CONTENTS (IWMP I)

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 (IWMP I) area programme a systematic survey has been conducted to know the potentiality of each village / Micro-Watershed. With this view, a baseline survey in IWMP I comprising of six micro watersheds namely Bairawas

(6D1E8b5), Sohla A+B (6D1E7g6), Deroli Jat (6D1E8b1), Gulawal (6D1E8a7), Nimbhera (6D1E7g1), Janjariawas (6D1E7s4). 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 I) of 6 micro watersheds namely Bairawas (6D1E8b5), Sohla A+B (6D1E7g6), Deroli Jat (6D1E8b1), Gulawal (6D1E8a7), Nimbhera (6D1E7g1), Janjariawas (6D1E7s4) 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 initiated by the following methods:-

1.1.3 Collection of Primary Data

Though the project was sanctioned in September, 2011 but the preparatory phase started in 2012.Initially, meetings were arranged with officials of concerned departments, technical experts and stake holders. During this meeting, preliminary details of the proposed project including location of villages and criteria of selection and was 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 and other problems related to the area were assessed. Sarpanches and local people were involved in the discussions and needs and scope of watershed works were 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 production of crops and seasonal vegetable, marketing facilities, fodder production, agro-forestry crops, livestock 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.

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 meeting were organized at common places and problem and possible solution were debated, discussed and efforts were made to reach 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 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 was thoroughly discussed with the community and 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 Dug out Pond, Cement Stone Masonry structures (Inlet & Outlet), Roof Top Rain water Harvesting Structures, Earthen Embankment with pucca outlet, Small Earthen Embankments, Water conveyance system, Dry stone Masonary structures, Silt Detention Dam, Community

Water Storage Tank 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

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

Various maps were prepared such as Base map, Present Land Use, Geo-hydrological, Micro Watershed, Drainage, Contours, Slope, Soil Classification, Land Capability Classification, Soil Fertility, Ground Water Depth and Quality, Proposed and existing activities of works. All Watershed maps (micro- watershed) have been prepared based on the watershed maps made available by Soil and Land use Survey of India (SLUSI) 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.

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, Soil erosion, forest, hydrology and present land use. 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 Dug out Pond, Cement Stone Masonry structures (Inlet & Outlet), Roof Top Rain water Harvesting Structures, Earthen Embankment with pucca outlet, Small Earthen Embankments, Water conveyance system, Dry stone Masonary structures, Silt Detention Dam, Community

Water Storage Tank 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
	Hydro-geological survey	Yes
	Contour Mapping	Yes
	Participatory net planning (PNP)	Yes
	Remote sensing data-especially soil	Yes

S.No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	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
	5. Land use	Yes
	6. Ground water status	Yes
B	Inputs	-
	Bio pesticides	Yes

S.No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	Organic manure	Yes
	Vermi- 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 I Project) falls in Mahendergarh block of Mahendergarh district in Haryana state. The project is a cluster of seven micro- watersheds namely Bairawas (6D1E8b5), Sohla A (6D1E7g6), Sohla B (6D1E7g6), Deroli Jat (6D1E8b1), Gulawal (6D1E8a7), Nimbhera (6D1E7g1), Janjariawas (6D1E7s4). The total geographical area of the project is **5422 ha** out of which **4671 ha** has been undertaken to be treated under IWMP I starting from year 2011-2012. The project is divided into seven 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	Bairawas watershed (IWMP I)	Bairawas	6D1E8b5	Bairawas Palh Pall	Mahendergarh	Mahendergarh	1039	831	99.72	ASCO Mahendergarh

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
				Gadania						
2	Bairawas watershed (IWMP I)	Sohla A	6D1E7g6	Sohla A	Mahendergarh	Mahendergarh	693	651	78.12	ASCO Mahendergarh
3	Bairawas watershed (IWMP I)	Sohla B	6D1E7g6	Sohla B	Mahendergarh	Mahendergarh	615	578	69.36	ASCO Mahendergarh
4	Bairawas watershed (IWMP I)	Deroli jat	6D1E8b1	Deroli jat (part) Khatiwas Bhandor nichi	Mahendergarh	Mahendergarh	1049	813	97.56	ASCO Mahendergarh
5	Bairawas watershed (IWMP I)	Gulawal	6D1E8a7	Gulawal Kuksi	Mahendergarh	Mahendergarh	583	516	61.92	ASCO Mahendergarh
6	Bairawas watershed (IWMP I)	Nimbhera	6D1E7g1	Nimbhera Balaicha	Mahendergarh	Mahendergarh	675	595	71.40	ASCO Mahendergarh
7	Bairawas watershed	Janjariawas	6D1E7s4	Janjariawas Chhajiawas	Mahendergarh	Mahendergarh	768	687	82.44	ASCO Mahendergarh

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 I)			Paharwas						
					Grand Total		**5422**	**4671**	**560.52**	

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 rainfed 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 poor to population)	10	Above 80 % (10)	80 to 50 % (7.5)	50 to 20 % (5)	Below 20% (2.5)
ii.	% of SC/ST population	10	More than 40 % (10)	20 to 40 % (5)	Less than 20% (3)	
iii.	Actual wages	5	Actual wages are significantly lower than minimum wages (5)	Actual wages are equal to or higher than minimum wages (0)		
iv.	% of small and marginal farmers	10	More than 80 % (10)	50 to 80 % (5)	Less than 50% (3)	
v.	Ground water status	5	Over exploited (5)	Critical (3)	Sub Critical (2)	Safe (0)
vi.	Moisture index/ DPAP/DDP block	15	-66.7 & below (15) DDP block	-33.3 to -66.6 (10) DPAP Block	0 to -33.2 (0) Non DPAP/DDP Block	
vii	Area under rain fed agriculture	15	More than 90 % (15)	80 to 90 % (10)	70 to 80 % (5)	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)	

S. No.	Criteria	Maximum Score	Ranges and Scores			
x	Productivity potential of the land	15	Lands with low production & where productivity can be significantly enhanced with reasonable efforts (15)	Lands with moderate production & where productivity can be enhanced with reasonable efforts (10)	Lands with high production & where productivity can be marginally enhanced with reasonable efforts (5)	
xi	Contiguity to another watershed that has already been developed/treated	10	Contiguous to previously treated watershed & contiguity within the micro-watersheds in the project (10)	Contiguity within the micro-watersheds in the project but non contiguous to previously treated watershed (5)	Neither contiguous to previously treated watershed nor contiguity within the micro-watersheds in the project (0)	
xii	Cluster approach in the plains (More than one contiguous micro-watersheds in the project)	15	Above 6 micro-watersheds in cluster (15)	4 to 6 micro-watersheds in cluster (10)	2 to 4 micro-watersheds in cluster (5)	
xiii	Cluster approach in the 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 110 concerning these thirteen parameters, a composite ranking was given to Bairawas Watershed (IWMP I) project as given in **Table- 3.**

The total number of families under BPL are less than the total number of households in the village. Hence, a score of 5 was allotted. Rain fed agriculture is more and more than 70 percent and more than 50 % farmers are small and marginal. So accordingly, scoring was done like project area comes under Aravalli range and Dohan basin of Haryana and 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 scheduled castes in this watershed area 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 7.5. 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 110.

Table- 3: Weightage of the Project

1	2	3	4	5	6	7	8	9												
Sr. No.	District	Name of the project	No. of micro-water-sheds proposed to be covered	Geographical area (ha)	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.	Mahendergarh	Bairawas watershed (IWMP I)	7	5422	4671	others	560.52	7.5	5	0	10	5	15	10	7.5	10	10	10	15	5	110

Table 4: Watershed Information

Name of the Project	No. of Micro-Watersheds to be Treated	Watershed codes	Watershed regime/type/order
Bairawas Watershed (IWMP I)	7	6D1E8b5, 6D1E7g6, 6D1E8b1, 6D1E8a7, 6D1E7g1, 6D1E7s4	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). The micro watershed wise ongoing developmental programme in the project area is 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
1	MGNREGA	Bairawas	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	491
2	MGNREGA	Sohla A+B	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	Nil
3	MGNREGA	Deroli jat	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	585
4	MGNREGA	Gulawal	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	285
5	MGNREGA	Nimbhera	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	262
6	MGNREGA	Janjariawas	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	407

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	Mahendergarh	374	187000	130	65000	17 (EAS)	8500	169	85639	205	101361
						22 (NWDPRA)	12139				

CHAPTER – 3

BASIC INFORMATION OF THE PROJECT AREA

GEOGRAPHY AND GEOHYDROLOGY

Bairawas Watershed (IWMP I) falls in Mahendergarh Block of District Mahendergarh. The area is occupied by Indo- Gangetic alluvial plains and area is traversed and drained by seasonal tributaries of Sahibi river system. Physiographically, the area is divided Interdunal plains and Arravalli hill range. The area of watershed lies in between 28˚06'45''to 28˚14'55'' N Latitude & 75˚58'50'' to 76˚03'50'' east longitude with general elevation varies between 272-435 m (google earth map) above mean sea level (MSL). Annual average rainfall of the district is 366 mm and 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, so area receives drought conditions in thrice in a five years. The Drainage and Contour 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 Bairawas Watershed (IWMP I)

Sr. No.	Name of Micro Watersheds 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	Bairawas (6D1E8b5)	Bairawas	378	304	371	297	-	7
		Palh	225	187	220	182	-	5
		Pall	144	96	132	84	-	12
		Gadania	292	244	198	150	-	94
	Sohla A+ B (6D1E7g6)	Sohla A+ B	1308	1229	800	721	-	508
3	Deroli jat (6D1E8b1)	Deroli jat (part)	500	360	471	331	-	29
		Khatiwas	274	218	249	193	-	25
		Bhandor nichi	275	235	231	191	-	44
4	Gulawal (6D1E8a7)	Gulawal	374	330	362	318	-	12
		Kuksi	209	186	200	177	-	9
5	Nimbhera (6D1E7g1)	Nimbhera	440	377	385	322	-	55
		Balaicha	235	218	196	179	-	39
6	Janjariawas (6D1E7s4)	Janjariawas	341	307	295	261	-	46
		Chhajiawas	153	121	140	108	-	13
		Paharwas	274	259	244	229	-	30
Total			**5422**	**4671**	**4494**	**3743**	**-**	**928**

(Source – District Census Handbook, 2001 Mahendergarh)

3.2 SOIL AND TOPOGRAPHY

The soils of Bairawas Watershed are shallow to deep, loamy sand to sandy loam with coarse fragments in pockets, typic or udic, ustorthent and ustipssament in the upper area with some rock out crops/ hillocks and very deep, loamy sand to sandy clay loam, typic ustipssamment, typic haplustepts and typic usti fluvent in lower area. The topography of the area ranges from nearly level to steep slopes with hillocks in pockets. Soils are subject to susceptible to severe to very severe water and wind erosion in upper area and moderate to severe in lower area. The slope ranges from 0.5 to 15% and above most of the area of micro watersheds falls under nearly level to gentle slopes. 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	Bairawas	6D1E8b5	1039	Loamy sand to sandy loam with coarse fragment and rock out crop in pockets	Nearly Level to gentle
2	Sohla A+ B	6D1E7g6	1308	Do	Nearly level to steep
3	Deroli jat (part)	6D1E8b1	1049	Loamy sand to sandy loam	Level to nearly level
4	Gulawal	6D1E8a7	583	Do	Level to nearly level
5	Nimbhera	6D1E7g1	675	Do	Level to nearly level
6	Janjariawas	6D1E7s4	768	Loamy sand to sandy loam with coarse fragment and rock out crop in pockets	Nearly level to steep

Sr. No.	Name of Micro Watersheds	Code	Geographical area (ha)	Major Soil types	Topography
			5422		

Source: - Department of Agriculture, Haryana

3.2.1 Flood and Drought Condition

There was no incidence of flood recorded and drought as well in watershed villages as per data collected from the revenue department reveals drought conditions is thrice in a five years. The absence of assured irrigation and drought resulted in low to very low yields of the crops.

Table 3. Flood and Drought condition

S.No.	Name of Micro- watersheds	Flood Incidence	Drought Incidence
1	Bairawas	Not recorded	Thrice in a five years
2	Sohla A+ B	Not recorded	Thrice in a five years
3	Deroli jat	Not recorded	Thrice in a five years
4	Gulawal	Not recorded	Thrice in a five years
5	Nimbhera	Not recorded	Thrice in a five years
6	Janjariawas	Not recorded	Thrice in a five years

3.3 SOILS

3.3.1 Soil Erosion

In the identified seven 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 property. Annual average rainfall of the district is 366 mm falling under these watersheds gets washed away in the form of runoff which also carries valuable top soil (sheet). Soil erosion in respect of sheet is quite high and unscientific mining has also created severe problems in the area. Majority of the watershed Community are dependent on rainfed agriculture due to lack of assured irrigation facility. Agriculture suffers due to area being rain fed and due to erratic rains in the region, resulting in further deterioration of socio economic conditions of community.

3.3.2 Soil Salinity/Alkalinity

There is low to moderate soil salinity in the Project and pH is normal and within the limits of 7.10 to 8.45. 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	Bairawas	7.15- 8.15	Low to Moderate
2	Sohla A+ B	7.16- 8.35	Low to Moderate

3	Deroli jat	7.15- 8.15	Low to Moderate
4	Gulawal	7.17- 8.35	Low to Moderate
5	Nimbhera	7.15- 8.45	Low to Moderate
6	Janjariawas	7.10- 8.15	Low to Moderate

3.3.3 SOIL CLASSIFICATION

Major soils associations' fall in the watershed are seven soil associations unit. 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 and phosphorus are low. 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- 5 (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.

Soil Mapping Unit- 8 (Majri Soil Association)

The Majri soil series is only series in this soil association. The soil series is excessively drained, Sand to Loamy sand to Silt loam, Sandy Mixed hyperthermic Typic Torripsamments. The soil series is moderate to strong calcareous, very deep, pH 8.40-8.60, yellowish brown in colour (10YR 5/4-10YR 5/8) developed on Sandunes of dune complexes/Aeolian sand on undulating terrain with Common medium hard concretions of calcium carbonate in C horizon.

Soil Mapping Unit- 9 (Zerpur Soil Association)

The Zerpur soil series is only series in this soil association. The soil series is well drained, Sand, Sandy Mixed hyperthermic Typic Ustipsamments. The soil series is non calcareous, very deep, pH 8.00-8.90 , yellowish brown to brownish yellow in colour (10YR 5/6-10YR 6/6) developed on unstable sand dune of dune complexes/Aeolian sand.

Soil Mapping Unit- 11 (Zerpur-Palri Soil Association)

The Zerpur soil series is dominated in this soil association and associated soil series is Palri. The dominant soil well drained, Sand, Sandy Mixed hyperthermic Typic Ustipsamments, 1st associate soil series is well drained, Sand loamy to Coarse sandy loam, Coarse loamy Mixed hyperthermic Typic Haplustepts. Zerpur soil series is non calcareous, very deep, pH 8.00-8.90 , yellowish brown to brownish yellow in colour (10YR 5/6-10YR 6/6) developed on unstable sand dune of dune complexes/Aeolian sand, Palri 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 Interdunal depressions/Dune complex over Aeolian Sand.

Soil Mapping Unit- 15 (Pathera- Zerpur Soil Association)

The Pathera soil series is dominated in this soil association and associated soil series is Zerpur. The dominant soil well drained, Sandy loam to Sandy Clay loam, Sandy Mixed hyperthermic Typic Ustipsamments, 1st associate soil series is well drained, Sand, Fine loamy Mixed hyperthermic Typic Haplustepts. Pathera soil series is non calcareous, very deep, pH 8.20-8.60, brown to yellowish brown in colour (10YR 4/3-10YR 5/6) developed on Gentle sloping Fluvo-aeolian plains over alluvium, Zerpur soil series is non calcareous, very deep, pH 8.00-8.90, yellowish brown to brownish yellow in colour (10YR 5/6-10YR 6/6) developed on unstable sand dune of dune complexes/Aeolian sand.

Soil Mapping Unit- 16 (Majri- Basal Soil Association)

The Majri soil series is dominated in this soil association and associated soil series is Basal. The dominant soil excessively drained, Sand to Loamy sand to Silt loam, Sandy Mixed hyperthermic Typic Torripsamments, 1st associate soil series is excessively drained, Loamy sand to Silt loam, Coarse loamy Mixed hyperthermic Typic Torriorthents. Majri soil series is moderate to strong calcareous, very deep, pH 8.40-8.60, yellowish brown in colour (10YR 5/4-10YR 5/8) developed on Sandunes of dune complexes/Aeolian sand on undulating terrain with Common medium hard concretions of calcium carbonate in C horizon, Basal soil series is moderate to strong calcareous, very deep, pH 7.15-8.00, brown to yellowish brown in colour (10YR 5/3-10YR 5/6) developed on Pediments formed by accumulation of eroded particles of Aravali hills.

Soil Mapping Unit- 18 (Khatodra- Zerpur Soil Association)

The Khatodra soil series is dominated in this soil association and associated soil series is Zerpur. The dominant soil well drained, Sandy loam to Loamy sand, Coarse loamy Mixed hyperthermic Typic Ustifluvents, 1st associate soil series is well drained, Sand, Sandy Mixed hyperthermic Typic Ustipsamments. Khatodra soil series is Moderately calcareous, very deep, pH 7.50-7.80, brown to dark yellowish brown in colour (10YR 5/3-10YR 4/6) developed on Gently sloping Fluvio-aeolian plain/Aeolian sand over Alluvium with Few hard concretions of calcium carbonate in C- horizon, Zerpur soil series is non calcareous, very deep, pH 8.00-8.90, yellowish brown to brownish yellow in colour (10YR 5/6-10YR 6/6) developed on unstable sand dune of dune complexes/Aeolian sand.

(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 deep to very deep soils, light to coarse loamy texture located on slight to gentle slope. These soils are well drained, moderately permeable and moderate to severe erosion hazard.

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

1. Land leveling should be subsidies, because farmers are not economically capable to bear the rate of land leveling.
2. Engineering measures like Check Dams, Percolation Embankments with other measures 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. Masonry structure (outlet) should be constructed with field bunds and percolation embankments for rills control.

Land capability subclass IV e3s3

These soils are greatly, light textured soils nearly level to gentle sloping lands. The water holding capacity is poor to very poor and the water erosion hazard is severe to very severe.

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 subsidies, because farmers are not economically capable to bear the rate of land leveling.
5. Construction of percolation ponds and embankments for increasing ground water recharge.

Land capability subclass VI es

These soils are shallow to deep, coarse fragments, light to medium textured soils on nearly level to gentle slopes, hilly and undulated, sloping, moderate to severely eroded lands developed on and along hillocks. 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. Soils would be suitable for pasture development; forestation and other major water harvesting structures (Percolation pond), silt detention/ percolation dams, drop structures and stone check dams.

3.3.5 Climatic Conditions

The average rainfall of the district is 366mm (during the past 13 year's data). The highest rainfall is 689 mm during the year 2010 and lowest in 2002 as 141mm. The uneven rainfall distribution is leading to run off soil every year to the steams, rivulets and depressed area of the Bairawas Watershed (IWMP I). The year wise rainfall from 2000 to 2012 is presented in **Table.5.**

Table 5. Rainfall during the years 2000-12

S.No.	Year	Rainfall (in mm)
1	2000	228
2	2001	384
3	2002	141
4	2003	339
5	2004	354
6	2005	530
7	2006	267
8	2007	312
9	2008	554
10	2009	321

11	2010	689
12	2011	362
13	2012	287
	Average Rainfall	**366**

(Source: - Deputy Director Agriculture, Mahendergarh)

The mean maximum temperature is 40.5˚ C (May and June) and mean minimum is 5.0˚ C (January) of the district.

3.3.6 Physiography and Reliefs

Physiographically, the area slope fall South- West to North- East. The general Elevation in the area belongs to new and old developed alluvium plains with sand overburden along hillocks in pockets in the area. 272-435 m above mean sea level (google earth map). Annual average rainfall of the district is 366 mm and the water is drained through field to field and ultimately create temporary water logging in low lying areas to create haphazard condition during rainy season if heavy rain received. 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
Bairawas Watershed (IWMP I)	272-435	0.5 to 15 and above	Dohan

3.4 LAND AND AGRICULTURE

The land holding pattern of the villages under Bairawas 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 Narnaul, Rewari, Delhi, Gurgaon, Dharuhera and Bhiwadi (Rajasthan). This affects directly the demographic profile of the villages.

The major crops Bajra, Gawar, green fodder and pulses in Kharif under rainfed conditions. The major crops during Rabi wheat, mustard, gram, green fodder and seasonal vegetables in rainfed and irrigated conditions. The soil and water conservation measures such as Engineering like Dug out Pond, Cement Stone Masonry structures (Inlet & Outlet), Roof Top Rain water Harvesting Structures, Earthen Embankment with pucca outlet, Small Earthen Embankments, Water conveyance system, Dry stone Masonary structures, Silt Detention Dam, Community Water Storage Tank 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	Shrubs	Grasses
1	Khairi	Amla	Pala	Anjan
2	Jand	Ber	Hins	Dhaman
3	Dhak	Guava	Puthkanda	Dub
4	Babool	Citrus	Bansa	Kana
5	Beri		Panwar	Dabh
6	Pipal		Karir	Pala
7	Lasura		Khip	Chirya
8	Shisham		Ak	
9	Neem		Phog	
10	Siris		Nagphani	
11	Kikar			

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
1031	3001	147	-	4179

3.4.2 AGRICULTURE/PATTERN

Table 9. Agriculture/ Pattern

Sr. No.	Name of Micro Watersheds	Villages	Land under agriculture use (ha)	Net Sown area (ha)	
				One time	Two times
1	Bairawas	Bairawas	371	271	255
		Palh	220	172	155
		Pall	132	101	87
		Gadania	198	155	139
2	Sohla A+ B	Sohla A+ B	800	625	575
3	Deroli jat	Deroli jat (part)	471	358	345
		Khatiwas	249	194	172
		Bhandor nichi	231	186	152
4	Gulawal	Gulawal	362	278	265

Sr. No.	Name of Micro Watersheds	Villages	Land under agriculture use (ha)	Net Sown area (ha)	
				One time	Two times
		Kuksi	200	164	132
5	Nimbhera	Nimbhera	385	295	264
		Balaicha	196	157	128
6	Janjariawas	Janjariawas	295	233	191
		Chhajiawas	140	108	92
		Paharwas	244	185	163
		Total	**4494**	**3482**	**3115**

(Source: Department of Agriculture, Haryana)

3.4.3 IRRIGATION

Lack of Assured Irrigation Facilities

The present source of irrigation is ground water where the area is underlain by fresh to marginal water quality and partially (75 ha) by canal network. 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 1: Canal		Source 2: Groundwater (Tube wells)		Total
			Availability months	Net area (ha)	Availability months	Net area (ha)	
1	Bairawas	Bairawas	-	-	July to June	350	350
		Palh	-	-	July to June	200	200
		Pall	-	-	July to June	97	97
		Gadania	-	-	July to June	161	161
2	Sohla A+ B	Sohla A+ B	-	-	July to June	278	278
3	Deroli jat	Deroli jat	July to March	75	July to June	225	300
		Khatiwas	-	-	July to June	210	210
		Bhandor nichi	-	-	July to June	150	150
4	Gulawal	Gulawal	-	-	July to June	135	135
		Kuksi	-	-	July to June	99	99
5	Nimbhera	Nimbhera	-	-	July to June	382	382
		Balaicha	-	-	July to June	181	181
6	Janjariawas	Janjariawas	-	-	July to June	268	268
		Chhajiawas	-	-	July to June	100	100
		Paharwas	-	-	July to June	241	241
		Total		**75**		**3077**	**3152**

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

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	Villages	Rabi crops(Wheat)				(Mustard)			
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
1	Bairawas	Bairawas	155	714085	4607	Yes	57	88179	1547	Yes
		Palh	42	191520	4560	Yes	74	114108	1542	Yes
		Pall	24	110400	4600	Yes	35	54075	1545	Yes
		Gadania	41	188395	4595	Yes	53	79500	1500	Yes
2	Sohla A+ B	Sohla A+ B	152	692360	4555	Yes	291	450177	1547	Yes

S. No.	Name of Micro Watersheds	Villages	Rabi crops(Wheat)				(Mustard)			
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
3	Deroli jat	Deroli jat (part)	122	562054	4607	Yes	174	267090	1535	Yes
		Khatiwas	63	289233	4591	Yes	74	114034	1541	Yes
		Bhandor nichi	49	224665	4585	Yes	72	110016	1528	Yes
4	Gulawal	Gulawal	82	377364	4602	Yes	124	191828	1547	Yes
		Kuksi	35	161000	4600	Yes	57	85500	1500	Yes
5	Nimbhera	Nimbhera	110	505780	4598	Yes	122	188856	1548	Yes
		Balaicha	64	293632	4588	Yes	40	61920	1548	Yes
6	Janjariawas	Janjariawas	55	253385	4607	Yes	105	162435	1547	Yes
		Chhajiawas	32	147200	4600	Yes	34	52428	1542	Yes
		Paharwas	58	267206	4607	Yes	90	139050	1545	Yes
		Total	**1084**				**1402**			

Table 11 B. Crop Details (Kharif)

S.	Name of	Villages	(Bajra)	(Gwar)

			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
1	Bairawas	Bairawas	185	319495	1727	Yes	23	40135	1745	Nil
		Palh	112	190960	1705	Yes	10	17290	1729	Nil
		Pall	55	94325	1715	Yes	12	20820	1735	Nil
		Gadania	82	141614	1727	Yes	12	20940	1745	Nil
2	Sohla A+ B	Sohla A+ B	375	646875	1725	Yes	59	102896	1744	Nil
3	Deroli jat	Deroli jat (part)	185	314500	1700	Yes	45	78300	1740	Nil
		Khatiwas	105	179550	1710	Yes	11	18975	1725	Nil
		Bhandor nichi	106	179670	1695	Yes	13	22685	1745	Nil
4	Gulawal	Gulawal	178	300642	1689	Yes	14	24276	1734	Nil
		Kuksi	83	142013	1711	Yes	23	40112	1744	Nil
5	Nimbhera	Nimbhera	209	358435	1715	Yes	22	37730	1715	Nil
		Balaicha	91	157157	1727	Yes	19	32300	1700	Nil
6	Janjariawas	Janjariawas	135	229500	1700	Yes	36	61848	1718	Nil
		Chhajiawas	72	124200	1725	Yes	9	15705	1745	Nil
		Paharwas	121	208967	1727	Yes	21	36645	1745	Nil
			2094				**329**			

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 in improving the soil health.

Table 12. Village Wise Distribution of Milk Production in Bairawas Watershed (IWMP I)

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	Bairawas	Bairawas	485/533/960300 (lit/per day/annum)	36/180/32400 (lit/per day/annum)	-	197	7
		Palh	342/3762/677160 (lit/per day/annum)	42/210/37800 (lit/per day/annum)	-	55	12
		Pall	319/3509/631620 (lit/per day/annum)	14/70/12600 (lit/per day/annum)	-	-	-
		Gadania	368/3680/662400 (lit/per day/annum)	10/55/9900 (lit/per day/annum)	-	216	4
2	Sohla A+ B	Sohla A+ B	498/5478/986040 (lit/per day/annum)	34/204/36720 (lit/per day/annum)	-	-	-
3	Deroli jat	Deroli jat	726/6171/1110780(lit/per day/annum)	279/1395/251100(lit/per day/annum)	-	122	31
		Khatiwas	273/3003/540540 (lit/per day/annum)	39/215/38610 (lit/per day/annum)	-	79	2
		Bhandor nichi	366/3477/625860 (lit/per day/annum)	9/45/8100 (lit/per day/annum)	74	95	16
4	Gulawal	Gulawal	394/4334/780120 (lit/per day/annum)	35/210/37800 (lit/per day/annum)	20	38	8
		Kuksi	92/1104/198720 (lit/per day/annum)	39/214/38610 (lit/per day/annum)	-	42	2
5	Nimbhera	Nimbhera	373/4103/738540 (lit/per day/annum)	21/105/18900 (lit/per day/annum)	-	272	9
		Balaicha	302/3171/570780 (lit/per day/annum)	62/341/61380(lit/per day/annum)	110	49	11
6	Janjariawas	Janjariawas	471/5181/932580 (lit/per day/annum)	77/462/83160 (lit/per day/annum)	113	15	26
		Chhajiawas	353/3177/571860 (lit/per day/annum)	30/150/27000 (lit/per day/annum)	-	-	10
		Paharwas	82/984/177120 (lit/per day/annum)	6/36/6480 (lit/per day/annum)	-	-	4

(Source: Animal Husbandry, Mahendergarh)

***Average yield of Buffalo is 11-12 kg/day and Average yield of Cow is 5-6 kg/day**

3.4.6 Ground Water Concern

a) Depth of Water

Ground Water Cell of Haryana has fixed hydrograph station mostly open well for monitoring purposes. The water level data is observed during pre and post monsoon. The data generated 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 40 to 72 m below ground level (bgl). The water table of Sohla, Nimbhera , Janjariawas and part of Bairawas and deroli Jat falls in the range of 40-60 m below ground level (bgl) where as the part of Bairawas, deroli jat and Gulawala falls in the range of 60-80m bgl. 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 of Water Level of Bairawas Watershed (IWMP I)

S. No.	Name of Micro Watersheds	Name of Villages	Source	Pre- Project level (m)
1	Bairawas	Bairawas	Open wells	67
		Palh	Open wells	43
		Pall	Open wells	47
		Gadania	Open wells	68
2	Sohla A+ B	Sohla A+ B	Open wells	49
3	Deroli jat	Deroli jat	Open wells	65

S. No.	Name of Micro Watersheds	Name of Villages	Source	Pre- Project level (m)
		Khatiwas	Open wells	60
		Bhandor nichi	Open wells	62
4	Gulawal	Gulawal	Open wells	72
		Kuksi	Open wells	43
5	Nimbhera	Nimbhera	Open wells	44
		Balaicha	Open wells	48
6	Janjariawas	Janjariawas	Open wells	42
		Chhajiawas	Open wells	40
		Paharwas	Open wells	43

The source of drinking water supply is through the tube wells network in the area. The micro watershed wise quality ranges from fresh to marginal. The water quality distribution in Sohla, Janjariawas, Bairawas and Gulawal is fresh where as in Nimbhera and part of Deroli Jat micro watershed is marginal. The area falls under overexploited category where the exploitation of ground water is over 100%. 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

From the availability of the data from the period June, 1974 to June, 2010 it is observed that the water table is declining at the rate of 0.91cm per year (Ground Water Cell, Haryana).

The seasonal fluctuation i.e. Pre and Post monsoon period is 1.5- 2.0m. The pattern of ground water depletion is almost uniform in the project area.

c) Rain water harvesting and Recharging

The water table is depleting in the area has come under over exploited zone so conservation of ground water is important in areas where ground water is exploited, 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 made 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, Mahendergarh. The details of common property resource in Bairawas Watershed (IWMP I) 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)			
		Pvt. Person	Govt.	PRI	Any Other	Pvt. Person	Govt.	PRI	Any Other
Bairawas Watershed (IWMP I)	Waste land	25	-	471	-	25	-	471	-
	Pasture	-	-	378	-	-	-	378	-
	Orchards	-	-	-	-	-	-	-	-
	Village wood lot	-	-	-	-	-	-	-	-
	Forest	-	-	132	-	-	-	132	-
	Village ponds, lake	-	-	20	-	-	-	20	-

Name of the Project	CPR Particulars	Total Area, ha (Area owned / in possession of)				Area available for treatment (ha)			
		Pvt. Person	Govt.	PRI	Any Other	Pvt. Person	Govt.	PRI	Any Other
	Community Buildings	-	-	60	-	-	-	60	-
	Weekly Mkts	-	-	-	-	-	-	-	-
	Permanent Mkts	-	-	-	-	-	-	-	-
	Temples/place of worship	-	-	-	12	-	-	-	12
	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.

Poor economic conditions of farmers: The general socio economic condition of the farmers in this area is 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	Name of villages	Total no. of houses	Total Population	SC

				Male	Female	Total	Male	Female	Total	%age
1	Bairawas	Bairawas	415	1095	950	2045	171	140	311	15
		Palh	197	540	514	1054	86	60	146	14
		Pall	209	613	523	1136	62	52	114	10
		Gadania	213	569	465	1034	66	62	128	12
2	Sohla A+ B	Sohla A+ B	415	1203	1030	2233	103	96	199	9
3	Deroli jat	Deroli jat	437	1156	1063	2219	326	314	640	29
		Khatiwas	330	974	837	1811	143	131	274	15
		Bhandor nichi	254	642	595	1237	176	146	322	26
4	Gulawal	Gulawal	300	816	695	1511	112	88	200	13
		Kuksi	97	255	216	471	50	43	93	20
5	Nimbhera	Nimbhera	317	836	771	1607	352	319	671	42
		Balaicha	196	557	492	1049	117	88	205	19
6	Janjariawas	Janjariawas	372	1003	883	1886	200	161	361	19
		Chhajiawas	202	547	501	1048	0	0	0	0
		Paharwas	106	323	286	609	20	19	39	6

S. No.	Name of the Micro watersheds	Name of villages	Total no. of houses	Total Population			SC			
				Male	Female	Total	Male	Female	Total	%age
		Total	**4060**	**11129**	**9821**	**20950**	**1984**	**1719**	**3703**	**17**

(Source- District Census 2011)

Table16. Village wise Literacy Rate in Bairawas Watershed (IWMP I)

S.No.	Name of the Micro watersheds	Name of villages	Total population	Literacy					
				Total Literates	% age	Male	% age	Female	% age
1	Bairawas	Bairawas	2045	1495	73	922	61	573	39
		Palh	1054	738	70	445	60	293	40
		Pall	1136	781	68	492	63	289	37
		Gadania	1034	708	68	452	64	256	36
2	Sohla A+ B	Sohla A+ B	2233	1399	62	869	62	530	38
3	Deroli jat	Deroli jat	2219	1559	70	933	60	626	40
		Khatiwas	1811	1333	73	814	61	519	39
		Bhandor nichi	1237	859	69	536	62	323	38
4	Gulawal	Gulawal	1511	1069	71	658	61	411	39
		Kuksi	471	345	73	213	62	132	38

5	Nimbhera	Nimbhera	1607	1035	64	620	60	415	40
		Balaicha	1049	754	72	451	60	303	40
6	Janjariawas	Janjariawas	1886	1283	68	773	60	510	40
		Chhajiawas	1048	760	72	455	60	305	40
		Paharwas	609	385	63	253	66	132	34
		Total	**20950**	**14503**	**69**	**8886**	**61**	**5617**	**39**

(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	Bairawas	Bairawas	171	140	275	291	12	4	4	0	102	17
		Palh	86	60	59	1	3	0	0	0	180	9
		Pall	62	52	72	5	13	6	0	0	90	6
		Gadania	66	62	22	2	2	0	0	0	31	1
2	Sohla A+ B	Sohla A+ B	103	96	142	5	37	1	9	1	97	11
3	Deroli jat	Deroli jat	326	314	109	11	20	2	1	1	188	18
		Khatiwas	143	131	44	0	6	0	5	1	224	6

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
		Bhandor nichi	176	146	52	19	18	2	2	0	112	50
4	Gulawal	Gulawal	112	88	148	12	45	5	3	0	59	8
		Kuksi	50	43	40	44	15	12	0	0	71	7
5	Nimbhera	Nimbhera	352	319	127	52	67	4	11	3	149	13
		Balaicha	117	88	183	1	2	0	0	0	22	4
6	Janjariawas	Janjariawas	200	161	255	182	42	24	0	1	141	60
		Chhajiawas	0	0	150	114	6	1	1	0	86	111
		Paharwas	20	19	83	19	33	25	2	0	29	10
		Total	**1984**	**1719**	**1761**	**758**	**321**	**86**	**38**	**7**	**1581**	**331**

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 Bairawas Watershed (IWMP I)

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

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	Bairawas	Bairawas	2045	204	90	Lack of employment opportunity	6500- 10000
		Palh	1054	84	120	Lack of employment opportunity	6500- 10000
		Pall	1136	113	90	Lack of employment opportunity	6500- 10000
		Gadania	1034	62	120	Lack of employment opportunity	6500- 10000
2	Sohla A+ B	Sohla A+ B	2233	111	180	Lack of employment opportunity	6500- 10000
3	Deroli jat	Deroli jat	2219	221	60	Lack of employment opportunity	6500- 10000
		Khatiwas	1811	162	60	Lack of employment opportunity	6500- 10000
		Bhandor nichi	1237	98	60	Lack of employment opportunity	6500- 10000
4	Gulawal	Gulawal	1511	90	90	Lack of employment opportunity	6500- 10000
		Kuksi	471	37	60	Lack of employment opportunity	6500- 10000
5	Nimbhera	Nimbhera	1607	112	90	Lack of employment opportunity	6500- 10000
		Balaicha	1049	73	90	Lack of employment opportunity	6500- 10000
6	Janjariawas	Janjariawas	1886	188	60	Lack of employment opportunity	6500- 10000
		Chhajiawas	1048	83	120	Lack of employment opportunity	6500- 10000
		Paharwas	609	60	60	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	Bairawas	Bairawas	415	143	34
		Palh	197	74	37
		Pall	209	89	42
		Gadania	213	144	67
2	Sohla A+ B	Sohla A+ B	415	100	24
3	Deroli jat	Deroli jat	437	122	28
		Khatiwas	330	126	38
		Bhandor nichi	254	96	38
4	Gulawal	Gulawal	300	-	-
		Kuksi	97	36	37
5	Nimbhera	Nimbhera	317	90	28
		Balaicha	196	43	22
6	Janjariawas	Janjariawas	372	55	15
		Chhajiawas	202	22	11
		Paharwas	106	16	15
		Total	**4060**	**1156**	**28**

(Source: District Administration Mahendergarh, Haryana)

INFRASTRUCTURE DETAILS

All the villages are well connected by pucca road and primary or middle school exists in all villages. Health facility is available in villages or nearby 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	Bairawas	Bairawas	Y	Y	Sr. Sec. School	Y	Y	Y	Y
		Palh	N	N	Primary School	N	Y	N	N
		Pall	N	N	Primary School	N	Y	N	N
		Gadania	N	N	Primary School	N	Y	N	N
2	Sohla A+ B	Sohla A+ B	N	N	Primary School	N	Y	N	N
3	Deroli jat	Deroli jat	N	N	Middle School	N	Y	N	N
		Khatiwas	N	N	Middle School	N	Y	N	N
		Bhandor nichi	N	N	Middle School	N	Y	N	N
4	Gulawal	Gulawal	N	N	Middle School	N	Y	N	N

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
		Kuksi	N	N	Primary School	N	Y	N	Y
5	Nimbhera	Nimbhera	N	N	Primary School	N	Y	Y	N
		Balaicha	N	N	Primary School	N	Y	N	N
6	Janjariawas	Janjariawas	N	N	Middle School	N	Y	N	N
		Chhajiawas	N	N	Primary School	N	Y	N	Y
		Paharwas	N	N	N	N	Y	N	N

FACILITIES/ HOUSEHOLD ASSETS

Table 21. Facilities/ Household assets in Bairawas Watershed (IWMP I)

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				

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	Bairawas	Bairawas	415	45	20	269	62	24	49	12	415	8
		Palh	197	21	9	128	29	11	23	5	197	3
		Pall	209	22	10	135	31	12	25	6	209	4
		Gadania	213	23	10	138	31	12	25	6	213	4
2	Sohla A+ B	Sohla A+ B	415	45	20	269	62	24	49	12	415	8
3	Deroli jat	Deroli jat	437	48	21	284	65	26	52	13	437	8
		Khatiwas	330	36	16	214	49	19	39	9	330	6
		Bhandor nichi	254	27	12	165	38	15	30	7	254	5
4	Gulawal	Gulawal	300	33	15	195	45	18	36	9	300	6
		Kuksi	97	10	4	63	14	5	11	2	97	1
5	Nimbhera	Nimbhera	317	34	15	206	47	19	38	9	317	6
		Balaicha	196	21	9	127	29	11	23	5	196	3
6	Janjariawas	Janjariawas	372	40	18	241	55	22	44	11	372	7
		Chhajiawas	202	22	10	13	30	12	24	6	202	4

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				
		Paharwas	106	11	5	68	15	6	12	3	106	2

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 Bairawas Watershed (IWMP I)

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	Bairawas	Bairawas	20250	15810	4640	3608	44308
		Palh	18450	14790	3920	4264	41424
		Pall	16560	12240	3360	4018	36178
		Gadania	19440	15640	4320	3526	42926
2	Sohla A+ B	Sohla A+ B	22050	17425	5200	4510	49185
3	Deroli jat	Deroli jat	20880	18700	4800	4264	48644
		Khatiwas	20070	17170	5200	3936	46376

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.
		Bhandor nichi	19530	15640	4240	3444	42854
4	Gulawal	Gulawal	18360	16490	4240	4018	43108
		Kuksi	22140	19040	4800	4510	50490
5	Nimbhera	Nimbhera	18270	15640	4320	3772	42002
		Balaicha	15750	11475	3520	3690	34435
6	Janjariawas	Janjariawas	21060	16320	4960	3280	45620
		Chhajiawas	17820	15130	4480	3526	40956
		Paharwas	22500	17000	4800	4100	48400

3.5.4 Comparative Status of crop Productivity

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

3.6 REASONS FOR LOW PRODUCTIVITY

- Moderate to severe erosion hazard
- 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.
- Low organic carbon content.
- Poor phosphorous and medium potash nutrients availability.
- Lack of assured irrigation facility.
- Acceptance of hybrid/ high yielding varieties is very low.
- Irregular and erratic rainfall: there is long span between two subsequent rainfalls in the area.
- Sudden change in climate of the area.
- Essential micro- nutrient deficiency in the soil.
- Dependence on monsoon.
- Improper use of fertilizer 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.

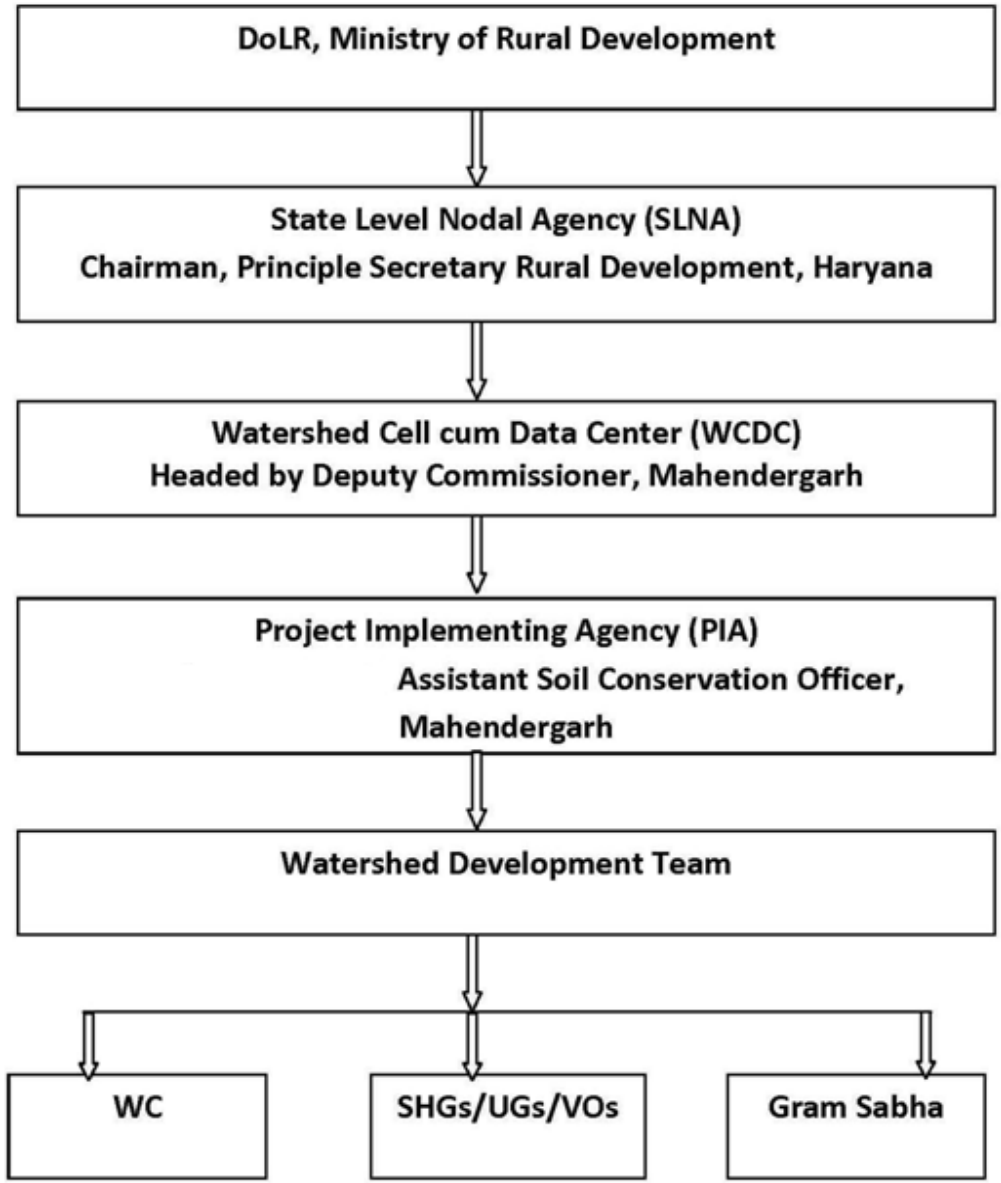
CHAPTER-4

PROJECT MANAGEMENT AGENCIES

4.1 INSTITUTIONAL ARRANGEMENT

Institutions play a major role in managing the projects. Realizing the importance of Community Participation, Decentralized Participatory Rural 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, Mahendergarh
Project Implementing Agency (PIA)
Assistant Soil Conservation Officer,
Mahendergarh
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, MAHENDERGARH

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 Mahendergarh is selected by the State Level Nodal Agency (SLNA) for Integrated Watershed Management Programme (IWMP) in Haryana. In the district Mahendergarh, where the area of development is 27898 ha, a separate dedicated unit, called the Watershed Cell cum Data Centre has been established which will oversee the implementation of watershed programme. The PIA is responsible for implementation of watershed project. Soils and Water Conservation Department, Mahendergarh will guide with its. He has a 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	Bairawas Watershed (IWMP-I)	i) Type of organization	Government
		ii) Name of organization	Department of Agriculture, Haryana
		iii) Designation & Address	ASCO, Mahendergarh
		iv) Telephone	01285- 220064
		v) Fax	-
		vi) E-mail	vimalyadav_3218@rediffmail.com, hkkt.sharma@gmail.com

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 Mahendergarh 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/ Chairman	Name of Members

Name of Micro Watersheds	Name of Villages	Name of President/ Chairman	Name of Members
Bairawas	Bairawas	Ravi Dutt	Mukesh Devi, Raj Kaur, Mukhtyar Singh, Surender Singh, Manju Devi, Savita Devi, Santosh Devi, Tatbeer, Rajesh, Banwari, Lal Singh, Lal Chand, Jaidayal, Hakikat Sharma
	Palh	Rajender Singh	Mukesh devi, Sarla devi, Ghanshyam, Harlal, Chhaju ram, Ram Prasad, Shree ram, Kalawati devi, Sunita devi, Bishambhar, Omparkash, Mahaveer, Ramkishan, Shingaro devi, Hakikat Sharma
	Pall	Chander Kiran	Mukesh devi, Raj kaur, Subhash chand, Chote lal, Sumer Singh, Mada ram, Shakuntala devi, Subhash Chand, Sunita devi, Gayatri devi, Satish kumar, Sitaram, Banwarilal, Mahaveer, Mahender Singh, Hakikat Sharma
	Gadania	Pradeep Kumar	Mukesh devi, Sarla devi, Subhash Chand, Motilal, Rajender, Chandra devi, Manju devi, Dharambir, Amar Singh, Shree ram, Hari Ram, Shree ram, Maya devi, Hakikat Sharma
Sohla	Sohla	Urmila devi	Mukesh devi, Murari lal, Girish kumar, Chitar Singh, Ramchander, Ghanshyam, Kusum devi, Hoshiyar, Saroj devi, Anita devi, Jagdish, Ishwar, Dharam Singh, Mahaveer, Dhanpat, Jaimal, Ravinder nandal
Deroli Jat	Deroli Jat	Sharmila devi	Rajkumar, Rakesh Kumar, Ram Swaroop, Gajanand, Rajkumar, Phool Wati, Dharmveer, Yashwanti, Sanjay Kumar, Sahaj kaur, Suman devi, Santosh, Sujaan, Umed Singh, Jagbeer,

Name of Micro Watersheds	Name of Villages	Name of President/ Chairman	Name of Members
			Jagdeep, Omparkash, Ravinder Nandal
	Khatiwas	Sunita devi	Rajkumar, Sodhan ram, Shubh ram, Bhagwani, Kirori lal, Kamla devi, Kailash devi, Ramjilal, Ramchander, Shiv dutt, Chotelal, Ravinder nandal
	Bhandor Nichi	Sumer Singh	Suman kumar, Chiranjilal, Parmaal Singh, Manphool, Surender Singh, Shobha devi, Rajrani, Ramchander, Rohtash, Mahaveer, Sher Singh, Ramesh kumar, Ramniwas, Dharampal, Hakikat Sharma
Gulawal	Gulawal	Krishan Kumar	Sanjeev Kumar, Hoshiyar Singh, Gugan Ram, Manphool devi, Ajit Singh, Lal Chand, Santosh devi, Ram nivas, Krishan, Hoshiyar, Suraj bhan, Kalawati, Santosh, Ravinder Nandal
	Kuksi	Ajit Singh	Mukesh Devi, Sarla Devi, Sajjan Singh, Satyender Singh, Rampyari Devi, Omparkash, Vidhya Devi, Subhash, Hariram, Harphool, Pavitra devi, Hakikat Sharma
Nimbhera	Nimbhera	Amilal	Mukesh devi, Murari lal, Balbir Singh, Ratipal, Omparkash, Savitri devi, Mukesh, Darshna devi, Chanderkala, Roshanlal, Jai parkash, Pratap Singh, Jile Singh
	Balaicha	Shushma Devi	Mukesh Devi, Murari Lal, Kishan Lal, Balbir Singh, Murti Devi, Niranjan Lal, Naurang Lal, Shyam Lal, Meena Devi, Suman Lata, Chhatar Pal, Hanuman, Jile Singh, Naurang Lal, Ramchander, Jile Singh

Name of Micro Watersheds	Name of Villages	Name of President/ Chairman	Name of Members
Janjariawas	Janjariawas	Murari Lal	Mukesh Devi, Rohtash, Lakhi Ram, Santra Devi, Gheesa Ram, Chameli Devi, Omprakash, Santa Devi, Rekha Devi, Satyanarayan, Mamta Devi, Rajnarayan, Mukesh, Trilok, Hardwari, Jile Singh
	Chajiawas	Rajveer	Mukesh Devi, Shakuntala Devi, Hari Singh, Ramavtar, Amar Singh, Dhanpat, Bhagwati, Gokal Ram, Shashi Kala, Savita Devi, Kiran Bala, Desh Raj, Hari Singh, Shyochand, Banwari Lal, Bhikha Ram, Rama Nand, Mana Devi, Jile Singh
	Paharwas	Amilal	Sharmila Devi, Omprakash, Karan Singh, Mahipal, Atraj Singh, Suresh Kumar, Sunda Ram, Ratipal, Jile Singh

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 ownership 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 I BAIRAWAS 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 I

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

Bairawas Watershed (IWMP I)	5422	4671	56052000	Administrative costs	560520	560520	1681560	1681560	1121040	5605200
				Monitoring	0	0	0	560520	0	560520
				Evaluation	0	0	0	0	560520	560520
				Entry point activities	2242080	0	0	0	0	2242080
				Institution and capacity building	0	2802600	0	0	0	2802600
				Detailed project report	560520	0	0	0	0	560520
				Watershed development works	0	4484160	8968320	9528840	8407800	31389120
				Livelihood activities for the asset less persons	0	0	1681560	2802600	560520	5044680
				Production system and micro enterprises	0	0	1681560	2242080	1681560	5605200
				Consolidation phase	0	0	0	0	1681560	1681560
				Total	**3363120**	**7847280**	**14013000**	**16815600**	**14013000**	**56052000**
				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: Bairawas)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
831	9972000	Administrative costs	99720	99720	299160	299160	199440	997200
		Monitoring	0	0	0	99720	0	99720
		Evaluation	0	0	0	0	99720	99720
		Entry point activities	398880	0	0	0	0	398880
		Institution and capacity building	0	498600	0	0	0	498600
		Detailed project report	99720	0	0	0	0	99720

		Watershed development works	0	797760	1595520	1695240	1495800	5584320
		Livelihood activities for the asset less persons	0	0	299160	498600	99720	897480
		Production system and micro enterprises	0	0	299160	398880	299160	997200
		Consolidation phase	0	0	0	0	299160	299160
		Total	**598320**	**1396080**	**2493000**	**2991600**	**2493000**	**9972000**
		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: Sohla A)

(**BUDGET AT A GLANCE)**

Effective Area	**Funds Available**	**Name of activity**	**1st Year**	**2nd Year**	**3rd Year**	**4th Year**	**5th Year**	**Total**
651	7812000	Administrative costs	78120	78120	234360	234360	156240	781200
		Monitoring	0	0	0	78120	0	78120
		Evaluation	0	0	0	0	78120	78120
		Entry point activities	312480	0	0	0	0	312480
		Institution and capacity building	0	390600	0	0	0	390600
		Detailed project report	78120	0	0	0	0	78120
		Watershed development works	0	624960	1249920	1328040	1171800	4374720
		Livelihood activities for the asset less persons	0	0	234360	390600	78120	703080
		Production system and micro enterprises	0	0	234360	312480	234360	781200
		Consolidation phase	0	0	0	0	234360	234360
		Total	**468720**	**1093680**	**1953000**	**2343600**	**1953000**	**7812000**
		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 4. PHASING YEAR WISE (Name of the Micro Watershed: Sohla B)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
578	6936000	Administrative costs	69360	69360	208080	208080	138720	693600
		Monitoring	0	0	0	69360	0	69360

		Evaluation	0	0	0	0	69360	69360
		Entry point activities	277440	0	0	0	0	277440
		Institution and capacity building	0	346800	0	0	0	346800
		Detailed project report	69360	0	0	0	0	69360
		Watershed development works	0	554880	1109760	1179120	1040400	3884160
		Livelihood activities for the asset less persons	0	0	208080	346800	69360	624240
		Production system and micro enterprises	0	0	208080	277440	208080	693600
		Consolidation phase	0	0	0	0	208080	208080
		Total	**416160**	**971040**	**1734000**	**2080800**	**1734000**	**6936000**
		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: Deroli Jat)

(**BUDGET AT A GLANCE)**

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
813	9756000	Administrative costs	97560	97560	292680	292680	195120	975600
		Monitoring	0	0	0	97560	0	97560
		Evaluation	0	0	0	0	97560	97560
		Entry point activities	390240	0	0	0	0	390240
		Institution and capacity building	0	487800	0	0	0	487800
		Detailed project report	97560	0	0	0	0	97560
		Watershed development works	0	780480	1560960	1658520	1463400	5463360
		Livelihood activities for the asset less persons	0	0	292680	487800	97560	878040

		Production system and micro enterprises	0	0	292680	390240	292680	975600
		Consolidation phase	0	0	0	0	292680	292680
		Total	**585360**	**1365840**	**2439000**	**2926800**	**2439000**	**9756000**
		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: Gulawal)

(**BUDGET AT A GLANCE)**

Effective Area	**Funds Available**	**Name of activity**	**1st Year**	**2nd Year**	**3rd Year**	**4th Year**	**5th Year**	**Total**
516	6192000	Administrative costs	61920	61920	185760	185760	123840	619200
		Monitoring	0	0	0	61920	0	61920
		Evaluation	0	0	0	0	61920	61920
		Entry point activities	247680	0	0	0	0	247680
		Institution and capacity building	0	309600	0	0	0	309600
		Detailed project report	61920	0	0	0	0	61920
		Watershed development works	0	495360	990720	1052640	928800	3467520
		Livelihood activities for the asset less persons	0	0	185760	309600	61920	557280
		Production system and micro enterprises	0	0	185760	247680	185760	619200
		Consolidation phase	0	0	0	0	185760	185760
		Total	**371520**	**866880**	**1548000**	**1857600**	**1548000**	**6192000**
		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: Nimbhera)

(**BUDGET AT A GLANCE)**

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
595	7140000	Administrative costs	71400	71400	214200	214200	142800	714000
		Monitoring	0	0	0	71400	0	71400

		Evaluation	0	0	0	0	71400	71400
		Entry point activities	285600	0	0	0	0	285600
		Institution and capacity building	0	357000	0	0	0	357000
		Detailed project report	71400	0	0	0	0	71400
		Watershed development works	0	571200	1142400	1213800	1071000	3998400
		Livelihood activities for the asset less persons	0	0	214200	357000	71400	642600
		Production system and micro enterprises	0	0	214200	285600	214200	714000
		Consolidation phase	0	0	0	0	214200	214200
		Total	**428400**	**999600**	**1785000**	**2142000**	**1785000**	**7140000**
		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 8. PHASING YEAR WISE (Name of the Micro Watershed: Janjariawas)

(**BUDGET AT A GLANCE)**

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
687	8244000	Administrative costs	82440	82440	247320	247320	164880	824400
		Monitoring	0	0	0	82440	0	82440
		Evaluation	0	0	0	0	82440	82440
		Entry point activities	329760	0	0	0	0	329760
		Institution and capacity building	0	412200	0	0	0	412200

		Detailed project report	82440	0	0	0	0	82440
		Watershed development works	0	659520	1319040	1401480	1236600	4616640
		Livelihood activities for the asset less persons	0	0	247320	412200	82440	741960
		Production system and micro enterprises	0	0	247320	329760	247320	824400
		Consolidation phase	0	0	0	0	247320	247320
		Total	**494640**	**1154160**	**2061000**	**2473200**	**2061000**	**8244000**
		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 was 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 for the all seven watersheds in Mahendergarh 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 ground water.
- Declining Water Table by use of Ground Water for irrigation.
- Frequent droughts.

CAPACITY BUILDING- 5%

Rs. 28, 02, 600/-

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 subject 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 sanct ioned 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 Mahendergarh 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**				
	Mahendergarh	Members of Watershed Committees @ 10 per committee would also include accompanying WDT Members.	700	300-350	2
02	Block Level Functional Programmes for Secretaries of Watershed Committees. **Two Days**				
	Mahendergarh	Secretaries of Village Watershed Committees	70	35-40	2
03	Project Level Sensitization Camps for WC **One Days**				
	Mahendergarh	Members of Watershed Committees @ 10 Persons (Tentative) per WC	700	50	14

04	Village Level Awareness Camps on IWMP at Micro Watershed Level for User Groups **One Day**				
	Mahendergarh	Approximately 50 prospective user groups per micro watershed.	2050	50	41
05	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP **One Day**				
	Mahendergarh	Three persons (Leader, Secretary and Treasurer) per Self Help Group @ around one SHG per village.	210	50	4

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	59405
2	Block Level Functional Programmes for Secretaries of Watershed Committees. Two Days	7735
3	Village Level Sensitization Camps for WC One Days	41372
4	Village Level Awareness Camps on IWMP at Micro Watershed Level for Prospective User Groups One Day	55604
5	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP One Day	15337
	Total	**179453**

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

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	19600	5	14	9800	700	2100	147000

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
2	User groups from each micro watershed	NRM, Post Project Management etc. –Exposure Visit	2	19600	5	14	9800	700	2100	147000
3	Sub watershed Level- WDT Members	Part II-Module I to V-Exposure Visit Outside State- Conceptual, Technical, Social, Management of Finance, Monitoring and Evaluation.	4	42000	5	7	10500	1500	4500	157500
4	Sub watershed Level- PIA Members	Exposure Visit- Within Fundamentals of Watershed, Finance Management, Final Report on WDP etc	2	19600	5	14	9800	700	4500	315000
5	District Level-	Exposure visit to successful	2	19600	5	14	9800	700	1400	98000

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
	WDC	watershed/ University.								
6	District Level-Line Deptt., WDC	Exposure visit to successful watersheds within state.	2	19600	5	14	9800	700	1400	98000
7	SLNA and District Level Controlling Officers	Exposure visit to successful watersheds outside state	4	84000	5	14	21000	1500	6000	420000
Total			**18**		**35**	**91**				**1382500**

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

S. No.	District	No. Micro watershed	No. of Camps/ Year/ Micro watershed	Total No. of camps per Year	Total No. of camps for 5 Year's	Amount of per Camp	Amount per Micro watershed	Total Budget
1.	Farmer Training Camp in each season	7	2	14	70	12,000	1,68,000	8,40,000
2.	Propaganda & Documentation (Puppet show, documentary movies show, video-graphy, Photography, wall Painting, Display Board, pamphlets, leaf lets. Etc)	7	2	14	70	5000	70,000	3,50,000
3	Contingency charges							50647
	Total							**1240647**

i) **Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD = 1,79,453/-**

ii) **Micro Watershed Wise Exposure cum training Visit For SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members**
= 13, 82,500/-

iii) **Farmer's / Beneficiaries training camps with Extension Program's = 12,40,647/-**

Grand Total = 28, 02,600/-

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. 22, 42,080/-** 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 Bairawas Watershed (IWMP I)

(Rs. In Lacs)

Sr.No.	Block	Name of Project	No. of EPAs Identified	No. of EPAs Completed	No. of EPAs in progress	Name/Nature of EPA	Location	Expenditure
1.	Mahendergarh	Bairawas Watershed (IWMP I)	20	20	Nil	1. Digging of Percolation Pond	Bairawas	0.29
						2.Water recharge with percolation pit with recharge well	Bairawas	1.89
						3.RCC pipe line for drainage	Balaicha	0.96
						4.Preparation of playground & wire fencing	Bhandor Nichi	0.99

Sr.No.	Block	Name of Project	No. of EPAs Identified	No. of EPAs Completed	No. of EPAs in progress	Name/Nature of EPA	Location	Expenditure
						5.RCC Pipe line for Drainage	Chhajiawas	0.33
						6.Open drainage channel to pond	Deroli Jat	2.00
						7.Drinking water storage tank	Gadania	0.99
						8.Connection of water tank to water supply main line	Gadania	0.09
						9.RCC pipeline for drainage to pond	Janjariawas	1.22
						10.UGP 75mm line for drinking	Khatiwas	1.60
						11.Percolation cum Stock pond	Kuksi	0.79
						12.Diversion bund & Channel to collect rain water	Nimbhera	1.18
						13.Interlocking Tile road	Paharwas	0.93
						14.Percolation cum Recharge pond	Palh	0.94
						15.Water Tanker for Supply of water	Pall	1.26

Sr.No.	Block	Name of Project	No. of EPAs Identified	No. of EPAs Completed	No. of EPAs in progress	Name/Nature of EPA	Location	Expenditure
						16.Boundary wall of Panchayat Ghar	Gulawala	1.35
						17.Interlocking Tile Road at Mandir	Sohla	0.77
						18.Diversion channel for Rain water collection	Sohla	1.58
						19.Open Channel for recharge into well	Sohla	2.63
						20.Interlocking Tile Floor at Panchayat Ghar	Sohla	1.03
						Total		**22.83**

Total project Cost @ 4%= Rs. 22, 42,080/-

CHAPTER- 7

WORK PHASE

7.1 WATERSHED DEVELOPMENT WORKS - 56%

The Works identified after the detailed investigation and survey of the Project Area and identified works were discussed with the team of experts comprising of PIA associated with the field officers working in the area, Hydrologist and supported by Experts from Livelihood, Agriculture, Animal Husbandry and Horticulture. 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 Dug out Pond, Cement Stone Masonry structures (Inlet & Outlet), Roof Top Rain water Harvesting Structures, Earthen Embankment with pucca outlet, Small Earthen Embankments, Water conveyance system, Dry stone Masonary structures, Silt Detention Dam, Community Water Storage Tank 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/village wise.

Drainage line Treatment

Construction of Cement Stone/Brick Masonry structure /Drop Structure/ Outlet

Existing System: The project area has an undulated and hummocks which are restrict to field operations to stabilized agriculture fields/ habitation located along the banks of ponds and agriculture land. The main objectives of these structures are in situ moisture conservation, soil conservation, field boundary stabilization, land leveling and safe disposal of run off to protect agriculture fields. The land holding is small and loss of land badly affects the economy of the family. The projects executed under DDP/DPAP, stone masonry were constructed at strategic locations which saved the land of the farmers and banks of village ponds.

Proposed System: Run-off from upper area shall be reduced by Afforestation and rain water harvesting/ Earthen Structures for recharge which would also check the soil erosion. As per need, earthen embankment with pucca outlet are proposed at strategic locations on field boundaries of undulated area to protect the farm lands, bank of ponds, habitation and infrastructure.

7.2 Renovation for capacity enhancement and construction of new Ponds

Existing System: There is an acute scarcity of water for livestock as village ponds dry out in summer months. Most ponds are silted up and need desiltation. Some are leaking from sides and water is lost quickly. Most of ponds do not have proper inlets, out lets and ramps for water disposal. There is genuine demand for renovation for capacity enhancement construction of new ponds in the area.

Proposed Activity: Renovation for capacity increase and construction of new pond. The provision for construction of 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 land and 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 for increase pondage capacity. Ponds as such are the best source of rainwater conservation and ground water recharge.

Gram Panchayat spend much money on renovation under different schemes but due to paucity of funds, works are taken up in piece meal and main works of protection measures are ignored. The stakeholders gave high priority for the construction of protection measures 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 protection measures 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.

7.3 Earthen Embankment with pucca outlet / Silt Detention Dams

Present Status: The most of area covered in project are undulated, sloppy, hilly and dune. There are feasible sites where Silt Detention Dam and Earthen Embankment with pucca outlet can be constructed to reduce erosion hazard and recharge of ground water. But this is not viable at individual level so the provision for as common cause has been provided in community basis.

Suggested Interventions: In quite a number of villages, sites have been identified for Earthen Embankment with pucca outlet / Silt Detention Dams, etc and provision has been kept as per the allocation of funds. In some watershed village paths have converted in

nalas due to erosion to be strengthened by construction of earthen embankments with pucca outlet. In some villages where Dohun River flow one Silt Detention Dam in each village proposed. The necessary provision has been kept.

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, and 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 filth 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:

Activities under NRM (56%) Micro Watershed Wise (IWMP I Mahendergarh) is given below and the proposed Action Plan/ Treatment Plan map shown in **Annexure X.**

Village wise distribution of 56% developments works under Bairawas Watershed Project (IWMP-1)

Table 1. Name of Project IWMP-1 Name of Micro Watershed: Janjariawas Name of Village: Janjariawas

Sr. No.	Activity/work with location/identification mark	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective
				Unit Cost Rs. in Lacs	Phy		
1	Dug out Pond	Near Sati Mata Mandir on Panchayat Land	No	3	1	3.00	To collect rain water and canal water for recharge & stock
2	Ramp, inlet, outlet & protection wall, if necessary at old ponds	West side of village near Duloth Road	Cum	0.0326	75	2.445	To check soil erosion
3	Roof Top Rain water Harvesting Structures.	Govt School Building	No	2	1	2.00	To recharge the roof rain water
4	Rain fed Horticulture	Agriculture fields	Ha	0.25	2	0.5	For generate extra income to farmers
5	Agro Forestry	Agriculture fields	Ha	0.15	5	0.75	To increase biomass cover
6	Earthen Embankment with pucca outlet	On undulated land	No.	0.77+0.20= 0.97	5	4.85	To protect soil from sheet and rill erosion
7	Small Earthen Embankments with vegetative Support	Agriculture field	100 Cum	0.029	19007	5.51	To check soil erosion and in situ moisture conservation

8	Water conveyance system from Dadri minor to Mirjani pond	Nearest minor to village pond	Rmt.	0.01	360	3.60	To ensure availability of water in pond during lean period
					Total Cost	**22.66**	
					Available Fund	**20.63**	
					Convergence	**2.03**	

Table 2. Name of Project IWMP-1 Name of Micro Watershed: Janjariawas Name of Village: Chhajiawas

Sr. No.	Nature of Works	Location	Unit	No. of Works	Estimated	Objective

				Unit Cost (Rs. in Lacs)	**Phy**	**Cost (Rs. In Lacs)**	
1	Renovation/new village pond	Near road of village	No.	3	1	3	For ground water recharging & availability of water for village community animals.
2	Ramp, inlet, outlet & protection wall, if necessary at old ponds	Near road of village	cum	0.0326	45	1.47	To provide inlet and outlet to check water losses and protection of pond in case of over flow
3	Earthen Embankment with pucca outlet	On undulated land	No.	0.77+0.20 = 0.97	2	1.94	To protect soil from sheet and rill erosion
4	Roof Top Rain Water Harvesting Str.	Govt School Building	No	2	1	2	To recharge the roof rain water
5	Rain fed Horticulture	Agriculture fields	Ha.	0.25	2	0.5	For generate extra income to farmers
6	Agro Forestry	Agriculture fields	Ha	0.15	4	0.6	To increase biomass cover
7	Small Earthen Embankments with vegetative Support	Agriculture field	100 Cum	0.029	7500	2.18	To check soil erosion and in situ moisture conservation
Total Cost						**11.68**	

Available Funds	**8.13**	
Convergence	**3.55**	

Table 3. Name of Project IWMP-1 Name of Micro Watershed: Janjariawas Name of Village:Paharwas

Sr. No.	Nature of Works	Location	Unit		No. of Works	Estimated Cost Rs. In Lacs	Objective
				Unit Cost Rs. in Lacs	Phy		
1	Dug Out Pond	West side of village	No	3	1	3.00	To collect rain water and canal water for recharge & cattles
2	Ramp, inlet, outlet & protection wall, if necessary at old ponds	West side of village	Cum	0.0326	100	3.26	To check soil erosion
3	Roof Top Rain water Harvesting Str.	School Building	No	2	1	2.00	To recharge the roof rain water
4	Rain fed Horticulture	Agriculture fields	Ha	0.25	2	0.50	For generate extra income to farmers

5	Agro Forestry	Agriculture fields	Ha	0.15	5	0.75	To increase biomass cover
6	Small Earthen Embankments with vegetative Support	Agriculture field	100 Cum	0.029	7600	2.20	To check soil erosion and in situ moisture conservation
7	Earthen Embankment with pucca outlet	On undulated land	No.	0.77+0.20= 0.97	3	2.91	To protect soil from sheet and rill erosion
8	Water conveyance system	From Khatodra Miner to Baniwala Pond	RMT	0.01	300	3.00	For connecting canal to pond to collect water for stock & recharge
9	Community Water Storage Tank with Pipe line	Nearest miner to agricultrure field	No.	3	1	3	For store surplus canal water for use during lean period
Total Cost						**20.62**	
Available funds						**17.4**	
Convergence						**3.22**	

Table 4. Name of Project IWMP-1 Name of Micro Watershed: Nimbhera Name of Village: Nimbhera

Sr.	No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective
					Unit Cost Rs. in Lacs	Phy		
1		Dug out Pond	Near Mandir & Near Samshan Bhumi	No	3	2	6.00	To collect rain water and canal water for recharge & stock
2		Ramp, inlet, outlet & protection wall, if necessary at old ponds	Baba Bhaiyawala pond	Cum	0.0326	200	6.52	To check soil erosion
3		Dry stone Masonary structure	Diversion Channel on South side near Baba Bhaiya	Cum	0.00256	435	1.11	To check soil erosion & proper management of rain water
4		Roof Top Rain water Harvesting Structures	Community Buildings	No	2	1	2.00	To recharge the roof rain water
5		Rain fed Horticulture	Agriculture fields	Ha	0.25	4	1.00	To generate extra income
6		Agro Forestry	Agriculture fields	Ha	0.15	7	1.05	To increase biomass cover

7	Earthen Embankment with pucca outlet	On undulated land	No.	0.77+0.20 = 0.97	8	7.76	To protect soil from sheet and rill erosion
8	Small Earthen Embankments with vegetative Support	Agriculture field	100 Cum	0.029	12021	3.49	To check soil erosion and in situ moisture conservation
Total Cost						**28.93**	
Available Funds						**25.33**	
Convergence						**3.60**	

Table 5. Name of Project IWMP-1 Name of Micro Watershed: Nimbhera Name of Village: Balaicha

Sr. No.	**Nature of Works**	**Location**	**Unit**	**No. of Works**		**Estimated Cost Rs. In Lacs**	**Objective**
				Unit Cost Rs. in Lacs	**Phy**		
1	Dug out Pond	South side of village	No	3	1	3.00	To collect rain water for recharge & stock
2	Ramp, inlet, outlet & protection wall, if necessary at old ponds	North East side	Cum	0.0326	65	2.12	To check soil erosion

3	Roof Top Rain water Harvesting Str.	Community Buildings	No	2	1	2.00	To recharge the roof rain water
4	Rain fed Horticulture	Agriculture fields	Ha	0.25	2	0.50	To generate extra income
5	Agro Forestry	Agriculture fields	Ha	0.15	5	0.75	To increase biomass cover
6	Earthen Embankment with pucca outlet	On undulated land	No.	0.77+0.20= 0.97	4	3.88	To protect soil from sheet and rill erosion
7	Small Earthen Embankments with vegetative Support	Agriculture field	100 Cum	0.029	14089	4.09	To check soil erosion and in situ moisture conservation
	Water conveyance system	From Miner to village Pond (RCC)	RMT	0.01	130	1.30	For connecting canal to pond to collect water for stock & recharge
Total Cost						**17.63**	
Available Funds						**14.65**	
Convergence						**2.98**	

Table 6. Name of Project IWMP-1 Name of Micro Watershed: Gulawala Name of Village: Gulawala

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective
				Unit Cost Rs. in Lacs	Phy		
1	Dug out Pond	Samshan Ghat	No	3	1	3.00	To collect rain water and canal water for recharge & stock
2	Ramp, inlet, outlet & protection wall, if necessary at old ponds	Samshan Ghat Pond	Cum	0.0326	115	3.75	To check soil erosion
3	Silt Detention Dam	In Dohun river along village path	No.	4.95	1	4.95	Water harvesting and ground water recharging
4	Earthen Embankment/ Diversion bund/ Guide bundh with pucca outlet	North side of village along hillocks and both side of river	No	0.77+0.20 = 0.97	12	11.64	To collect rain water and to check soil erosion

5	Rain fed Horticulture	Agriculture fields	Ha	0.25	3	0.75	To generate extra income
6	Agro Forestry	Agriculture fields	Ha	0.15	5	0.75	To increase biomass cover
Total Cost						**24.84**	
Available Funds						**22.18**	
Convergence						**2.66**	

Table 7. Name of Project IWMP-1 Name of Micro Watershed: Gulawala Name of Village: Kuksi

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective
				Unit Cost Rs. in Lacs	Phy		
1	Dug out Pond	West side of village	No	3	1	3.00	To collect rain water for recharge & stock
2	Ramp, inlet, outlet & protection wall, if necessary at old ponds	SamshanGhat Pond	Cum	0.0326	45	1.47	To check soil erosion
3	Earthen Embankment/ Diversion bund/ Guide bundh with pucca outlet	Both sides of river and fileld boundries	No	0.77+0.20 = 0.97	5	4.85	To collect rain water and to check soil erosion

4	Small Earthen Embankment with vegetative Support	Agriculture Fields Boundries	100cum	0.029	7200	2.09	For the control of soil erosion, in situ moisture conservation.
5	Roof Top Rain water Harvesting/recharging injection well	Community Buildings	No	2	1	2.00	To recharge the roof rain water
6	Agro Forestry	Agriculture fields	Ha	0.15	4	0.60	To generate extra income
7	Rain fed Horticulture	Agriculture fields	Ha	0.25	2	0.50	To increase biomass cover
Total Cost						**14.51**	
Available funds						**12.5**	
Convergence						**2.01**	

Table 8. Name of Project IWMP-1 Name of Micro Watershed: Bairawas Name of Village: Bairawas

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective
				Unit Cost Rs. in Lacs	Phy		
1	Dug out Pond	Dulhodi Wala	No	3	2	6.00	To collect rain water and canal water for recharge & stock

2	WCS (RCC Pipe line)	Field of Ranjeet to Main pond	RMT	0.01	300	3.00	For connecting canal to pond to collect water for stock & recharge
3	Roof Top Rain water Harvesting Str.	Govt School Building	No	2	1	2.00	To recharge the roof rain water
4	Rain fed Horticulture	Agriculture fields	Ha	0.25	4	1.00	To generate extra income
5	Agro Forestry	Agriculture fields	Ha	0.15	5	0.75	To increase biomass cover
6	Earthen Embankment with pucca outlet	On undulated land	No.	0.77+0.20= 0.97	5	4.85	To protect soil from sheet and rill erosion
7	Small Earthen Embankments with vegetative Support	Agriculture field	100 Cum	0.029	15091	4.38	To check soil erosion and in situ moisture conservation
Total Cost						**21.98**	
Available Funds						**20.43**	
Convergence						**1.55**	

Table 9. Name of Project IWMP-1 Name of Micro Watershed: Bairawas Name of Village: Palh

Sr. No.	Nature of	Location	Unit	No. of Works	Estimated	Objective

	Works			Unit Cost Rs. in Lacs	Phy	Cost Rs. In Lacs	
1	Dug out Pond	Ashawala	No	3	1	3.00	To collect rain water and canal water for recharge & stock
2	WCS (RCC Pipe Line)	Nihalawas Miner to Pond	RMT	0.01	190	1.90	For connecting canal to pond to collect water for stock & recharge
3	Roof Top Rain water Harvesting recharging injection well	Govt School Building	No	2	1	2.00	To recharge the roof rain water
4	Ramp, inlet, outlet & protection wall, if necessary at old ponds	Badawala Johad	Cum	0.0326	115	3.75	To check soil erosion
5	Rain fed Horticulture	Agriculture fields	Ha	0.25	2	0.50	To generate extra income
6	Agro Forestry	Agriculture fields	Ha	0.15	4	0.60	To increase biomass cover
7	Small Earthen Embankments with vegetative	Agriculture field	100 Cum	0.029	14024	4.07	To check soil erosion and in situ moisture conservation

	Support						
Total Cost						**15.82**	
Available Funds						**12.57**	
Convergence						**3.25**	

Table 10. Name of Project IWMP-1 Name of Micro Watershed: Bairawas Name of Village: Pall

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective
				Unit Cost Rs. in Lacs	Phy		
1	Small Earthen Embankments	Agriculture field	100 Cum	0.029	8006	2.32	To check soil erosion and in situ moisture conservation
2	Roof Top Rain water Harvesting Structure.	Govt School Building	No	2	1	2.00	To recharge the roof rain water
3	Ramp, inlet, outlet & protection wall, if necessary at old ponds	Pond near Canal	Cum	0.0326	108	3.52	To check soil erosion

4	Rain fed Horticulture	Agriculture fields	Ha	0.25	1	0.25	To generate extra income
5	Agro Forestry	Agriculture fields	Ha	0.15	2	0.3	To increase biomass cover
Total Cost						**8.39**	
Available funds						**6.45**	
Convergence						**1.94**	

Table 11. Name of Project IWMP-1 Name of Micro Watershed: Bairawas Name of Village: Gadania

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost	Objective
				Unit Cost Rs. in Lacs	Phy	Rs. in Lacs	
1	Dug out Pond	North side of village (Bani)	No	3	1	3.00	To collect rain water and canal water for recharge & stock

2	Ramp, inlet, outlet & protection wall, if necessary at old ponds	Near road of village	cum	0.0326	90	2.93	To provide inlet and outlet to check water losses and protection of pond in case of over flow
3	WCS (RCC Pipe line)	Kherki Miner to Johad	RMT	0.01	450	4.50	For connecting canal to pond to collect water for stock & recharge
4	Roof Top Rain water Harvesting recharging injection well	Govt School Building	No	2	1	2.00	To recharge the roof rain water
5	Rain fed Horticulture	Agriculture fields	Ha	0.25	4	1.00	To generate extra income
6	Agro Forestry	Agriculture fields	Ha	0.15	6	0.90	To increase biomass cover
7	Small Earthen Embankments with vegetative Support	Agriculture field	100 Cum	0.029	12150	3.52	To check soil erosion and in situ moisture conservation
Total Cost						**17.86**	
Available Funds						**16.4**	
Convergence						**1.46**	

Table 12. Name of Project IWMP-1 Name of Micro Watershed: Deroli Jat Name of Village: Deroli Jat

Sr. No.	Nature of Works	Location	Unit		No. of Works	Estimated Cost Rs. In Lacs	Objective
				Unit Cost Rs. in Lacs	Phy		

1	Dug out Pond	North west side near the village near Dohan river	No	3	1	3.00	To collect rain water and river water for recharge & stock
2	Ramp, inlet, outlet & protection wall, if necessary at old ponds	Pond near Dohan river and Pipliwala Johad	Cum	0.0326	115	3.75	To check soil erosion
3	WCS (RCC Pipe line)	JN Canal to Baniwala both johad (Pond)	RMT	0.01	558	5.58	For connecting canal to pond to collect water for stock & recharge
4	Silt Detention Dam	In Dohun river along village boundry of Deroli Ahir	No.	4.95	1	4.95	Water harvesting and ground water recharging
5	Roof Top Rain water Harvesting Str.	Govt School Building	No	2	1	2.00	To recharge the roof rain water
6	Rain fed Horticulture	Agriculture fields	Ha	0.25	2	0.50	To generate extra income
7	Agro Forestry	Agriculture fields	Ha	0.15	5	0.75	To increase biomass cover
8	Earthen Embankment with pucca outlet	On undulated land	No.	0.77+0.20 = 0.97	5	4.85	To protect soil from sheet and rill erosion
9	Small Earthen Embankments with vegetative Support	Agriculture field	100 Cum	0.029	9080	2.63	To check soil erosion and in situ moisture conservation

Total Cost	**28.01**	
Available Funds	**24.19**	
Convergence	**3.82**	

Table 13. Name of Project IWMP-1 Name of Micro Watershed: Deroli Jat Name of Village: Khatiwas

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective
				Unit Cost Rs. in Lacs	Phy		
1	Dug out Pond	North West side of village at Haddarohi	No	3	1	3.00	To collect rain water and canal water for recharge & stock
2	Ramp, inlet, outlet & protection wall, if necessary at old ponds	Haddarohi Pond	Cum	0.0326	120	3.91	To check soil erosion
3	WCS (RCC Pipe line)	Khairoli Minor to Haddarohi pond	RMT	0.01	400	4.00	For connecting canal to pond to collect water for stock & recharge

4	Roof Top Rain water Harvesting Str.	Govt School Building	No	2	1	2.00	To recharge the roof rain water
5	Rain fed Horticulture	Agriculture fields	Ha	0.25	2	0.50	To generate extra income
6	Agro Forestry	Agriculture fields	Ha	0.15	2	0.30	To increase biomass cover
7	Small Earthen Embankments with vegetative Support	Agriculture field	100 Cum	0.029	12150	3.52	To check soil erosion and in situ moisture conservation
Total Cost						**17.24**	
Available Funds						**14.65**	
Convergence						**2.59**	

Table 14. Name of Project IWMP-1 Name of Micro Watershed: Deroli Jat Name of Village: Bhandor Nichi

Sr.	Nature of Works	Location	Unit	No. of Works	Estimated	Objective

No.				Unit Cost Rs. in Lacs	Phy	Cost Rs. In Lacs	
1	Dug out Pond	Near SamshanGhat	No	3	1	3.00	To collect rain water and canal water for recharge & stock
2	Ramp, inlet, outlet & protection wall, if necessary at old ponds	Samshan Ghat Pond and Satiwala Johad	Cum	0.0326	92	3.00	To check soil erosion
3	WCS (RCC/PVC Pipe line)	Jatwas Miner to Samshan Ghat Pond	RMT	0.01	250	2.50	For connecting canal to pond to collect water for stock & recharge
4	Roof Top Rain water Harvesting Str.	Govt School Building	No	2	1	2.00	To recharge the roof rain water
5	Rain fed Horticulture	Agriculture fields	Ha	0.25	2	0.50	To generate extra income
6	Agro Forestry	Agriculture fields	Ha	0.15	5	0.75	To increase biomass cover
7	Small Earthen Embankments with vegetative Support	Agriculture field	100 Cum	0.029	18214	5.28	To check soil erosion and in situ moisture conservation
Total Cost						**17.03**	
Available Funds						**15.79**	

Convergence	**1.24**	

Table 15. Name of Project IWMP-1 Name of Micro Watershed: Sohla Name of Village: Sohla

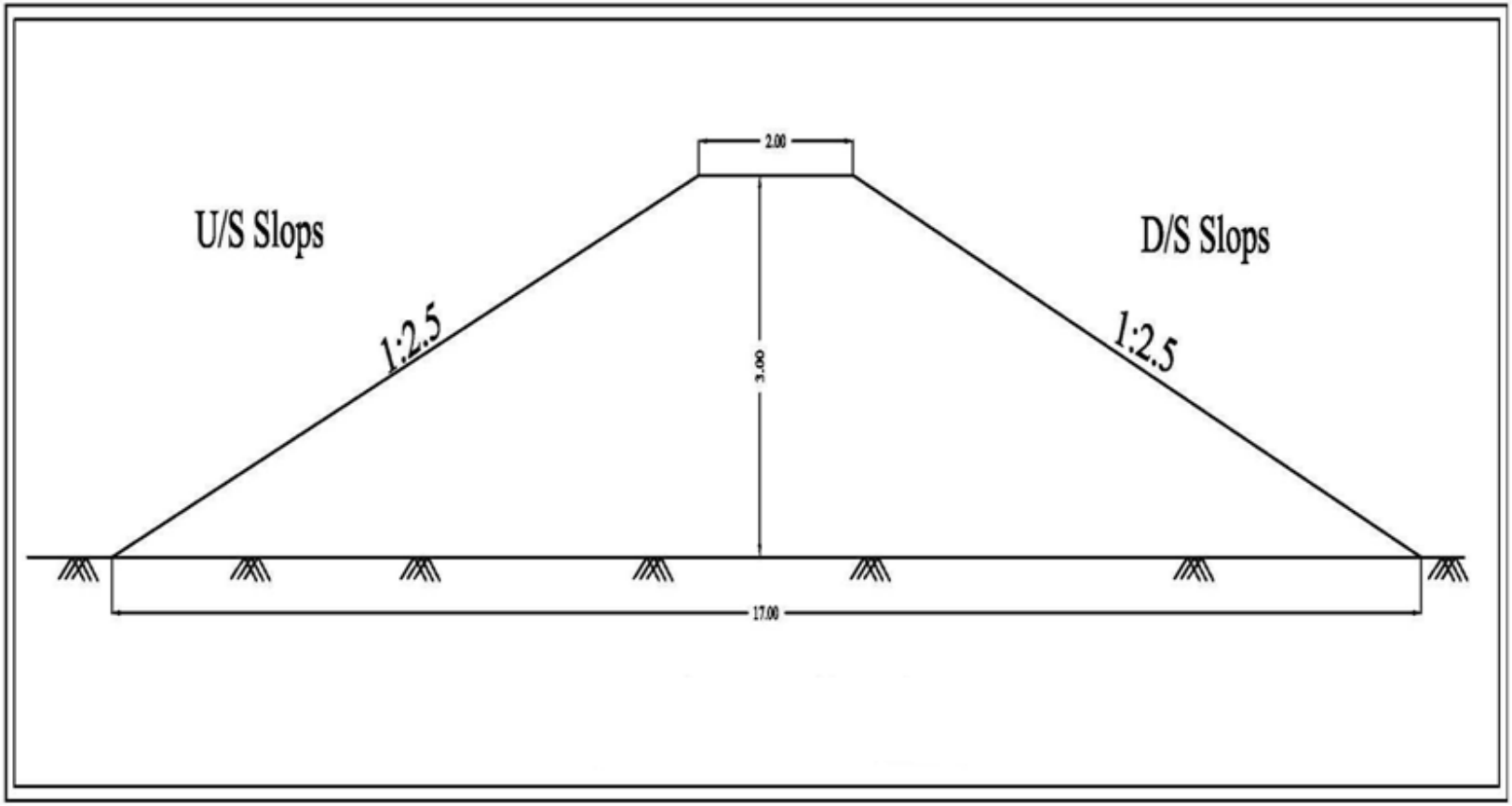
Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective
				Unit Cost Rs. in Lacs	Phy		
1	Dug out Pond	Near Duloth Road, Teejawali , Near Mandir	No	3	4	12.00	To collect rain water for recharge & stock
2	Ramp, inlet, outlet & protection wall, if necessary at old ponds	Mandir Wala Johad and Pahadke Pass wala	Cum	0.0326	275	8.97	To check soil erosion
3	Roof Top Rain water Harvesting Str.	Govt School Building and Panchayat Ghar & Anganwadi	No	2	2	4.00	To recharge the roof rain water
4	Rain fed Horticulture	Agriculture fields	Ha	0.25	15	3.75	To generate extra

							income
5	Agro Forestry	Agriculture fields	Ha	0.15	35	5.25	To increase biomass cover
6	Dry stone Masonry structure	Diversion Channel on South side near Baba Bhaiya	Cum	0.00256	650	1.66	To check soil erosion & proper management of rain water
7	Dug out Dam/Embankment/Check Dam/Diversion Channels	North side of village	No	0.77+0.20= 0.97	30	29.10	To collect rain water and to check soil erosion
8	Small Earthen Embankments with vegetative Support	Agriculture field	100 Cum	0.029	25017	7.25	To check soil erosion and in situ moisture conservation
9	Community Water Storage Tank with Pipe line	Nearest miner to agricultrure field	No.	3	4	12	For store surplus canal water for use during lean period
Total Cost						**83.98**	
Available Funds						**82.59**	
Convergence						**1.39**	

Cost Sharing: During the PRA exercise and meeting with the stake holders from time to time, the beneficiaries agreed to contribute in form of material, labour and cash to 10% of structure cost. The watershed development funds and pattern of utilization would be decided by the UGs/ WDT and PIA during implementation programme.

Table 16. DETAILED ESTIMATE OF EARTHEN EMBANKMENT

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



EARTHEN EMBANKMENT

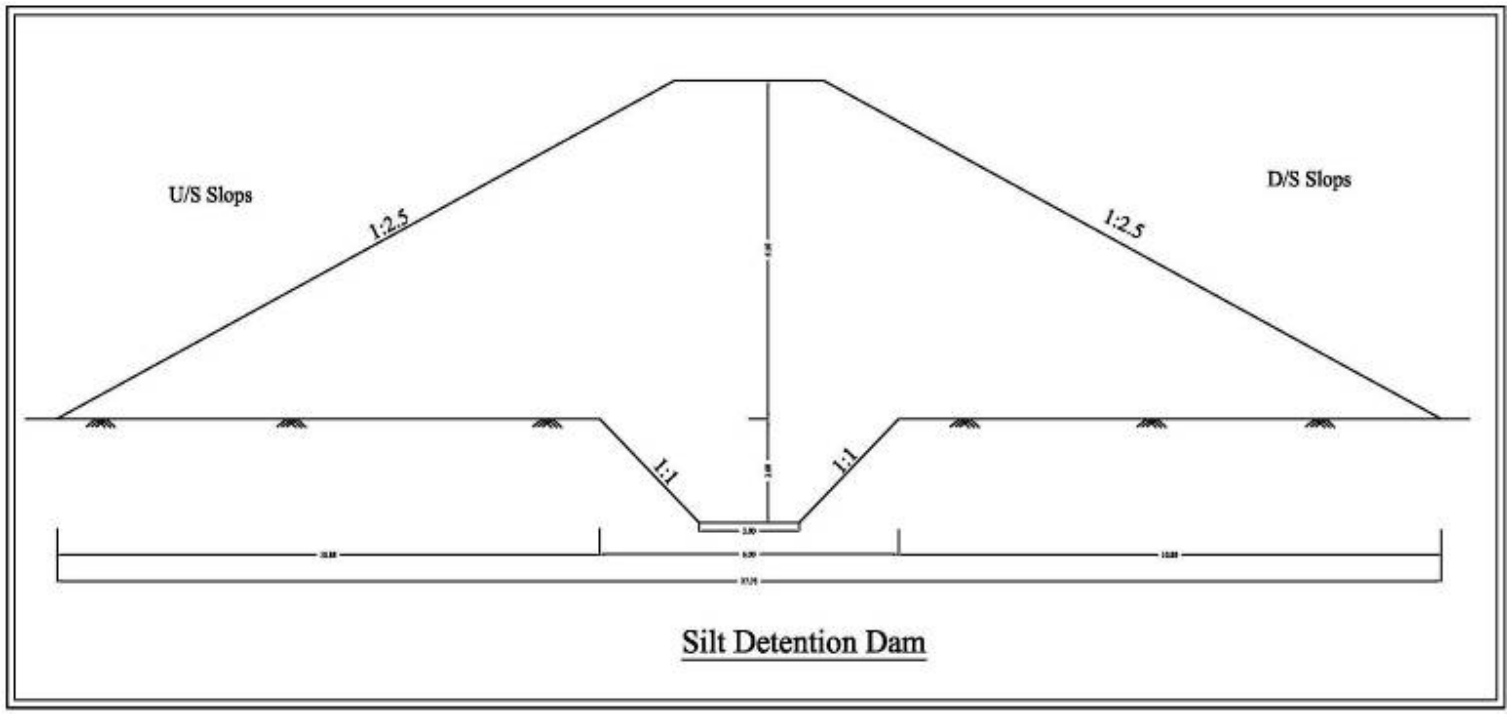
Leads Statement :-					
Cross Section Area = (Base + Top) ÷ 2 x Height i.e {(17.00 +2.00) ÷ 2} x 3.00 = 28.50 Square meters					
Horizontal leads = (Base/2) + (Cross section area/ 2 x 0.6) i.e. (17.00/2) + [{28.50}/(2 x 0.6)] =32.25 meters					
Vertical leads = (Height +0.60) x 0.4 x 10 i.e. (3.00 +0.60) 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)	1344.00 cum	[(15.00 x 5 No.)+ 350% C. Prem.= 337.50	100 cum	4536.00

	H.S.R. 6.2 (c) (ii)				
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. 17. DETAILED ESTIMATE OF SILT DETENTION DAM

	Let the Average length of the Dam =	50 meters			
	Let the Average Height of the Dam =	4.5 meters			
	Up Stream Slope of the Dam =	1 : 3			
	Down Stream Slope of the Dam =	1 : 2.5			



Silt Detention Dam

Table. 18. Leads Statement

Leads Statement :-
Cross Section Area = (Base + Top) ÷ 2 x Height i.e {(27.75 +3.00) ÷ 2} x 4.50 = 69.19 Square meters

Horizontal leads = (Base/2) + (Cross section area/ 2 x 0.6) i.e. (27.75/2) + [{69.19}/(2 x 0.6)] =71.54 meters							
Vertical leads = (Height +0.60) x 0.4 x 10 i.e. (4.50 +0.60) x 0.4 x 10 = 20.40 meters							
Total leads = 71.54 meters + 20.40 meters = 91.94 meters							
Number of leads = (91.94 - 15.00) / 7.5 = 10.25 leads Or Say 11 No. of Leads							
Area of Jungle Clearance :-							
Area to be covered by the body of Dam = Length x Average base i.e. 50.00 x 27.75 = 1387.50 Sq. meters							
Area from where E/W is to be excavated = Av. Length x leads i.e. 50.00 x 91.94 = 4597.00 Sq. meters							
Total Area = 1387.50 + 4597.00 =		5984.50	Sq. meters.				
Volume of Key Trench :-							
(Length - 2 x 2.50) x Av. Width x Height i.e (50.00 - 2 x 2.50) x (6.00 +2.00)/2 x 2.00=						360.00	cum
Volume of Loose soil to be removed :-							
Area to be covered by the body of Dam X Depth of loose soil i.e (1387.50 x 0.30) =						416.25	cum
Volume of Earthwork in bund filling :-							
(Cross Section Area X Length) + Loose soil to be removed i.e.(69.19 x 50.00)+ 416.25 =						3875.75	cum
DETAILED ESTIMATE OF CHUTE SPILLWAY							
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	1	2.00	1.00	1.50	3.00	

	Side walls	2	24.00	1.00	1.50	72.00	
	Wing walls	2	2.00	1.00	1.50	6.00	
	Toe with extension	1	4.00	1.00	1.50	6.00	
	Apron	1	24.00	2.00	(2.0+1.0)/2 =1.50	72.00	
				Total =		**159.00**	
2	**Cement concrete work 1 : 4 : 8 in the Foundation and plinth H.S.R 10.39**						
	Crest wall	1	2.00	0.90	0.20	0.36	
	Side walls	2	24.00	0.90	0.20	8.64	
	Wing walls	2	2.00	0.90	0.20	0.72	
	Toe with extension	1	4.00	0.90	0.20	0.72	
	Apron	1	24.00	2.00	0.20	9.60	
				Total =		**20.04**	
3	**Square rubble stone masonry course 1: 5 in foundation and plinth H.S.R 12.23**						
	Crest wall	1	2.00	0.70	1.30	1.82	
	Side walls	2	24.00	0.70	0.30	10.08	
	Wing walls	2	2.00	0.70	1.30	3.64	

	Toe with extension	1	4.00	0.70	0.30	0.84	
				Total =		**16.38**	
4	**Square rubble stone masonry course 1: 5 above G.L. H.S.R 12.23 and 12.31**						
	Side walls	2	24.00	0.50	(1.0+0.6)/2=0.80	19.20	
	Wing walls	2	2.00	0.50	1.00	2.00	
	Toe with extension	1	6.00	0.50	0.20	0.60	
	Toe wall extensions	1	1.00	0.50	0.60	0.30	
				Total =		**22.10**	
	Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41						
	On top of crest wall	1	2.00	0.50	0.05	0.05	
	On top of side walls	2	24.00	0.50	0.05	1.20	
	On top of wing walls	2	2.00	0.50	0.05	0.10	
	On top of Toe wall	1	4.00	0.50	0.05	0.10	
	Apron	1	24.00	2.00	0.10	4.80	
5				**Total =**		**6.25**	
	Cement plastering work 1:4 on the						
6							

	Crest wall both side	2	2.00	_	1.30	5.20	
	Side walls	2	24.00	_	(1.0+0.6)/2=0.80	38.40	
	Wing walls	2	2.00	_	2.30	9.20	
	Toe with extensions	1	4.00	_	0.20	0.80	
	Toe wall extensions	2 x 2	1.00	_	0.60	2.40	
				Total =		**56.00**	

Material Statement and cost of Material:-

S.No.	Item of Work	Quantity (cum)	Cement (bags)	Sand (cum)	Stone blast (cum)	Bajri 20 mm (cum)	Stone boulders (cum)
1	C.C work 1 : 4 : 8	20.04	68.136	9.6192	19.2384	_	_
2	Sq. Rub. Masonry 1: 5 in foundation.	16.38	28.1736	4.914	_	_	18.018
3	Sq. Rub. Masonry 1: 5 above ground level.	22.10	38.012	6.63	_	_	24.31
4	C.C work 1 : 2 : 4	6.25	39.375	2.75	_	5.50	_
5	C. plastering work 1 : 4	56.00 sqm	6.16	0.84	_	_	_

	Total =	**179.8566**	**24.7532**	**19.2384**	**5.5**	**42.328**
	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	**44065**	**23516**	**18565**	**5418**	**40000**
Total Cost of Materials =		**Rupees**	**131563**	**/-only**		

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	5984.50 sq.m	Rs.66.80 + 300% C. Prem. =267.20	100 sq.m	15990.58
2	Removal of loose soil up to 0.3 m below Natural surface level H.S.R. 6.2 (b)	416.25 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	10987.75
3	E/Work excavation for digging of the key trench H.S.R. 6.6	360.00 cum	Rs.1108.10 + 350% C. Prem.= 4986.45	100 cum	17951.22
4	Excavation of E/Work for clay filling in Key trench including lead up to 495 mts. H.S.R. 6.2(b)and 6.2 (c)	360.00 cum	586.60+(6x15)+(32x13.25)+ (26x12.00) + 350% C. Prem.= 6356.70	100 cum	22884.12

5	Extra for puddling work in key trench H.S.R. 6.6 (f)	360.00 cum	Rs. 498.60 + 350% C. Prem.= 2243.70	100 cum	8077.32
6	E/work excavation for making embank- ment undressed including breaking of Clods. H.S.R. 6.2 (b)	3875.75 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	102308.17
7	Extra for admixture for single or kanker Exceeding 30% but up to 40%. H.S.R. 6.2 (h) ii	3875.75 cum	Rs. 318.55 + 350% C. Prem.= 1433.48	100 cum	55558.10
8	Extra for every 7.5 meter additional lead beyond 60mt but up to 255 m by the animal or animal driven cart (11 leads) H.S.R. 6.2 (c) (ii)	3875.75 cum	[(15.00 x 6 No.)+ (13.25 x 5 No.)] + 350% C. Prem.= 703.12	100 cum	27251.17
9	Extra for compaction and watering earth laying in 25cm layers source of water leads up to 1 km. H.S.R. 6.2 (g) (ii),(i)	3875.75 cum	Rs.(75.00+ 68.10)+350% C. Prem.= 643.95	100 cum	24957.89
10	Extra for rolling with road roller / tractor H.S.R. 6.2 (g) (v)	3875.75 cum	Rs.225.00 + 110 % C. Prem.= 472.50	100 cum	18312.92
11	Excavation of earthwork in foundation and plinth	159.00 cum	Rs.1108.10 + 350 % C. Prem.	100 cum	**7928.46**

	H.S.R 6.6		=4986.45		
12	Cement concrete work 1 : 4 : 8 in the Foundation and plinth H.S.R 10.39	20.04 cum	Rs. 64.95 + 370 % C. Prem. =305.27	cum	**6117.61**
13	Square rubble stone masonry course1: 5 in foundation and plinth H.S.R 12.23	16.38 cum	Rs. (160.35+26.00) +250% C. Prem. =652.22	cum	**10683.36**
14	Square rubble stone masonry course1: 5 above G.L. H.S.R 12.23 and 12.31	22.10 cum	Rs. (160.35+26.00+27.20) +200% C. Prem.= 747.42	cum	**16517.98**
15	Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41	6.25 cum	Rs.64.95 + 370 % C. Prem. =305.27	cum	**1907.94**
16	Cement plastering work 1:4 on the stone walls H.S.R 15.5	56.00 sqm	Rs. 5.50 + 340 % C. Prem. =24.20	cum	**1355.20**
17	Total Cost of Materials =				**131562.923**
Total =					**480352.726**
Add Contingency at the rate of 3% =					14410.5818
Grand Total =					**494763.31**

Say Rs. 4.95 Lacs

Table. 19. 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**					
	Crest wall with extensions	1	8.00	1.70	0.20	2.72
	Side walls	2	1.50	0.70	0.20	0.42

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
	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
	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

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

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
				Total =		**27.45**

Table. 20. 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	950.00	965.00	985.00	945.00 per

		per bag	per cum	per cum	per cum	cum
	Cost of Materials	**19924**	**12014**	**5318**	**1018**	**31055**
	Total Cost of Materials =	**Rupees**	**69329**	**/-only**		

Table. 21. LABOUR COST

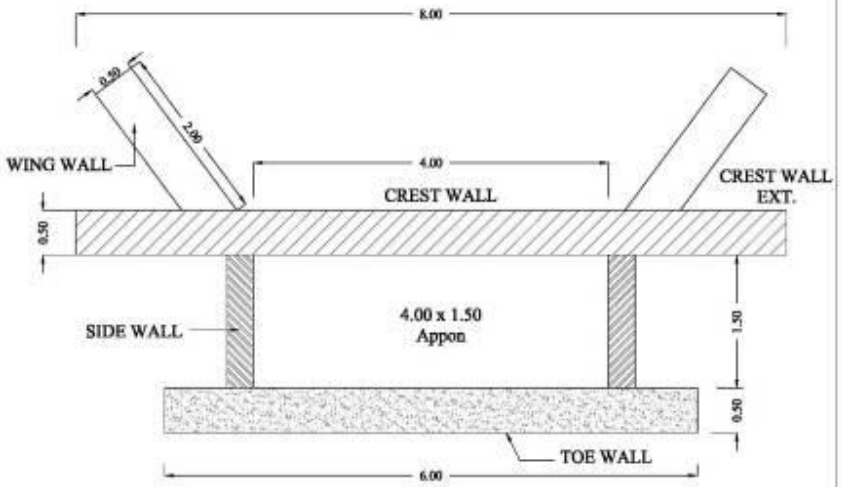
S. No.	**Item of work Quantity**		**Rate**	**Unit**	**Amount**
1	Excavation of earthwork in foundation and plinth H.S.R 6.6	36.60 cum	1108.10 +350% C. Prem. =4986.45	100 cum	**1825.04**
2	Cement concrete work 1 : 8 : 16 in the Foundation and plinth H.S.R 10.39	5.74 cum	64.95 +370% C. Prem. =305.27	cum	**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 Foundation and plinth H.S.R 10.41	1.18 cum	64.95 +370% C. Prem. =305.27	cum	**358.69**
6	Cement plastering work 1:4 on the stone	27.45	5.50 +340 % C. Prem.	cum	**664.29**

S. No.	Item of work Quantity		Rate		Unit	Amount
	walls H.S.R 15.5	sqm	=24.2			
	Total =	29.875 cum				**25358.64525**
					or say Rs.25359/- only	

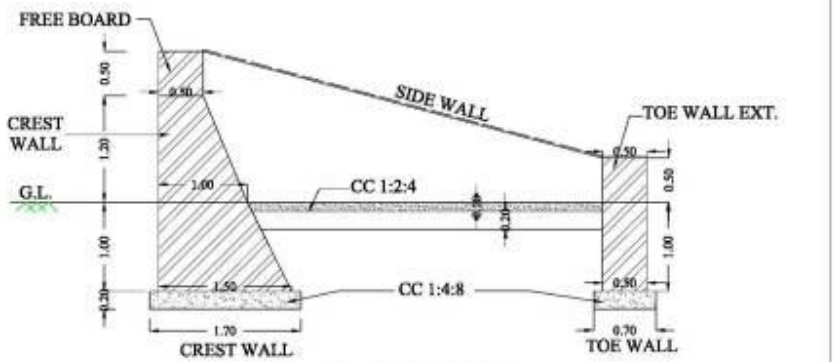
Table. 22. ABSTRACT OF COST

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. 23. 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. 24. 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. Contingency @2%	**5029.1753**
					Grand Total	**256487.94**
					Or say `	**2.60 Lac**

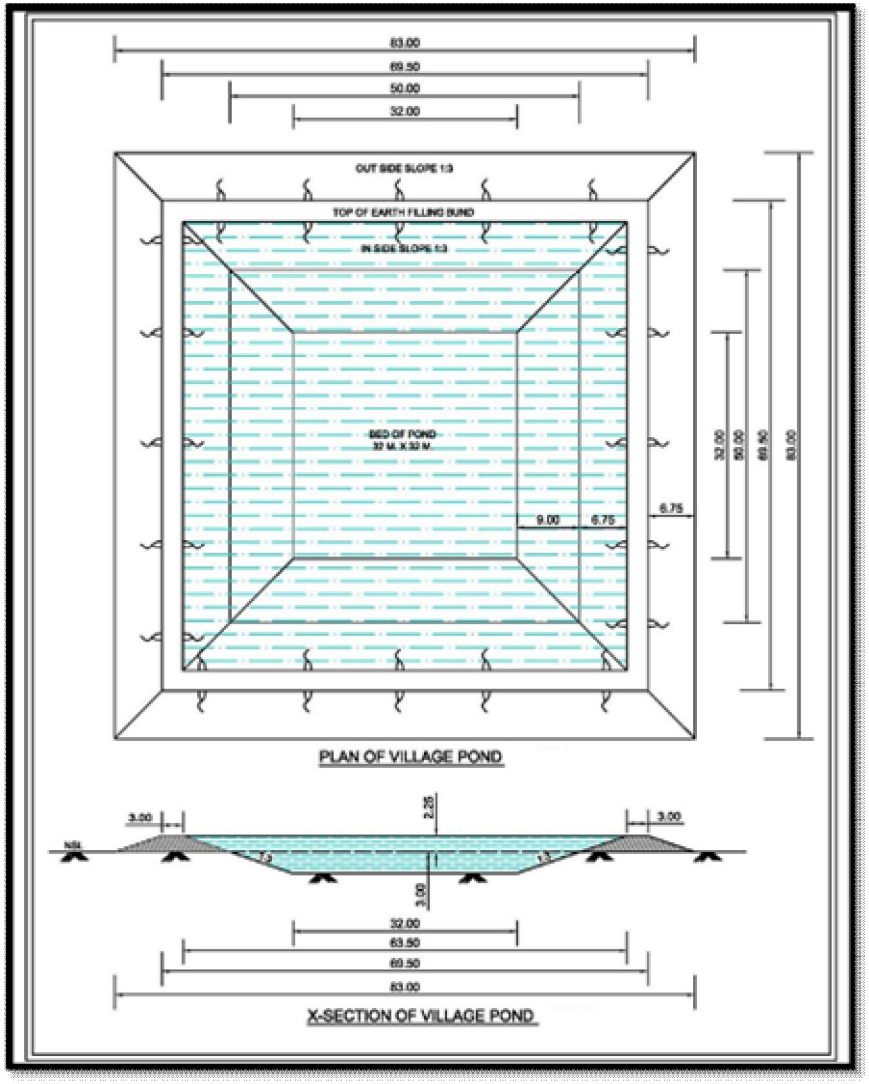

83.00
69.50
50.00
32.00
OUT SIDE SLOPE 1:3
TOP OF EARTH FILLING BUND
IN SIDE SLOPE 1:3
BED OF POND
32 M. X 32 M.
9.00
6.75
6.75
32.00
50.00
69.50
83.00
PLAN OF VILLAGE POND
3.00
2.25
3.00
NSL
1:3
1:3
1
3.00
32.00
63.50
69.50
83.00
X-SECTION OF VILLAGE POND

Table. 25 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. 26. 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 nitrogen and phosphorous because the organic carbon contained in the soil is very low and the available potash in the soil is medium. 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. There is no well organized marketing system in fruit plants. **Proposed System:** The average annual rainfall is 366 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 and Kinnow and 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 of 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 Arravali, 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 27.Detail of Production System proposed to be promoted in the project village

S. No.	Particulars	Contents	No. of micro watersheds	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 45 farmers of each micro watershed/year @ Rs.200/ kit as	7	315 (farmers)	1575 (mini kits)	200 per mini kits	315000

S. No.	Particulars	Contents	No. of micro watersheds	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
		assistance is provided.					
	Agriculture	Application of farm inputs like Zinc Sulphate or Sulphur or weedicides or pesticides. 45 farmer of each micro watershed/ year @ Rs.200/ kits as assistance is provided.	7	315 (farmers)	1575 (mini kits)	200 per mini kits	315000
	Agriculture	Supply of Agriculture implements – 20 farmers (average) per micro watershed @ Rs. 1000/ units as assistance is provided.	7	140 (farmers)	700	1000	700000
	Agriculture	Agro Forestry: Eucalyptus/ neem on 50% subsidy @ Rs. 10/ plant as assistance is provided.	7	4200 (plants)	21000 plants	Rs. 10 per plant	210000
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)	7	700 plants	3500 plants	Rs.40 per plant	140000
	Horticulture	Kitchen gardening Packets distributed to 100 farmers in each micro watershed/ year @ Rs.25/ packet.	7	700	3500	Rs. 25 Per packet	87500
	Horticulture	Four units of Bee keeping in each micro watershed @ 3000/ unit as assistance are provided.	7	28	140	3000	420000
	Horticulture	Three units of Vermi compost in each micro watershed per year @ Rs. 10000 per unit as	7	21	105	10000	1050000

S. No.	Particulars	Contents	No. of micro watersheds	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
		assistance is provided.					
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.	7	315	1575	225	354375
	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.	7	315	1575	225	354375
	Animal Husbandry	Supply of mini- kits of high yielding variety green fodder seeds to 30 farmers in each micro watershed/year @ Rs.200/- mini kits.	7	210 (farmers)	1050 Seeds of mini kit	200 per mini kit of seeds	210000
4	Joint camps with Line Departments	Two training camps to beneficiaries on Proven technology in agriculture are provided (during pre kharif and rabi season).	7	14	70	20000	1400000
		Contingency					48950

Total: Rs. 5605200/-

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 is 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.

Under Agro forestry, tree species commonly planted is Neem. The impacts of such type's plantation have given extra source of income.

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 decomposed 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 vermi 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 forme 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 28: 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 size 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 rainfed 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) Mahendergarh 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. Floriculture

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

Table 29. Revolving Fund Assistance for SHGs

S.No.	Name of micro watersheds	No. of villages	Total SHGs	Amount of RFA per SHG	Total
1	Bairawas	4	9	25000	225000
2	Sohla A+B	1	3	25000	75000
3	Deroli Jat	3	7	25000	175000
4	Gulawal	2	5	25000	125000
5	Nimbhera	2	5	25000	125000
6	Janjariwas	3	7	25000	175000
	Total	**15**	**36**		**725000**

Table 30. 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	Bairawas	4	9	35000	315000
2	Sohla A+B	1	3	35000	105000
3	Deroli Jat	3	7	35000	245000
4	Gulawal	2	5	35000	175000
5	Nimbhera	2	5	35000	175000
6	Janjariwas	3	7	35000	245000
	Total	**15**	**36**		**1260000**

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

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

	watersheds	villages	micro watershed	trainee for 6 month	
1	Bairawas	4	15	10000	150000
2	Sohla A+B	1	10	10000	100000
3	Deroli Jat	3	12	10000	120000
4	Gulawal	2	10	10000	100000
5	Nimbhera	2	10	10000	100000
6	Janjariwas	**3**	12	10000	120000
	Total	**15**	**69**		**690000**

Note: The beneficiaries will contribute 10% as cost sharing of the livelihood support programme Rs. 690000 @ 10% cost sharing.

= 690000- 69000

= 621000/-

Table 32. One time assistance as Revolving Fund to unemployed youth who have successfully completed Computer Training for setting up a computer centre

S. No.	Name of micro watersheds	No. of villages	No. of Persons in micro watershed	Amount of Training per Trainee	Total
1	Bairawas	4	15	20000	300000

2	Sohla A+B	1	10	20000	200000
3	Deroli Jat	3	12	20000	240000
4	Gulawal	2	10	20000	200000
5	Nimbhera	2	10	20000	200000
6	Janjariwas	**3**	12	20000	240000
	Total	**15**	**69**		**1380000**

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. 1380000 @ 10% cost sharing.

= 1380000- 138000

= 1242000/-

Table 33. 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	Bairawas	4	3	6	2000	6	36000
2	Sohla A+B	1	1	2	2000	6	12000
3	Deroli Jat	3	3	6	2000	6	36000
4	Gulawal	2	2	4	2000	6	24000
5	Nimbhera	2	2	4	2000	6	24000
6	Janjariwas	**3**	2	4	2000	6	24000
	Total	**15**	**13**	**26**			**156000**

Total cost for 13 Centres

1. Payment to trainers 156000/-

2. Sewing Machine Cost 42000/- (lump sum)

Table 34. 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	Bairawas	4	3	2000	6	12000	3	36000
2	Sohla A+B	1	1	2000	6	12000	1	12000
3	Deroli Jat	3	3	2000	6	12000	3	36000
4	Gulawal	2	2	2000	6	12000	2	24000
5	Nimbhera	2	2	2000	6	12000	2	24000
6	Janjariwas	3	2	2000	6	12000	2	24000
	Total	**15**	**13**				**13**	**156000**

Total Cost:

Payment to trainer: Rs.156000/-

Table 35. 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	Bairawas	4	5	5
2	Sohla A+B	1	4	4
3	Deroli Jat	3	4	4
4	Gulawal	2	3	3
5	Nimbhera	2	3	3
6	Janjariwas	3	4	4
	Total	**15**	**23**	**23**
	Rate (Rs)		**25000**	**10000**
	Cost (Lakh Rs)		**5.75**	**2.30**

Contingency, printing material and other unseen items: Rs. 37680/-

Total funds available under this component are Rs. 5044680/-

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), Mahendergarh

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. 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. 36)

Detail of Convergence of IWMP and other schemes

Table 36. 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	Bairawas	64.05	55.84	8.21	8.21
2	Sohla A+B	83.98	82.59	1.39	1.39
3	Deroli Jat	62.28	54.63	7.65	7.65
4	Gulawal	39.35	34.68	4.67	4.67
5	Nimbhera	46.56	39.98	6.58	6.58
6	Janjariwas	54.96	46.17	8.79	8.79
		351.18	**313.89**	**37.29**	**37.29**

- 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 49 ha horticulture development programme with the financial assistance of Rs. 12.25 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 Dug out Pond, Cement Stone Masonry structures (Inlet & Outlet), Roof Top Rain water Harvesting Structures, Earthen Embankment with pucca outlet, Small Earthen Embankments, Water conveyance system, Dry stone Masonary structures, Silt Detention Dam, Community Water Storage Tank 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	Bairawas	831	99,72,000	99,720
2	Sohla A	651	78,12,000	78,120
3	Sohla B	578	69,36,000	69,360

4	Deroli Jat	813	97,56,000	97,560
5	Gulawala	516	61,92,000	61,920
6	Nimbhera	595	71,40,000	71,400
7	Janjariawas	687	82,44,000	82,440

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	Bairawas	831	99,72,000	99,720
2	Sohla A	651	78,12,000	78,120
3	Sohla B	578	69,36,000	69,360

4	Deroli Jat	813	97,56,000	97,560
5	Gulawala	516	61,92,000	61,920
6	Nimbhera	595	71,40,000	71,400
7	Janjariawas	687	82,44,000	82,440

CONSOLIDATION PHASE- 3 %

Consolidation Phase = Rs. 16, 81,560 /-

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: Bairawas

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	0.60
2	Preparation of Project completion report	0.15
3	Documentation of success stories	0.15
4	Management of proper utilization of WDF	0.45
5	Mechanism for quality and sustainability issues under the Project	0.15
6	Watershed activities	1.49

Total: 2.99 lacs

Name of Micro watershed: Sohla A

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	0.47
2	Preparation of Project completion report	0.12
3	Documentation of success stories	0.11

4	Management of proper utilization of WDF	0.35
5	Mechanism for quality and sustainability issues under the Project	0.12
6	Watershed activities	1.17

Total: 2.34 lacs

Name of Micro watershed: Sohla B

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	0.42
2	Preparation of Project completion report	0.11
3	Documentation of success stories	0.10
4	Management of proper utilization of WDF	0.31
5	Mechanism for quality and sustainability issues under the Project	0.10
6	Watershed activities	1.04

Total: 2.08 lacs

Name of Micro watershed: Deroli Jat

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	0.59
2	Preparation of Project completion report	0.15
3	Documentation of success stories	0.14
4	Management of proper utilization of WDF	0.44
5	Mechanism for quality and sustainability issues under the Project	0.15
6	Watershed activities	1.46

Total: 2.93 lacs

Name of Micro watershed: Gulawala

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	0.37
2	Preparation of Project completion report	0.10
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.28
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.93

Total: 1.86 lacs

Name of Micro watershed: Nimbhera

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	0.43
2	Preparation of Project completion report	0.11

3	Documentation of success stories	0.10
4	Management of proper utilization of WDF	0.32
5	Mechanism for quality and sustainability issues under the Project	0.11
6	Watershed activities	1.07

Total: 2.14 lacs

Name of Micro watershed: Janjariawas

Table 9. Consolidated Phase

S. No	**Type of activity**	**Amount earmarked (Rs. in lacs)**
1	Managing/ upgrading of all activities taken up under the project	0.49
2	Preparation of Project completion report	0.13
3	Documentation of success stories	0.12
4	Management of proper utilization of WDF	0.37
5	Mechanism for quality and sustainability issues under the Project	0.12
6	Watershed activities	1.24

Total: 2.47 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 4671 ha and the Project Cost is 560.52 lacs covering 7 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 I 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 will gain a lot. 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 Bairawas Watershed I 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. best they can take only single crop, which keeps them partially engage 4 to 5 months. Similarly due to lack of fodder animal husbandry does not keep them engage full time. Thus the people mainly depend upon casual labour either in the villages is in Narnaul, Rewari, Delhi, Gurgaon, Bhiwadi, 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	Women	Total	SC	others	Women	Total	SC	others	Women	Total
1	Bairawas	2041	6407	487	8935	385	2817	2766	5968	33	33	33	99

2	Sohla A+ B	3522	9015	677	13214	103	1203	1126	2432	11	11	11	33
3	Deroli jat	3223	5176	342	8741	645	2772	3086	6503	22	22	33	77
4	Gulawal	1733	3559	256	5548	162	1071	1042	2275	22	11	22	55
5	Nimbhera	3062	2971	364	6397	469	1393	1670	3532	11	22	22	55
6	Janjariawas	1225	5827	335	7387	220	1873	1850	3943	22	22	33	77
	Total	**14806**	**32955**	**2461**	**50222**	**1984**	**11129**	**11540**	**24653**	**121**	**121**	**154**	**396**

50222 man days would be generated with the implementation of the project in Bairawas Watershed (IWMP I), which means 100 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 Bairawas Watershed (IWMP I)

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	Bairawas	463	90	232	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%

2	Sohla A+ B	111	180	56	90	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
3	Deroli jat	481	60	241	30	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
4	Gulawal	127	90	64	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
5	Nimbhera	185	90	93	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
6	Janjariawas	331	180	166	90	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 in the area the project is expected to augment the ground water resources with the proposed water harvesting structure. Through the ground water table is depleting over the years and presently stands 41 to 72 m.

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

S. No	Name of micro watersheds	Source	Pre- Project level (m)	Expected post project conditions
1	Bairawas	Open wells	68	The area falls in over exploited category as per the ground water assessment, provision of percolation tank at feasible site has been provided to check the further fall of water table in the area.
2	Sohla A+ B	Open wells	49	
3	Deroli jat	Open wells	63	
4	Gulawal	Open wells	72	
5	Nimbhera	Open wells	45	
6	Janjariawas	Open wells	41	

Source: Ground Water Cell, Haryana

9.4 CROPS

Agriculture primary depends upon water, but this is availability of this is lacking without existence of canal network and deeper ground water conditions. All this can change with the integrated land and water management during the watershed project. The

planned Dug out Pond, Cement Stone Masonry structures (Inlet & Outlet), Roof Top Rain water Harvesting Structures, Earthen Embankment with pucca outlet, Small Earthen Embankments, Water conveyance system, Dry stone Masonary structures, Silt Detention Dam, Community Water Storage Tank 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 Bairawas Watershed (IWMP I)

Name of Micro-Watersheds	Name of Crops	Pre project		Total Production(in Kg)	Total Value Rs (in lacs)	Expected post project		Total Production (in Kg)	Total Value Rs (in lacs)
		Area ha	Average yield Kg. Per ha			Area ha	Average yield Kg. Per ha		
Bairawas	Wheat	262	4590	1202580	162.35	285	5003	1425855	192.49
	Mustard	219	1533	335727	100.72	241	1686	406326	121.90
	Bajra	434	1727	749518	93.69	477	1900	906300	113.29
Sohla A+B	Wheat	152	4555	692360	93.47	164	4919	806716	108.91
	Mustard	291	1547	450177	135.05	320	1702	544640	163.39
	Bajra	375	1725	646875	80.86	412	1898	781976	97.75
Deroli jat	Wheat	234	4594	1074996	145.12	257	5053	1298621	175.31
	Mustard	320	1535	491200	147.36	352	1689	594528	178.36
	Bajra	396	1725	683100	85.39	436	1898	827528	103.44
Gulawal	Wheat	117	4602	538434	72.69	126	4970	626220	84.54

	Mustard	181	1547	280007	84.00	199	1702	338698	101.61
	Bajra	261	1701	443961	55.50	287	1871	536977	67.12
Nimbhera	Wheat	174	4598	800052	108.01	189	5012	947268	127.88
	Mustard	162	1548	250776	75.23	178	1703	303134	90.94
	Bajra	300	1725	517500	64.69	330	1898	626340	78.29
Janjariawas	Wheat	145	4607	668015	90.18	159	5068	805812	108.78
	Mustard	229	1547	354263	106.28	252	1702	428904	128.67
	Bajra	328	1727	566456	70.81	361	1900	685900	85.74
Total		**4580**			**1771.39**	**5025**			**2128.41**

Source: Revenue Department and Department of Agriculture, Mahendergarh (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	Bairawas	8	11	19
2	Sohla A+ B	21	15	36
3	Deroli jat	17	6	23
4	Gulawal	5	5	10
5	Nimbhera	8	6	14
6	Janjariawas	6	6	12
	Total	**65**	**49**	**114**

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	Bairawas	14	17	31
2	Sohla A+ B	211	35	246
3	Deroli jat	22	12	34

4	Gulawal	5	9	14
5	Nimbhera	14	12	26
6	Janjariawas	23	14	37
	Total	**289**	**99**	**388**

9.7 LIVESTOCK

Table 7. Details of livestock in the project area

S. No.	Name of micro watersheds	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	Bairawas	Buffalo	1514	11-12	440-480	1741	13-14	546-588	Increase in milk yield and number of animals by approx. 15%
		Cow	102	5-6	75-90	117	7-8	140-160	Increase in milk yield and number of animals by approx. 15%
2	Sohla A+ B	Buffalo	498	11-12	440-480	573	13-14	546-588	Increase in milk yield and number of animals by approx. 15%
		Cow	34	6-7	180-210	39	8-9	256-288	Increase in milk yield and number of animals by approx. 15%
3	Deroli jat	Buffalo	1365	7-8	140-160	1570	9-10	225-250	Increase in milk yield and number of animals by approx. 15%

S. No.	Name of micro watersheds	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	
		Cow	327	5-6	75-90	376	7-8	140-160	Increase in milk yield and number of animals by approx. 15%
4	Gulawal	Buffalo	486	10-12	400-480	559	12-14	504-588	Increase in milk yield and number of animals by approx. 15%
		Cow	74	6-7	180-210	85	8-9	256-288	Increase in milk yield and number of animals by approx. 15%
5	Nimbhera	Buffalo	675	11-12	440-480	776	13-14	546-588	Increase in milk yield and number of animals by approx. 15%
		Cow	83	5-6	75-90	95	7-8	140-160	Increase in milk yield and number of animals by approx. 15%
6	Janjariawas	Buffalo	906	7.5- 8.5	150-170	1042	9.5- 10.5	238-263	Increase in milk yield and number of animals by approx. 15%
		Cow	113	5-6	75-90	130	7-8	140-160	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 8: Backward-Forward Linkages

Sr. No.	Project	Type of Marketing Facility	Pre-Project (no.)	During the Project (no.)	Post-project (no.)
1	Bairawas Watershed (IWMP I)	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	Subsides	Educate by Extension & Training	Supplies would be

		suppliers			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	Convergence with NHM (Horticulture)	To be increased

			Cultivation	department	
			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 committee, 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	• Awareness camps to be organized • Trainings and exposure visits UGs and WCs to be held Capacity building	• Quality of management of common resources improved. • Quality of distribution of	

Components	Activities	Outputs	Effect	Impact
	(I.E.C. Activities). • Capacity Building workshops and exposure visits for User Group 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.	workshops to be organized one. • Federations of UGs and WC to be formed.	benefits between people improved. • Increased awareness amongst women about village resources • Women participation enhanced in decision-making of GVCs. • Involvement of youth and children in village development.	

Components	Activities	Outputs	Effect	Impact
	• Sensitize Village communities to involve children and youth in development			
Fund Management	• Improve management and utilization of UGs and WCs • Prepare communities to explore other sources of income for UGs and WCs.	UGs and WCs operating bank account and managing resources on their own.	• Purpose, frequency 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	• 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	• 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

Components	Activities	Outputs	Effect	Impact
	fruits and forest species. • Input trainings, conduct meetings and organize exposure visits 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.	plantations and protection. • Trainings, exposure visits and meetings to be organized for communities, village volunteers and staff. • Income generation intervention promoted		women
Rainfed Area Development	• Treatment of land through improved soil and moisture	• Land to be brought under improved soil moisture conservation	• Improved productivity of treated land. • Increased	Increase in proportion of households having more security of food Increase in contribution of agricultural

Components	Activities	Outputs	Effect	Impact
	conservation practices on watershed basis. • Promotion of good agricultural 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	practices. • Good agricultural practices to be promoted. • Organic farming to be promoted. Fodder banks to be 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.	availability of water in cells. • Increase in annual agricultural production. • Farmers adopt organic farming 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.	income to the household income

Components	Activities	Outputs	Effect	Impact
	generation activities like grading, processing and packaging. • Promotion of better irrigation 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	• 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,

Components	Activities	Outputs	Effect	Impact
	institutions			decision-making, leadership and fund management. • Equality and equity in gender relations at home (decision making, expenditure, 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 available water 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.