabilize crop production, save crops from adverse impacts of droughts and raise income level of farmers. The increased fodder availability and animal health care, the milk production would increase. There would be increased cash flows from subsidiary occupations. The increased awareness, operations through SHGs and easy availability of finance would make the communities more vibrant and enterprising.