CONTENTS (IWMP I)

CHAPTER- 1

METHODOLOGY

INTRODUCTION

The Government of India (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 eight micro watersheds namely Silkhoh (2C5G1n1), Chilawali (2C5G1m6), Naharpur (2C5G1m7), Gurnawat (2C5G1m5), Khori Kalan (2C5G1m2), Rangala (2C5G1f7), Jaurasi (2C5G1j1) and Uton (2C5G1f6). 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 (IWMPI) of 8 micro watersheds namelySilkhoh (2C5G1n1), Chilawali (2C5G1m6), Naharpur (2C5G1m7), Gurnawat (2C5G1m5), Khori Kalan (2C5G1m2), Rangala (2C5G1f7), Jaurasi (2C5G1j1) and Uton (2C5G1f6) with their respective codes.

1.1.2Base 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

The project was sanctioned in 30th Steering committee meeting for IWMP on 30.01.2013 and the preparatory phase started in 2013.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 base map has been prepared using maps of Soil and Land Use Survey of India (SLUSI).The code assigned in the maps have been given to all micro-watersheds (villages) in the watershed area.

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.

1.2.1Participatory 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), Earthen Embankment with pucca outlet, Small Earthen Embankments, Gully Plugs, Check Dams, Percolation embankments, Marginal Bandhs and Percolation ponds 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.

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 members 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 using GIS technology 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 Ground Water Quality, ProposedAction Plan (works).

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), Earthen Embankment with pucca outlet, Small Earthen Embankments, Gully Plugs, Check Dams, Percolation embankments, Marginal Bandhs and Percolation ponds 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
	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.

CHAPTER – 2

PROJECT BACKGROUND

2.1 PROJECT BACKGROUND

Integrated Watershed Management Programme, (IWMP I Project) falls in Tauru block of Mewat district in Haryana state. The project is a cluster of eight micro- watersheds namely Silkhoh (2C5G1n1), Chilawali (2C5G1m6), Naharpur (2C5G1m7), Gurnawat (2C5G1m5), Khori Kalan (2C5G1m2), Rangala (2C5G1f7), Jaurasi (2C5G1j1) and Uton (2C5G1f6). The total geographical area of the project is **5185 ha** out of which **4250 ha** has been undertaken to be treated under IWMP I starting from year 2012-2013. The project is divided into eight 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	Sunari	Silkhoh	2C5G1n1	Silkhoh	Taoru	Mewat	394	302	36.24	ASCO, Mewat
2	Sunari	Silkhoh	2C5G1n1	Nanuka	Taoru	Mewat	98	68	8.16	ASCO, Mewat
3	Sunari	Silkhoh	2C5G1n1	Thana Alam Alias Masit	Taoru	Mewat	141	125	15	ASCO, Mewat
4	Sunari	Chilawali	2C5G1m6	Chilawali	Taoru	Mewat	151	151	18.12	ASCO, Mewat
5	Sunari	Chilawali	2C5G1m6	Saidpur	Taoru	Mewat	63	57	6.84	ASCO, Mewat

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
6	Sunari	Chilawali	2C5G1m6	Mundarka	Taoru	Mewat	103	103	12.36	ASCO, Mewat
7	Sunari	Chilawali	2C5G1m6	Bhogipur	Taoru	Mewat	97	94	11.28	ASCO, Mewat
8	Sunari	Naharpur	2C5G1m7	Naharpur	Taoru	Mewat	84	59	7.08	ASCO, Mewat
9	Sunari	Naharpur	2C5G1m7	Subasheri	Taoru	Mewat	74	55	6.6	ASCO, Mewat
10	Sunari	Naharpur	2C5G1m7	Kangarka	Taoru	Mewat	115	115	13.8	ASCO, Mewat
11	Sunari	Naharpur	2C5G1m7	Sewka	Taoru	Mewat	140	125	15	ASCO, Mewat
12	Sunari	Naharpur	2C5G1m7	Raniaki	Taoru	Mewat	154	135	16.2	ASCO, Mewat
13	Sunari	Gurnawat	2C5G1m5	Gurnawat	Taoru	Mewat	154	137	16.44	ASCO, Mewat
14	Sunari	Gurnawat	2C5G1m5	Bharangpur	Taoru	Mewat	119	110	13.2	ASCO, Mewat
15	Sunari	Gurnawat	2C5G1m5	Chundhika	Taoru	Mewat	99	85	10.2	ASCO, Mewat
16	Sunari	Gurnawat	2C5G1m5	Nijampur Taoru	Taoru	Mewat	222	175	21	ASCO, Mewat
17	Sunari	Khori Kalan	2C5G1m2	Khori Kalan	Taoru	Mewat	353	277	33.24	ASCO, Mewat
18	Sunari	Khori Kalan	2C5G1m2	Khori Khurd	Taoru	Mewat	177	155	18.6	ASCO, Mewat
19	Sunari	Rangala	2C5G1f7	Rangala	Taoru	Mewat	464	288	34.56	ASCO, Mewat

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
20	Sunari	Rangala	2C5G1f7	Sunari	Taoru	Mewat	259	215	25.8	ASCO, Mewat
21	Sunari	Jaurasi	2C5G1j1	Jaurasi	Taoru	Mewat	715	690	82.8	ASCO, Mewat
22	Sunari	Uton	2C5G1f6	Uton	Taoru	Mewat	324	229	27.48	ASCO, Mewat
23	Sunari	Uton	2C5G1f6	Fatehpur	Taoru	Mewat	294	225	27	ASCO, Mewat
24	Sunari	Uton	2C5G1f6	Rathiwas	Taoru	Mewat	391	275	33	ASCO, Mewat
					Grand Total		**5185**	**4250**	**510**	

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)	
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	

S. No.	Criteria	Maximum Score	Ranges and Scores			
					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 93 concerning these thirteen parameters, a composite ranking was given to Sunari Watershed (IWMP I) project as given in **Table- 3.**

The total number of families under BPL are in the range of 50 to 80% of the total number of households in the village. Hence, a score of 7.5 was allotted. Rain fed agriculture is in the range of 80 to 90%, hence a score of 10 is alloted and more than 80 % farmers are small and marginal, hence scoring of 10 is done. Ground water of the project area is over

exploited, hence scoring of 5 is done. The percentage of scheduled castes in this watershed area is less than 20% of the total population, hence 3 score was allotted. With all the parameters taken together gives the watershed score to be 93.

Table- 3: Weightage of the Project

S. No.	District	Name of the project	No. of micro-watersheds proposed to be covered	Proposed project area (ha)	Type of project (Hilly/ Desert/ Others)	Proposed cost (Rs. in lakh)	Weight age under the criteria													
							i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	Total
1.	Mewat	Sunari Sub-Watershed (IWMP I)	8	4250	Hilly/ Sub-Hilly	510.00	7.5	3	0	10	5	0	10	7.5	10	15	5	10	10	93

Table 4: Watershed Information

Name of the Project	No. of Micro-Watersheds to be Treated	Watershed codes	Watershed regime/type/order
Sunari Watershed (IWMP I)	8	2C5G1n1, 2C5G1m6, 2C5G1m7, 2C5G1m5, 2C5G1m2, 2C5G1f7, 2C5G1j1 and 2C5G1f6	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 for year 2012-13
1	MGNREGA	Silkhoh	DRDA, Mewat	To provide assured employment of 100 days in a year to unskilled labour and development of village.	0
2	MGNREGA	Chilawali	DRDA, Mewat	To provide assured employment of 100 days in a year to unskilled labour and development of village.	--
3	MGNREGA	Naharpur	DRDA, Mewat	To provide assured employment of 100 days in a year to unskilled labour and development of village.	--
4	MGNREGA	Gurnawat	DRDA, Mewat	To provide assured employment of 100 days in a year to unskilled labour and development of village.	--
5	MGNREGA	Khori Kalan	DRDA, Mewat	To provide assured employment of 100 days in a year to unskilled labour and development of village.	--
6	MGNREGA	Rangala	DRDA, Mewat	To provide assured employment of 100 days in a year to unskilled labour and development of village.	57
7	MGNREGA	Jaurasi	DRDA, Mewat	To provide assured employment of 100 days in a year to unskilled labour and development of village.	28
8	MGNREGA	Uton	DRDA, Mewat	To provide assured employment of 100 days in a year to unskilled labour and development of village.	80

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)

Names of Districts	Total micro-watersheds in the District		Micro-watersheds covered so far						Net watersheds to be covered	
			Dept. of Land Resources		Other Ministries/ Depts.		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.)
Mewat	271	149588	23	12700	67	36780	90	49480	181 (balance) 19	100108 (balance) 9056

CHAPTER – 3

BASIC INFORMATION OF THE PROJECT AREA

GEOGRAPHY AND GEOHYDROLOGY

Sunari Watershed (IWMP I) falls in Tauru Block of District Mewat. The area of watershed lies in between 28˚06'45''to 28˚14'55'' N Latitude & 76˚52'30'' to 76˚57'30'' east longitude with general elevation varies between 242-306 m (google earth map) above mean sea level (MSL). Annual average rainfall of the district is 563 mm and about 80 percent of its annual rainfall is received in the month of July to September. The Drainage and Contour map is presented in **Annexure II A and II B.**

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 Sunari 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	Silkhoh	Silkhoh	394	302	357	265	3	34
2	Silkhoh	Nanuka	98	68	94	64	3	1
3	Silkhoh	Thana Alam Alias Masit	141	125	132	116	6	3
4	Chilawali	Chilawali	151	151	129	129	2	20
5	Chilawali	Saidpur	63	57	52	46	7	4
6	Chilawali	Mundarka	103	103	90	90	0	13
7	Chilawali	Bhogipur	97	94	89	86	0	8

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
8	Naharpur	Naharpur	84	59	73	48	1	10
9	Naharpur	Subasheri	74	55	65	46	0	9
10	Naharpur	Kangarka	115	115	97	97	4	14
11	Naharpur	Sewka	140	125	126	111	2	12
12	Naharpur	Raniaki	154	135	137	118	1	16
13	Gurnawat	Gurnawat	154	137	135	118	1	18
14	Gurnawat	Bharangpur	119	110	106	97	1	12
15	Gurnawat	Chundhika	99	85	88	74	1	10
16	Gurnawat	Nijampur Taoru	222	175	198	151	4	20
17	Khori Kalan	Khori Kalan	353	277	255	179	18	80
18	Khori Kalan	Khori Khurd	177	155	144	122	3	30
19	Rangala	Rangala	464	288	331	155	43	90
20	Rangala	Sunari	259	215	234	190	5	20
21	Jaurasi	Jaurasi	715	690	622	597	20	73
22	Uton	Uton	324	229	284	189	10	30
23	Uton	Fatehpur	294	225	263	194	3	28
24	Uton	Rathiwas	391	275	281	165	6	104
			5185	**4250**	**4382**	**3447**	**144**	**659**

(Source – District Census Handbook, 2001 Mewat)

3.2 SOIL AND TOPOGRAPHY

The soils of Sunari Watershed are Loamy sand to sandy clay loam with coarse fragments in lower horizon along the foothills and sandy loam to sandy clay loam in the most of the area. The topography of the area ranges from nearly level to gentle slope in the lower area and gentle to steep slopes on ridge/hillocks. Soils are subject to susceptible to severe to very severe erosion hazard in upper areas and moderate to severe in lower areas. The slope ranges from less than 1 to 5% and above. Most of the area of micro watersheds falls under 1-3% 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.	Silkhoh	2C5G1n1	633	Loamy sand to sandy loam with coarse fragments	Nearly level to gentle in lower areas whereas high in the hilly areas of the watershed
2.	Chilawali	2C5G1m6	414	Loamy sand to sandy loam with coarse fragments in pockets	
3.	Naharpur	2C5G1m7	567	Sandy loam to sandy clay loam	
4.	Gurnawat	2C5G1m5	594	Sandy loam to sandy clay loam	
5.	Khori Kalan	2C5G1m2	530	Sandy loam to sandy clay loam	
6.	Rangala	2C5G1f7	723	Sandy loam to sandy clay loam	
7.	Jaurasi	2C5G1j1	715	Sandy loam to clay loam	
8.	Uton	2C5G1f6	1009	Loamy sand to sandy loam with coarse fragments in pockets	
Total			**5185**		

Source: - Department of Agriculture, Haryana

3.2.1 Flood and Drought Condition

The data collected from the revenue department reveals that the incidences of flood and drought conditions occur once 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

Sr. No.	Name of Micro- watersheds	Flood Incidence	Drought Incidence
1.	Silkhoh	Once in a 5 Year	Once in a 5 Year
2.	Chilawali		
3.	Naharpur		
4.	Gurnawat		
5.	Khori Kalan		
6.	Rangala		
7.	Jaurasi		
8.	Uton		

3.3 SOILS

3.3.1 Soil Erosion

In the identified eight micro watersheds in twenty four villages, it is observed that due to thin vegetative cover to increase the loss of surface soil in the hilly and sand duny area of watershed. This results in degradation of agricultural land and loss of organic matter. Annual average rainfall of the district is 563 mm. Soil erosion is high and unscientific mining has also created severe problems in the area. Majority of the watershed Community are dependent on rain-fed 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 7.30 to 8.60. 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

Sr. No.	Name of Micro Watersheds	Name of Village	Soil pH	Type of salinity
1	Sikhoh	Silkhoh	7.3-8.2	Normal
		Nanuka	7.6-8.0	Normal
		Thana Alam Alias Masit	7.3-8.3	Normal
2	Chilawali	Chilawali	7.5-8.3	Normal
		Saidpur	7.5-8.4	Normal
		Mundarka	7.7-8.4	Normal
		Bhogipur	7.7-8.5	Normal
3	Naharpur	Naharpur	7.6-8.6	Normal
		Subasheri	7.6-8.3	Normal
		Kangarka	7.6-8.5	Normal
		Sewka	8.0-8.5	Normal
		Raniaki	7.7-8.2	Normal
4	Gurnawat	Gurnawat	7.9-8.5	Normal
		Bharangpur	7.7-8.2	Normal
		Chundhika	7.8-8.5	Normal
		Nijampur Taoru	8.0-8.5	Normal
5	Khori Kalan	Khori Kalan	7.6-8.4	Normal
		Khori Khurd	8.1-8.5	Normal
6	Rangala	Rangala	8.0-8.6	Normal
		Sunari	7.6-8.5	Normal
7	Jaurasi	Jaurasi	7.5-8.3	Normal
8	Uton	Uton	7.7-8.0	Normal
		Fatehpur	7.6-8.4	Normal
		Rathiwas	7.5-8.3	Normal

3.3.3 SOIL CLASSIFICATION

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 is medium. The fertility status map of the project area is exhibited in **Annexure-VI**.

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 two 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, 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 subsidized, because farmers are not economically capable to bear the rate of land leveling.

2. Engineering measures like Check Dams, Percolation Embankments with other soil conservation measures be under taken.
3. Agronomic measures like Dry farming, strip& Mixed cropping with other soil conservation measures like agro forestry and rain-fed 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 generally light in texture developed on 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, light in texture with coarse fragments, developed on gentle to steep slope and exposed rock-out crops. The water holding capacity is 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. Specific and special soil conservation measures should be adopted to check water erosion and gully control; soils should be provided permanent vegetation (Afforestation) cover to check further deterioration of soils.

2. Soils would be suitable for pasture development; forestation, recreation activity and other major water conservation structures (Water harvesting structure, silt detention dam, etc).

3.3.5 Climatic Conditions

The average rainfall of the district is 563 mm (during the past 10 year's data). The highest rainfall is 974 mm during the year 2006 and lowest in 2007 as 232 mm. The uneven rainfall distribution is leading to run off soil every year to the steams, rivulets and depressed area of the Sunari Watershed (IWMP I). The year wise rainfall from 2004 to 2013 is presented in **Table.5.**

Table 5. Rainfall during the years 2004-13

Sr. No.	Year	Rainfall (in mm)
1	2004	381
2	2005	503
3	2006	974
4	2007	232
5	2008	959
6	2009	450
7	2010	516
8	2011	344
9	2012	518
10	2013	755
	Average Rainfall	**563**

(Source: - Deputy Director Agriculture, Mewat)

The mean maximum temperature is 48˚ C (May and June) and mean minimum is 3.0˚ C (January) of the district and number of normal rainy days are 31.

3.3.6 Physiography and Reliefs

Physiographically, the area slope fall South- East to North-West. The general Elevation of the area is 242-306 m above mean sea level (google earth map). The watershed area developed on recent and old developed alluvium plains with sand overburden along hillocks in pockets in the area. Annual average rainfall of the district is 563 mm and the water is drained through field to field and ultimately drain through seasonal nala. The elevation range and percentage slope distribution has been presented in **Table 6.**

Table 6. Physiography and Relief

Project Name	Elevation (MSL)	Slope Range (%)
Sunari Watershed (IWMP I)	242-306 m	Less than 1 to 5% and above

3.4 LAND AND AGRICULTURE

The land holding pattern of the villages under Sunari Watershed shows that the majority of the land holding is below 3.0 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 Faridabad, Dharuhera, Manesar and Gurgaon. This affects directly the demographic profile of the villages.

The major crops Bajra, Arhar, green fodder and pulses in Kharif under rainfed conditions. The major crops during Rabi wheat, oilseeds, gram, green fodder and seasonal vegetables in rainfed/irrigated conditions. The soil and water conservation measures such as Engineering like Dug out Pond, Cement Stone Masonry structures (Inlet & Outlet), Earthen Embankment with pucca outlet, Small Earthen Embankments, Gully Plugs, Check Dams, Percolation embankments, Marginal Bandhs and Percolation ponds 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	Shisham	Ber	Dubb Grass
2	Kikar	Mango	
3	Neem	Guava	
4	Arjun	Amla	
5	Pipal		
6	Safeda		
7	Popular		

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	Total owners
4663	924	1051	6640

3.4.2 AGRICULTURE/PATTERN

Table 9. Agriculture/ Pattern

Sr. No.	Name of Micro-watersheds	Land under agriculture use (ha)	Net Sown area (ha)	
			One time	Two times
1	Silkhoh	583	486	381
2	Chilawali	360	308	224
3	Naharpur	498	413	324
4	Gurnawat	527	443	334
5	Khori Kalan	399	342	237
6	Rangala	565	481	343
7	Jaurasi	622	517	401
8	Uton	828	689	542
	Total	**4382**	3679	2786

(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 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.

Sr. No	Name of Micro Watersheds	Name of Villages	Source 1: Canal		Source 2: Groundwater (Tube wells)	
			Availability months	Net area (ha)	Availability months	Net area (ha)
1	Silkhoh	Silkhoh	-	-	July to June	92
2	Silkhoh	Nanuka	-	-	July to June	30
3	Silkhoh	Thana Alam Alias Masit	-	-	July to June	16
4	Chilawali	Chilawali	-	-	-	0
5	Chilawali	Saidpur	-	-	July to June	6
6	Chilawali	Mundarka	-	-	-	0
7	Chilawali	Bhogipur	-	-	July to June	3
8	Naharpur	Naharpur	-	-	July to June	25
9	Naharpur	Subasheri	-	-	July to June	19
10	Naharpur	Kangarka	-	-	-	0
11	Naharpur	Sewka	-	-	July to June	15
12	Naharpur	Raniaki	-	-	July to June	19
13	Gurnawat	Gurnawat	-	-	July to June	17

Sr. No	Name of Micro Watersheds	Name of Villages	Source 1: Canal		Source 2: Groundwater (Tube wells)	
			Availability months	Net area (ha)	Availability months	Net area (ha)
14	Gurnawat	Bharangpur	-	-	July to June	9
15	Gurnawat	Chundhika	-	-	July to June	14
16	Gurnawat	Nijampur Taoru	-	-	July to June	47
17	Khori Kalan	Khori Kalan	-	-	July to June	76
18	Khori Kalan	Khori Khurd	-	-	July to June	22
19	Rangala	Rangala	-	-	July to June	176
20	Rangala	Sunari	-	-	July to June	44
21	Jaurasi	Jaurasi	-	-	July to June	25
22	Uton	Uton	-	-	July to June	95
23	Uton	Fatehpur	-	-	July to June	69
24	Uton	Rathiwas	-	-	July to June	116
						935

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

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)

Sr. No	Name of Micro Watersheds	Village	Wheat				Oil Seed			
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
1	Sikhoh	Silkhoh	107	305057	2851	D.A.P./ Urea	75	88275	1177	D.A.P./ Urea
		Nanuka	25	71825	2873	D.A.P./ Urea	40	47840	1196	D.A.P./ Urea
		Thana Alam Alias Masit	59	166616	2824	D.A.P./ Urea	53	61109	1153	D.A.P./ Urea
2	Chilawali	Chilawali	84	234696	2794	D.A.P./ Urea	40	46480	1162	D.A.P./ Urea
		Saidpur	27	76761	2843	D.A.P./ Urea	12	13872	1156	D.A.P./ Urea
		Mundarka	58	165996	2862	D.A.P./ Urea	32	35936	1123	D.A.P./ Urea
		Bhogipur	49	139209	2841	D.A.P./ Urea	36	40392	1122	D.A.P./ Urea
3	Naharpur	Naharpur	40	111320	2783	D.A.P./ Urea	31	35433	1143	D.A.P./ Urea
		Subasheri	39	111579	2861	D.A.P./ Urea	34	39338	1157	D.A.P./ Urea
		Kangarka		0		D.A.P./ Urea	22	25806	1173	D.A.P./ Urea

Sr. No	Name of Micro Watersheds	Village	Wheat				Oil Seed			
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
		Sewka	91	257894	2834	D.A.P./ Urea	33	39072	1184	D.A.P./ Urea
		Raniaki	104	297856	2864	D.A.P./ Urea	31	35743	1153	D.A.P./ Urea
4	Gurnawat	Gurnawat	110	309210	2811	D.A.P./ Urea	22	25256	1148	D.A.P./ Urea
		Bharangpur	92	261464	2842	D.A.P./ Urea	13	14781	1137	D.A.P./ Urea
		Chundhika	60	172320	2872	D.A.P./ Urea	15	17370	1158	D.A.P./ Urea
		Nijampur Taoru	171	477432	2792	D.A.P./ Urea	18	20232	1124	D.A.P./ Urea
5	Khori Kalan	Khori Kalan	114	319770	2805	D.A.P./ Urea	51	57936	1136	D.A.P./ Urea
		Khori Khurd	118	334648	2836	D.A.P./ Urea	21	24171	1151	D.A.P./ Urea
6	Rangala	Rangala	242	689942	2851	D.A.P./ Urea	61	68015	1115	D.A.P./ Urea
		Sunari	174	494682	2843	D.A.P./ Urea	47	53016	1128	D.A.P./ Urea

Sr. No	Name of Micro Watersheds	Village	Wheat				Oil Seed			
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
7	Jaurasi	Jaurasi	399	1142337	2863	D.A.P./ Urea	201	227934	1134	D.A.P./ Urea
8	Uton	Uton	188	534672	2844	D.A.P./ Urea	34	38964	1146	D.A.P./ Urea
		Fatehpur	136	389096	2861	D.A.P./ Urea	64	75584	1181	D.A.P./ Urea
		Rathiwas	260	730860	2811	D.A.P./ Urea	31	35278	1138	D.A.P./ Urea

Table 11 B. Crop Details (Kharif)

Sr. No	Name of Micro Watersheds	Village	Bajra				Arhar			
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
1	Sikhoh	Silkhoh	161	251482	1562	D.A.P./ Urea	3	2961	987	D.A.P./ Urea
2		Nanuka	66	104412	1582	D.A.P./ Urea	6	5958	993	D.A.P./ Urea
3		Thana Alam Alias Masit	115	177445	1543	D.A.P./ Urea	1	1012	1012	D.A.P./ Urea

Sr. No	Name of Micro Watersheds	Village	Bajra				Arhar			
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
4	Chilawali	Chilawali	112	172256	1538	D.A.P./ Urea	4	4032	1008	D.A.P./ Urea
5		Saidpur	45	69930	1554	D.A.P./ Urea	2	2042	1021	D.A.P./ Urea
6		Mundarka	82	128658	1569	D.A.P./ Urea	3	3054	1018	D.A.P./ Urea
7		Bhogipur	75	116775	1557	D.A.P./ Urea	3	3075	1025	D.A.P./ Urea
8	Naharpur	Naharpur	48	75648	1576	D.A.P./ Urea	4	4132	1033	D.A.P./ Urea
9		Subasheri	47	72004	1532	D.A.P./ Urea	-			D.A.P./ Urea
10		Kangarka	79	125452	1588	D.A.P./ Urea	2	1950	975	D.A.P./ Urea
11		Sewka	77	122661	1593	D.A.P./ Urea	-			D.A.P./ Urea
12		Raniaki	121	189365	1565	D.A.P./ Urea	2	1994	997	D.A.P./ Urea
13	Gurnawat	Gurnawat	127	201041	1583	D.A.P./ Urea	2	2034	1017	D.A.P./ Urea
14		Bharangpur	59	91273	1547	D.A.P./ Urea	8	8192	1024	D.A.P./ Urea
15		Chundhika	59	92748	1572	D.A.P./ Urea	6	5916	986	D.A.P./ Urea
16		Nijampur Taoru	143	224081	1567	D.A.P./ Urea	2	1946	973	D.A.P./ Urea
17	Khori Kalan	Khori Kalan	98	156212	1594	D.A.P./ Urea	1	1011	1011	D.A.P./ Urea
18		Khori Khurd	105	162960	1552	D.A.P./ Urea	4	4024	1006	D.A.P./ Urea

Sr. No	Name of Micro Watersheds	Village	Bajra				Arhar			
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
19	Rangala	Rangala	265	415255	1567	D.A.P./ Urea	-			D.A.P./ Urea
20		Sunari	188	296476	1577	D.A.P./ Urea	10	10240	1024	D.A.P./ Urea
21	Jaurasi	Jaurasi	392	601328	1534	D.A.P./ Urea	-			D.A.P./ Urea
22	Uton	Uton	213	335688	1576	D.A.P./ Urea	-			D.A.P./ Urea
23		Fatehpur	190	294120	1548	D.A.P./ Urea	7	6853	979	D.A.P./ Urea
24		Rathiwas	240	374160	1559	D.A.P./ Urea	2	1988	994	D.A.P./ Urea
				4851430				72414		

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 Sunari Watershed (IWMP I)

Sr. No	Name of Micro Watersheds	Villages	Buffalo(*Lit/per day/annum) for 6 months	Cow(*lit/per day/annum) for 6 months	Sheep	Goat
1	Sikhoh	Silkhoh	1200/9000/1620000	447/1564/181610	--	175

Sr. No	Name of Micro Watersheds	Villages	Buffalo(*Lit/per day/annum) for 6 months	Cow(*lit/per day/annum) for 6 months	Sheep	Goat
2		Nanuka	188/1316/236880	13/39/7020	--	5
3		Thana Alam Alias Masit	396/3366/605880	84/294/52920	--	30
4	Chilawali	Chilawali	793/5947/1070550	141/634/114210	--	35
5		Saidpur	-	-	--	--
6		Mundarka	381/3048/548640	54/189/34020	--	100
7		Bhogipur	371/3153/567630	93/279/50220	--	260
8	Naharpur	Naharpur	269/1883/338940	39/156/28080	--	--
9		Subasheri	391/3128/563040	39/175/31590	--	45
10		Kangarka	1123/8422/1516050	210/630/113400	--	100
11		Sewka	513/3847/692550	75/262/47250	100	100
12		Raniaki	823/6995/1259190	54/243/43740	--	150
13	Gurnawat	Gurnawat	742/5194/934920	104/416/74880	50	125
14		Bharangpur	488/3416/614880	93/279/50220	--	55
15		Chundhika	757/6056/1090080	84/378/68040	--	125
16		Nijampur Taoru	1185/10072/1813050	162/486/87480	--	60
17	Khori Kalan	Khori Kalan	2989/20923/3766140	104/416/74880	--	30
18		Khori Khurd	757/5677/1021950	54/243/43740	40	30
19	Rangala	Rangala	635/5397/971550	132/462/83160	--	130
20		Sunari	3050/24400/4392000	630/1890/340200	100	125
21	Jaurasi	Jaurasi	3965/27755/4995900	483/2173/391230	--	50
22	Uton	Uton	1550/11625/2092500	84/294/52920	125	150
23		Fatehpur	879/6592/1186650	102/408/73440	-	50
24		Rathiwas	2310/18480/3326400	171/513/92340	--	130

(Source: Animal Husbandry, Mewat)

***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 13 to 32 m below ground level (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 Sunari Watershed (IWMP I)

Sr. No.	Name of Micro Watersheds	Name of Villages	Pre- Project level (m)
1	Sikhoh	Silkhoh	30.40
2		Nanuka	30.40
3		Thana Alam Alias Masit	30.40
4	Chilawali	Chilawali	30.40
5		Saidpur	30.40
6		Mundarka	30.40
7		Bhogipur	21.85
8	Naharpur	Naharpur	--
9		Subasheri	21.85
10		Kangarka	30.40
11		Sewka	21.85
12		Raniaki	21.85
13	Gurnawat	Gurnawat	23.10
14		Bharangpur	32.65
15		Chundhika	23.10
16		Nijampur Taoru	32.65
17	Khori Kalan	Khori Kalan	25.72
18		Khori Khurd	25.72
19	Rangala	Rangala	25.72
20		Sunari	23.10
21	Jaurasi	Jaurasi	13.05

Sr. No.	Name of Micro Watersheds	Name of Villages	Pre- Project level (m)
22	Uton	Uton	13.05
23		Fatehpur	13.05
24		Rathiwas	13.05

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 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, Mewat. The details of common property resource in Sunari 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
Sunari Watershed (IWMP I)	Waste land	100	200	300	19	100	200	19	19
	Pasture	-	-	69	-	-	-	69	-
	Orchards	16.5	-	-	-	16.5	-	-	-
	Village wood lot	7	-	7	-	-	-	14	-
	Forest	-	30	-	-	-	-	30	-
	Village ponds, lake	-	-	14	-	-	-	14	-
	Community Buildings	-	29.5	-	-	-	-	29.5	-
	Weekly Mkts	-	-	-	-	-	-	-	-
	Permanent Mkts	1	-	-	-	1	-	-	-
	Temples/place of worship	-	-	4.5	-	-	-	4.5	-
	Others	-	-	5.5	-	-	-	5.5	-

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

Sr. No.	Name of the Micro watershed	Name of villages	Total no. of houses	Total Population			SC			
				Male	Female	Total	Male	Female	Total	%age
1	Sunari Sub Watershed (IWMP-1)	Sikhoh	448	1801	1666	3467	51	47	98	2.8
2		Nanuka	55	201	198	399	52	50	102	25.6
3		Thana Alam Alias Masit	108	415	371	786	1	1	2	0.3
4		Chilawali	270	998	938	1936	0	0	0	0.0
5		Saidpur	-	-	-	-	-	-	-	-
6		Mundarka	117	569	527	1096	261	252	513	46.8
7		Bhogipur	74	270	268	538	26	30	56	10.4
8		Naharpur	19	75	74	149	0	0	0	0.0
9		Subasheri	120	342	319	661	60	60	120	18.2
10		Kangarka	295	1055	998	2053	117	120	237	11.5
11		Sewka	209	787	698	1485	136	126	262	17.6
12		Raniaki	248	930	893	1823	321	299	620	34.0
13		Gurnawat	331	1416	1265	2681	47	54	101	3.8
14		Bharangpur	170	738	657	1395	11	11	22	1.6
15		Chundhika	135	499	472	971	106	97	203	20.9
16		Nijampur Taoru	329	1523	1411	2934	141	126	267	9.1
17		Khori Kalan	-	-	-	-	-	-	-	-
18		Khori Khurd	102	309	320	629	110	106	216	34.3
19		Rangala	404	1051	869	1920	232	200	432	22.5
20		Sunari	403	1506	1410	2916	186	157	343	11.8
21		Jaurasi	767	2415	2189	4604	421	368	789	17.1
22		Uton	248	850	740	1590	126	110	236	14.8
23		Fatehpur	152	459	426	885	47	48	95	10.7
24		Rathiwas	493	1475	1319	2794	550	467	1017	36.4

(Source- District Census 2011)

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

Sr. No.	Name of the Micro watershed	Name of villages	Total population	Literacy					
				Total Literates	% age	Male	% age	Female	% age
1	Sunari Sub Watershed (IWMP-1)	Sikhoh	3467	875	25.2	658	75.2	217	24.8
2		Nanuka	399	189	47.4	123	65.1	66	34.9
3		Thana Alam Alias Masit	786	270	34.4	190	70.4	80	29.6
4		Chilawali	1936	696	36.0	478	68.7	218	31.3
5		Saidpur							
6		Mundarka	1096	646	58.9	416	64.4	230	35.6
7		Bhogipur	538	330	61.3	206	62.4	124	37.6
8		Naharpur	149	65	43.6	42	64.6	23	35.4
9		Subasheri	661	373	56.4	219	58.7	154	41.3
10		Kangarka	2053	937	45.6	599	63.9	338	36.1
11		Sewka	1485	634	42.7	429	67.7	205	32.3
12		Raniaki	1823	928	50.9	593	63.9	335	36.1
13		Gurnawat	2681	912	34.0	645	70.7	267	29.3
14		Bharangpur	1395	652	46.7	437	67.0	215	33.0
15		Chundhika	971	473	48.7	293	61.9	180	38.1
16		Nijampur Taoru	2934	1299	44.3	880	67.7	419	32.3
17		Khori Kalan							
18		Khori Khurd	629	356	56.6	209	58.7	147	41.3
19		Rangala	1920	1261	65.7	778	61.7	483	38.3
20		Sunari	2916	1307	44.8	874	66.9	433	33.1
21		Jaurasi	4604	3209	69.7	1912	59.6	1297	40.4
22		Uton	1590	792	49.8	521	65.8	271	34.2
23		Fatehpur	885	564	63.7	334	59.2	230	40.8
24		Rathiwas	2794	1908	68.3	1113	58.3	795	41.7

(Source- District Census- 2011)

Table 17. EMPLOYMENT STATUS

Sr. 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	Sunari Sub Watershed (IWMP-1)	Sikhoh	51	47	146	43	125	22	4	35	371	31
2		Nanuka	52	50	18	0	5	0	0	0	46	1
3		Thana Alam Alias Masit	1	1	41	9	7	2	1	5	115	8
4		Chilawali	0	0	157	2	25	2	1	1	140	7
5		Saidpur										
6		Mundarka	261	252	34	12	9	2	3	0	104	6
7		Bhogipur	26	30	64	10	41	3	1	0	12	6
8		Naharpur	0	0	32	30	0	0	0	0	0	1
9		Subasheri	60	60	36	0	2	0	0	0	32	5
10		Kangarka	117	120	112	9	12	10	3	0	222	14
11		Sewka	136	126	62	1	33	2	7	57	187	18
12		Raniaki	321	299	71	3	24	2	7	45	170	15
13		Gurnawat	47	54	34	1	2	3	0	0	56	0
14		Bharangpur	11	11	35	2	34	9	0	0	105	4
15		Chundhika	106	97	30	0	9	1	0	0	149	12
		Nijampur Taoru	141	126	67	7	50	4	23	1	153	12
		Khori Kalan										
		Khori Khurd	110	106	36	5	0	0	3	0	61	5
		Rangala	232	200	64	3	81	2	0	0	372	24
		Sunari	186	157	108	44	57	10	9	60	266	36
		Jaurasi	421	368	496	32	6	3	1	1	411	29
		Uton	126	110	117	97	11	4	1	1	204	106
		Fatehpur	47	48	91	5	19	12	0	0	117	10

Sr. 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
		Rathiwas	550	467	77	6	93	8	2	2	409	45

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 Sunari Watershed (IWMP I)

Sr. 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	Sikhoh	Silkhoh	3467	347	60	1. Lack of job opportunity in project area. 2. Poor economic condition of household due to low wages in Agriculture Economy 3. Better employment opportunity outside the native place. 4. Land purchase by outsider from NCR	5500
2		Nanuka	399	48	90		5600
3		Thana Alam Alias Masit	786	86	60		5800
4	Chilawali	Chilawali	1936	271	120		5500
5		Saidpur	--				
6		Mundarka	1096	132	60		5400
7		Bhogipur	538	81	90		5600
8	Naharpur	Naharpur	149	16	75		5850
9		Subasheri	661	79	120		5800
10		Kangarka	2053	205	100		5400
11		Sewka	1485	193	90		5300
12		Raniaki	1823	273	60		5500
13	Gurnawat	Gurnawat	2681	268	75		5650
14		Bharangpur	1395	167	120		5400
15		Chundhika	971	136	60		5600
16		Nijampur Taoru	2934	352	75		5500
17	Khori Kalan	Khori Kalan	2125	276	90		5700

Sr. 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
18		Khori Khurd	629	63	90		5400
19	Rangala	Rangala	1920	230	60		5600
20		Sunari	2916	408	100		5700
21	Jaurasi	Jaurasi	4604	599	120		5350
22	Uton	Uton	1590	207	90		5400
23		Fatehpur	885	89	75		5500
24		Rathiwas	2794	419	90		5800

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

Table 19. BPL Pattern

Sr. No.	Name of Micro watersheds	Name of villages	Total houses	Total Household- BPL	% of BPL HH
1	Sikhoh	Silkhoh	448	30	6.70
2		Nanuka	55	18	32.72
3		Thana Alam Alias Masit	108	11	10.20
4	Chilawali	Chilawali	270	23	8.5
5		Saidpur	--	--	--
6		Mundarka	177	76	43.00
7		Bhogipur	74	19	25.67
8	Naharpur	Naharpur	19	07	36.84
9		Subasheri	120	48	40
10		Kangarka	295	41	13.90
11		Sewka	209	68	32.53
12		Raniaki	248	91	37
13	Gurnawat	Gurnawat	331	43	13
14		Bharangpur	170	10	5.88
15		Chundhika	135	45	33.53
16		Nijampur Taoru	329	96	29.17
17	Khori Kalan	Khori Kalan	450	144	32
18		Khori Khurd	102	51	50
19	Rangala	Rangala	404	34	8.41

Sr. No.	Name of Micro watersheds	Name of villages	Total houses	Total Household- BPL	% of BPL HH
20		Sunari	403	127	31.51
21	Jaurasi	Jaurasi	767	94	12.25
22	Uton	Uton	248	55	22.17
23		Fatehpur	152	27	17.76
24		Rathiwas	493	172	34.88

(Source: District Administration Mewat, 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

Sr. 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	Sikhoh	Silkhoh	N	N	Y/Middle	N	Y	N	N
2		Nanuka	N	N	Y/Primary	N	Y	N	N
3		Thana Alam Alias Masit	N	N	Y/Primary	N	Y	N	N
4	Chilawali	Chilawali	N	N	Y/Middle	N	N	N	N
5		Saidpur	N	N	N	N	N	N	N
6		Mundarka	N	N	Y/Middle	N	Y	Y	N
7		Bhogipur	N	N	2/Primary/Middle	N	Y	N	N
8	Naharpur	Naharpur	N	N	1-Middle	N	Y	N	N
9		Subasheri	N	N	Higher Secondary	N	Y	N	N
10		Kangarka	N	N	1 Primary & 1 Private	N	Y	N	N

Sr. 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
11		Sewka	N	N	Middle	N	Y	N	Y
12		Raniaki	N	N	2 Primary/High School	N	Y	N	N
13	Gurnawat	Gurnawat	N	N	1 Middle	N	Y	N	N
14		Bharangpur	N	N	1 Primary	N	Y	N	N
15		Chundhika	N	N	1 Primary	N	Y	N	N
16		Nijampur Taoru	N	N	Middle	N	Y	N	N
17	Khori Kalan	Khori Kalan	Y	N	Primary, Sr. Sec. & Pvt. = 3	N	Y	Y	N
18		Khori Khurd	N	N	Middle	N	Y	N	Y
19	Rangala	Rangala	N	N	1 Primary	N	Y	N	N
20		Sunari	N	N	2 Primary / Middle	N	Y	N	N
21	Jaurasi	Jaurasi	Y	Y	2 Primary/Sr. Secondary	N	Y	Y	Y
22	Uton	Uton	N	N	1 Middle	Y	Y	N	N
23		Fatehpur	N	N	1 Middle	Y	Y	N	N
24		Rathiwas	N	Y	3 Pvt., Primary & Middle	Y	Y	Y	Y

FACILITIES/ HOUSEHOLD ASSETS

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

Sr. 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	Sikhoh	Silkhoh	448	150	-	1510	300	25	150	60		100

Sr. 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				
2		Nanuka	55	05	-	185	30	2	10	10		15
3		Thana Alam Alias Masit	108	15	-	360	75	6	25	16		22
4	Chilawali	Chilawali	270	75	-	977	125	15	30	15		65
5		Saidpur			-							
6		Mundarka	177	90	-	600	100	4	120	50		35
7		Bhogipur	74	55	-	280	50	8	70	35		32
8	Naharpur	Naharpur	19	15	-	85	16	1	10	15		14
9		Subasheri	120	35	-	410	75	3	50	12		33
10		Kangarka	295	85	-	978	150	20	175	125		75
11		Sewka	209	125	-	615	105	6	90	35		65
12		Raniaki	248	177	-	735	100	5	60	70		85
13	Gurnawat	Gurnawat	331	85	-	1120	200	10	100	35		95
14		Bharangpur	170	85	-	585	45	5	60	25		28
15		Chundhika	135	85	-	465	55	8	25	30		38
16		Nijampur Taoru	329	152	-	1115	300	21	62	65		100
17	Khori Kalan	Khori Kalan	450	125	-	1600	225	10	25	85		150
18		Khori Khurd	102	35	-	360	60	10	15	25		45
19	Rangala	Rangala	404	115	-	1365	175	05	150	150		125
20		Sunari	403	220	-	1386	200	10	50	75		125
21	Jaurasi	Jaurasi	767	425	-	2672	425	75	500	350		200
22	Uton	Uton	248	135	-	845	50	05	30	15		50

Sr. 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				
23		Fatehpur	152	150	-	519	110	20	125	78		62
24		Rathiwas	493	150	-	1686	225	25	275	200		150

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 Sunari Watershed (IWMP I)

Sr. 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 income Rs.
1	Sikhoh	Silkhoh	3610	1250	9850	1850	16560
2		Nanuka	3032	1120	8910	1820	14882
3		Thana Alam Alias Masit	2930	1130	8710	1830	14600
4	Chilawali	Chilawali	3110	1210	9750	1860	15930
5		Saidpur	--	--	--	--	--
6		Mundarka	3150	1150	9510	1820	15630
7		Bhogipur	3210	1150	8910	1805	15075
8	Naharpur	Naharpur	3350	1190	8710	1905	15155
9		Subasheri	3460	1250	9510	2010	16230
10		Kangarka	3190	1130	9410	1810	15540
11		Sewka	3110	1130	8910	2050	15200
12		Raniaki	3210	1120	9610	1950	15890
13	Gurnawat	Gurnawat	3450	1210	9420	1890	15970

Sr. 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 income Rs.
14		Bharangpur	3220	1150	8510	1820	14730
15		Chundhika	3150	1130	8110	1850	14240
16		Nijampur Taoru	3510	1230	9550	1930	16220
17	Khori Kalan	Khori Kalan	3450	1220	8720	1830	15220
18		Khori Khurd	3210	1150	8510	1750	14620
19	Rangala	Rangala	3540	1230	9515	1890	15845
20		Sunari	3350	1230	9120	1950	15650
21	Jaurasi	Jaurasi	3550	1250	9725	1950	16475
22	Uton	Uton	3340	1170	9120	1790	15420
23		Fatehpur	3220	1210	8925	1830	15185
24		Rathiwas	3440	1220	8917	1850	15427

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.

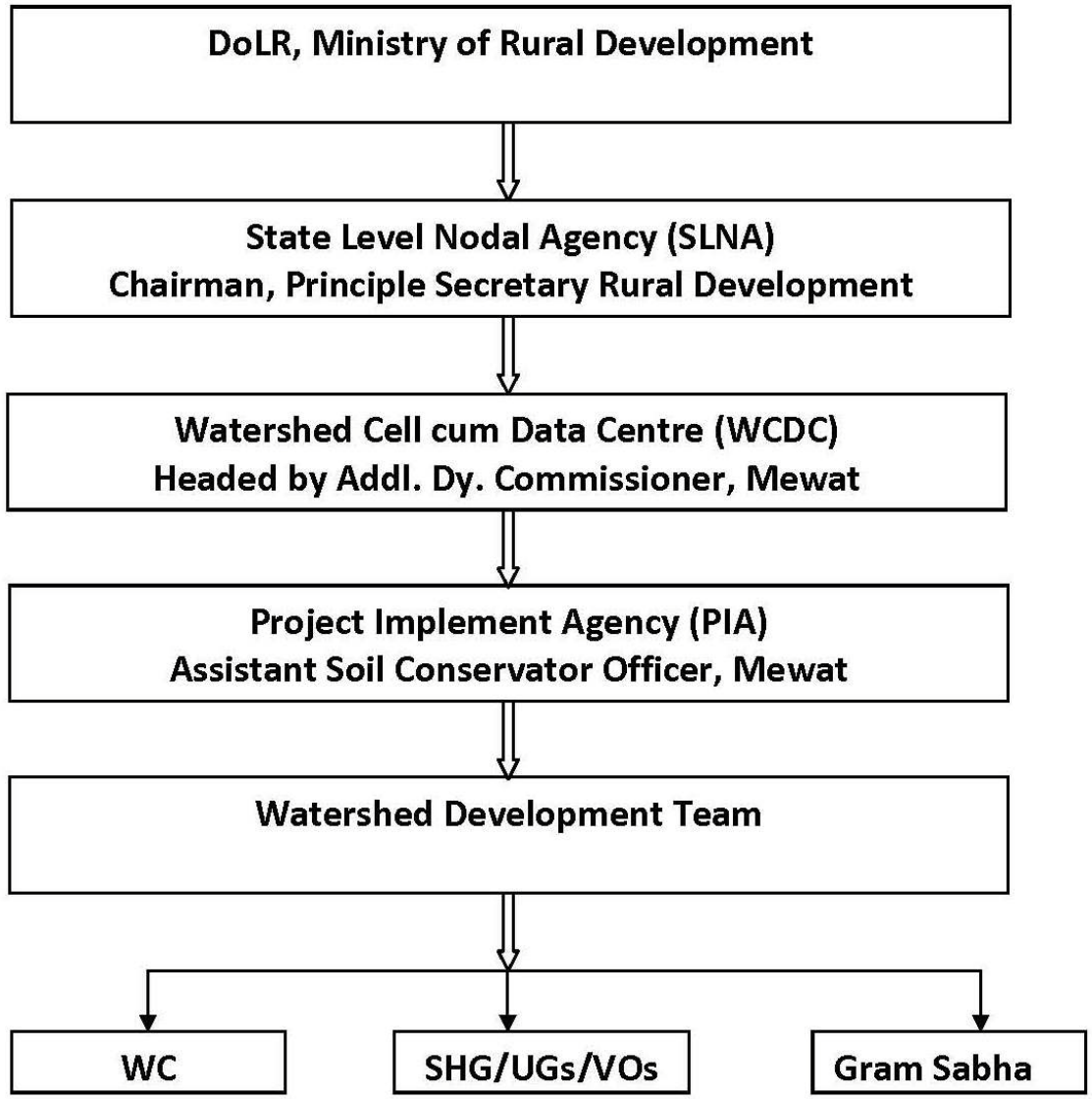
CHAPTER-4

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 (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
Watershed Cell cum Data Centre (WCDC)
Headed by Addl. Dy. Commissioner, Mewat
Project Implement Agency (PIA)
Assistant Soil Conservator Officer, Mewat
Watershed Development Team
WC
SHG/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, MEWAT

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 Mewat is selected by the State Level Nodal Agency (SLNA) for Integrated Watershed Management Programme (IWMP) in Haryana. In the district Mewat, where the area of development is 9056 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, Mewat 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	Sunari Watershed (IWMP-I)	i) Type of organization	Government
		ii) Name of organization	Department of Agriculture, Haryana
		iii) Designation & Address	ASCO, Mewat
		iv) Telephone	08901259941
		v) Fax	-
		vi) E-mail	ascomewat@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 Mewat 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 Village	Name of President	Name of Secretary	Name of Members
Silkhoh	Akbari	Suban Khan	Smt. Akbari Devi, Muveen Khan, Jormal, Bil Kish, Chet Ram, Asgar, Mahavir, Deevan Singh, Sushila, Aas Mohd. Rafiq, Hanif
Nanuka	Akbari	Suban Khan	Smt. Akbri, Andhi, Imran, Fazri, Chet Ram, Sohan Lal, Mahavir, Deevan, Sushila
Thana Alam Alias Masit	Akbari	Suban Khan	Smt. Akbari, Andhi, Fajru, Dhupan, Malloo, Joohar, Mahavir, Deevan Singh, Ruksar, Apurav, Ilmi, Ishaq, Fazaru
Chilawali	Smeena	Haseen	Smt. Samina, Yashin, Simrat, Khatiza, Ismile, Hameed, Aabind, Deevan Singh, Kahanaiya Lal, Ameena, Haseen, Imrat Naseer
Saidpur	Naresh	Manoj Kumar	
Mundarka	Naresh	Manoj Kumar	Smt. Naresh, Chandermal, Hukam Chand, Kamlesh, Sohan Lal, Raghubir, Fasru, Indrudhariwala, Resham, Ram Kishan, Raju,

Name of Micro Village	Name of President	Name of Secretary	Name of Members
			Suman Khan, Mahavir
Bhogipur	Ved Pal	Kapil	Vedpal, Shankar, Mahmood, Santosh, Balli, Ram Singh, Fazri, Inderdhariwala, Kahnaiya Lal, Kamlesh, Deshraj, Jai Singh
Naharpur	Sed Pal	Kapil	Ved Pal, Umar Rao, Mahmood, Rambati, Lalit, Ibrahim, Fazri, Inder Dhariwala, Zile Singh, Santosh
Subasheri	Ved Pal	Kapil	
Kangarka	Naresh	Manoj Kumar	Smt. Naresh, Chandermal, Bhajan Lal, Ramvati, Mohendru, Ashok Kumar, Fazaru, Inder Dhariwal, Kahnaiya Lal, Shakuntla, Suneel, Sunder
Sewka	Mohinder Singh	Manoj Kumar	Mohender Singh, Hura, Maman, Mangu Ram, Zayad, Om Prakash, Mazid, Inderdhariwala, Seema Devi, Manoj Kumar, Manoj, Rajender
Raniaki	Sohan Lal	Sanjeev	Sohan Lal, Umar Rao, Sher Mohd., Manuna, Gurman, Balbir, Mazid, Inder Dhari Wala, Zile Singh, Rajbati, Sanjeev, Hari Ram, Fude Ram
Gurnawat	Noordeen	Irshad	Noordin, Badrudin, Bahin, Sumari, Laxmi, Ilyash, Barkati, Inderdhariwal, Amum, Irshad, Liyakat, Moovin
Bharangpur	Noordeen	Irshad	
Chundhika	Hasan Mohd.	Altaf	Hasan Mohd., Prahlad, Abdul Rahman, Rihana, Charan Singh, Noor Deen, Maksoodan, Inder Dhariwala, Zile Singh,
Nijampur Taoru	Noordeen	Irshad	Noordeen, Bajjar, Ilyash, Raghubir, Mainaj, Laky, Barkto, Inder Dhari Wala, Khatuni, Irshad, Zmalu, Nayb
Khori Kalan	Akhtar Ali	Jahid Hussain	Akhtar Ali, Sleni, Nihal Singh, Jaibuna Dharm Pal, Nababdeen, Jaswant, Inderdhariwala, Sarswati, Zahid, Balwan, Ram Prasad

Name of Micro Village	Name of President	Name of Secretary	Name of Members
Khori Khurd	Akhtar Ali	Jahid Hussain	Akhtar Hussain, Saleni, Karim Khan, Nirmala, Puran, Ilyas, Gulshana, Inderdhariwala, Kanta, Zahid, Dharmpal
Rangala	Akhtar Ali	Jahid Hussain	Akhtar Ali, Saleni, Samsudeen, Samela, Kishan Dutt, Gulsana, Inderdhariwala, Urmila, Zadi, Shera Singh, Unish
Sunari	Smt. Safedi	Mohd. Naseem Ahmad	Safedi, Sunara, Hamid, Anna, Azeen, Saukat, Aasam Khan, Inderdhariwal, Neelam, Islam, Razak, Arbind, Ali Mohd.
Jaurasi	Devender Singh	Pardeep Kumar	Devender Singh, Rajbir Singh, Karan Singh, Neelam, Laxmi, Panna Lal, Inderjit Pratap Singh, Inderdhariwal, Ram Lal, Mohender, Satpal, Vijay Pal
Uton	Zakir Hussain	Ajay Kumar	Zakir Hussain, Kalu Khan, Laxmi, Dev Karan, Aafran, Safi Mohd., Jaswant Singh, Inderdhari Wal, Kalpana, Jai Singh, Islam, Tahir Ishayak
Fatehpur	Sunil Kumar	Naveen Kumar	Sunil Kumar, Kamr Singh, Kawar Singh, Vidhya, Raja, Jaikan, Naresh, Indershari Wal, Nirmala, Satvir, Jagat, Inder, Satpal
Rathiwas	Parveen Kumar	Deepender	Praveen Kumar, Sohan Lal, Narender, Dharmbir, Meva, Rama Nand, Jaswant Singh, Inderdhariwal, Sakuntla, Prabhati, Satvir, Ishwar, Rajender

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 SUNARI 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
Sunari Watershed (IWMP I)	5185	4250	51000000	Administrative costs	510000	510000	1530000	1530000	1020000	**5100000**
				Monitoring	0	0	0	510000	0	**510000**
				Evaluation	0	127500	127500	127500	127500	**510000**
				Entry point activities	2040000	0	0	0	0	**2040000**
				Institution and capacity building	0	2550000	0	0	0	**2550000**
				Detailed project report	510000	0	0	0	0	**510000**
				Watershed development works	0	4080000	8160000	8670000	7650000	**28560000**
				Livelihood activities for the asset less persons	0	0	1530000	2550000	510000	**4590000**
				Production system and micro enterprises	0	0	1530000	2040000	1530000	**5100000**
				Consolidation phase	0	0	0	0	1530000	**1530000**
				Total	**3060000**	**7267500**	**12877500**	**15427500**	**12367500**	**51000000**
				Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**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: Silkhoh)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
495	5940000	Administrative costs	59400	59400	178200	178200	118800	**594000**
		Monitoring	0	0	0	59400	0	**59400**
		Evaluation	0	14850	14850	14850	14850	**59400**
		Entry point activities	237600	0	0	0	0	**237600**
		Institution and capacity building	0	297000	0	0	0	**297000**
		Detailed project report	59400	0	0	0	0	**59400**
		Watershed development works	0	475200	950400	1009800	891000	**3326400**
		Livelihood activities for the asset less persons	0	0	178200	297000	59400	**534600**
		Production system and micro enterprises	0	0	178200	237600	178200	**594000**
		Consolidation phase	0	0	0	0	178200	**178200**
		Total	**356400**	**846450**	**1499850**	**1796850**	**1440450**	**5940000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**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: Chilawali)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
405	4860000	Administrative costs	48600	48600	145800	145800	97200	**486000**
		Monitoring	0	0	0	48600	0	**48600**
		Evaluation	0	12150	12150	12150	12150	**48600**
		Entry point activities	194400	0	0	0	0	**194400**
		Institution and capacity building	0	243000	0	0	0	**243000**
		Detailed project report	48600	0	0	0	0	**48600**
		Watershed development works	0	388800	777600	826200	729000	**2721600**
		Livelihood activities for the asset less persons	0	0	145800	243000	48600	**437400**
		Production system and micro enterprises	0	0	145800	194400	145800	**486000**
		Consolidation phase	0	0	0	0	145800	**145800**
		Total	**291600**	**692550**	**1227150**	**1470150**	**1178550**	**4860000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**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: Naharpur)
(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
489	5868000	Administrative costs	58680	58680	176040	176040	117360	**586800**
		Monitoring	0	0	0	58680	0	**58680**
		Evaluation	0	14670	14670	14670	14670	**58680**
		Entry point activities	234720	0	0	0	0	**234720**
		Institution and capacity building	0	293400	0	0	0	**293400**
		Detailed project report	58680	0	0	0	0	**58680**
		Watershed development works	0	469440	938880	997560	880200	**3286080**
		Livelihood activities for the asset less persons	0	0	176040	293400	58680	**528120**
		Production system and micro enterprises	0	0	176040	234720	176040	**586800**
		Consolidation phase	0	0	0	0	176040	**176040**
		Total	**352080**	**836190**	**1481670**	**1775070**	**1422990**	**5868000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**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: Gurnawat)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
507	6084000	Administrative costs	60840	60840	182520	182520	121680	**608400**
		Monitoring	0	0	0	60840	0	**60840**
		Evaluation	0	15210	15210	15210	15210	**60840**
		Entry point activities	243360	0	0	0	0	**243360**
		Institution and capacity building	0	304200	0	0	0	**304200**
		Detailed project report	60840	0	0	0	0	**60840**
		Watershed development works	0	486720	973440	1034280	912600	**3407040**
		Livelihood activities for the asset less persons	0	0	182520	304200	60840	**547560**
		Production system and micro enterprises	0	0	182520	243360	182520	**608400**
		Consolidation phase	0	0	0	0	182520	**182520**
		Total	**365040**	**866970**	**1536210**	**1840410**	**1475370**	**6084000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**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: Khori Kalan)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
432	5184000	Administrative costs	51840	51840	155520	155520	103680	**518400**
		Monitoring	0	0	0	51840	0	**51840**
		Evaluation	0	12960	12960	12960	12960	**51840**
		Entry point activities	207360	0	0	0	0	**207360**
		Institution and capacity building	0	259200	0	0	0	**259200**
		Detailed project report	51840	0	0	0	0	**51840**
		Watershed development works	0	414720	829440	881280	777600	**2903040**
		Livelihood activities for the asset less persons	0	0	155520	259200	51840	**466560**
		Production system and micro enterprises	0	0	155520	207360	155520	**518400**
		Consolidation phase	0	0	0	0	155520	**155520**
		Total	**311040**	**738720**	**1308960**	**1568160**	**1257120**	**5184000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**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: Rangala)
(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
503	6036000	Administrative costs	60360	60360	181080	181080	120720	**603600**
		Monitoring	0	0	0	60360	0	**60360**
		Evaluation	0	15090	15090	15090	15090	**60360**
		Entry point activities	241440	0	0	0	0	**241440**
		Institution and capacity building	0	301800	0	0	0	**301800**
		Detailed project report	60360	0	0	0	0	**60360**
		Watershed development works	0	482880	965760	1026120	905400	**3380160**
		Livelihood activities for the asset less persons	0	0	181080	301800	60360	**543240**
		Production system and micro enterprises	0	0	181080	241440	181080	**603600**
		Consolidation phase	0	0	0	0	181080	**181080**
		Total	**362160**	**860130**	**1524090**	**1825890**	**1463730**	**6036000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**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: Jaurasi)
(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
690	8280000	Administrative costs	82800	82800	248400	248400	165600	**828000**
		Monitoring	0	0	0	82800	0	**82800**
		Evaluation	0	20700	20700	20700	20700	**82800**
		Entry point activities	331200	0	0	0	0	**331200**
		Institution and capacity building	0	414000	0	0	0	**414000**
		Detailed project report	82800	0	0	0	0	**82800**
		Watershed development works	0	662400	1324800	1407600	1242000	**4636800**
		Livelihood activities for the asset less persons	0	0	248400	414000	82800	**745200**
		Production system and micro enterprises	0	0	248400	331200	248400	**828000**
		Consolidation phase	0	0	0	0	248400	**248400**
		Total	**496800**	**1179900**	**2090700**	**2504700**	**2007900**	**8280000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING
YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and
Funds in Rs.

Table 9. PHASING YEAR WISE (Name of the Micro Watershed: Uton)
(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
729	8748000	Administrative costs	87480	87480	262440	262440	174960	**874800**
		Monitoring	0	0	0	87480	0	**87480**
		Evaluation	0	21870	21870	21870	21870	**87480**
		Entry point activities	349920	0	0	0	0	**349920**
		Institution and capacity building	0	437400	0	0	0	**437400**
		Detailed project report	87480	0	0	0	0	**87480**
		Watershed development works	0	699840	1399680	1487160	1312200	**4898880**
		Livelihood activities for the asset less persons	0	0	262440	437400	87480	**787320**
		Production system and micro enterprises	0	0	262440	349920	262440	**874800**
		Consolidation phase	0	0	0	0	262440	**262440**
		Total	**524880**	**1246590**	**2208870**	**2646270**	**2121390**	**8748000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**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 Mewat 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%

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 13 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 Mewat 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**				
	Mewat	Members of Watershed Committees @ 10 per committee would also include accompanying WDT Members.	430	200-250	2
02	Block Level Functional Programmes for Secretaries of Watershed Committees. **Two Days**				
	Mewat	Secretaries of Village Watershed Committees	43	20-25	2
03	Project Level Sensitization Camps for WC **One Days**				
	Mewat	Members of Watershed Committees @ 10 Persons (Tentative) per WC	430	50	9
04	Village Level Awareness Camps on IWMP at Micro Watershed Level for User Groups **One Day**				
	Mewat	Approximately 50 prospective user groups per micro watershed.	950	50	19
05	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP **One Day**				
	Mewat	Three persons (Leader, Secretary and Treasurer) per Self Help Group @ around one SHG per village.	126	50	3

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	47524
2	Block Level Functional Programmes for Secretaries of Watershed Committees. Two Days	6188
3	Village Level Sensitization Camps for WC One Days	33098
4	Village Level Awareness Camps on IWMP at Micro Watershed Level for Prospective User Groups One Day	44483
5	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP One Day	12270
	Total	**143562**

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

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	32000	5	16	80000	1000	2000	160000
2	User groups from each micro watershed	NRM, Post Project Management etc. –Exposure Visit	2	16000	5	8	40000	1000	2000	80000
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	48000	5	8	60000	1500	6000	240000
4	Sub watershed Level- PIA Members	Exposure Visit- Within Fundamentals of Watershed, Finance	2	24000	5	8	60000	1500	3000	120000

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
		Management, Final Report on WDP etc								
5	District Level-WDC	Exposure visit to successful watershed/ University.	2	16000	5	8	40000	1000	2000	80000
6	District Level-Line Deptt., WDC	Exposure visit to successful watersheds within state.	2	16000	5	8	40000	1000	2000	80000
7	SLNA and District Level Controlling Officers	Exposure visit to successful watersheds outside state	4	48000	5	8	60000	1500	6000	240000
Total			**18**		**35**	**64**				**1000000**

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

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	8	2	16	80	12,000	120000	960000
2.	Propaganda & Documentation (Puppet show, documentary movies show, video-graphy, Photography, wall Painting, Display Board, pamphlets, leaf lets. Etc)	8	2	16	80	5000	50000	400000
3	Contingency charges							46438
	Total							**1406438**

i) **Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD = 1,43,562/-**

ii) **Micro Watershed Wise Exposure cum training Visit For SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members**
= 10, 00,000/-

iii) **Farmer's / Beneficiaries training camps with Extension Program's = 14,06,438/-**

Grand Total = 25, 50,000/-

6.2.1. EXPECTED OUTCOME OF CAPACITY BUILDING

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

6.3 Entry Point Activities 4%

EPA activities are taken up under the watershed to build rapport with village community at the beginning of the project, generally certain important works which are in urgent demand of the local community are taken up. A group discussion was conducted in the Gram Sabha meeting/watershed committee regarding EPA activities. It was conveyed to the Gram Sabha that an amount of **Rs. 20, 40,000/-** 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 Sunari 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.	Tauru	Sunari Watershed (IWMP I)	20	20	Nil	Harvesting Roof	Taoru	0.69
						Top recharge system	Silkho	0.60
						Harvesting recharge pit	Chilawali	0.88
						Harvesting recharge pit	Chilawali	0.60
						Harvesting recharge pit	Gurnawat	1.02
						Harvesting recharge pit	Gurnawat	0.60
						Harvesting recharge pit	Jaurasi	2.16
						Harvesting recharge pit	Jaurasi	0.60
						Harvesting recharge pit	Khori Kalan	1.73
						Harvesting recharge pit	Khori Kalan	0.60
						Harvesting recharge pit	Uton	0.80
						Harvesting recharge pit	Uton	0.60
						Sludge water channels	Uton	2.11
						Sludge water channels	Rangala	2.47
						Water Tank	Subasheri	1.40
						Water Tank	Bhogipur	0.63
						Water Tank	Bharangpur	0.63
						Cattle Crust	Silkhoh	0.24
						Cattle Crust	Nanuka	0.24
						Cattle Crust	Naharpur	0.24
						Total		**18.88**

Total project Cost @ 4%= Rs. 20,40,000/-

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), Earthen Embankment with pucca outlet, Small Earthen Embankments, Gully Plugs, Check Dams, Percolation embankments, Marginal Bandhs and Percolation ponds 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.

Proper publicity about the proposed project proposal through brochure , pamphlet, wall writing at common place must be carried out in the project areas.

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 and 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.

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 Mewat) is given below and the proposed Action Plan/ Treatment Plan map shown in **Annexure X.**

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

Name of Project: IWMP I		**Name of Watershed: Sunari**			**Name of Village : Silkho**						
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity (cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp &Retaining wall.	28˚08.818'	76˚56.895'	2.00	1.00	945	1418	No.	1 no	4.00	4.00	To provide drinking water for animals, Irrigation to fields, checking of soil erosion. & Ground water recharging.
2	Excavation of pond construction of Ramp &Retaining wall..	28˚08.538'	76˚57.677'	10.00	-	4727	7090	No.	1 no	5.00	5.00	To provide drinking water for animals, checking of soil erosion. & Ground water recharging.
3	Check Dam	28˚08.884' 28˚08.878'	76˚57.621' 76˚57.711'	17.00	-	8035	-	Cum	200	0.02	4.00	Water harvesting &Ground water recharging, Check of soil erosion.
4	Gully plug	28˚08.530' 28˚08.510'	76˚57.290' 76˚57.221'	13.00	-	6145	9217	No	3 no	1.00	3.00	Water harvesting &Ground water recharging, Check of soil erosion.
5	Renovation / Desilting of old Silt Detention Dam.	28˚08.504'	76˚57.456'	20.00	-	9453	14180	No	1 no	3.00	3.00	Water harvesting &Ground water recharging, Check of soil erosion.

6	Land levelling* in panchayat land.	28˚08.810'	76˚57.830'	-	-	-	-	Hect.	5.0	0.75	4.50	To level the panchayat land &to increase the income of the panchayat.
	Total cost										23.50	
	Available funds										20.29	
	Convergence										3.21	

*** Before executing detail topographic survey and assessment must be carried out before implementation.**

Name of Project: IWMP I		**Name of Watershed: Sunari**							**Name of Village : Nanuka**		
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp.	28˚09.413'	76˚56.004'	21.00	2.00	9900	14800	No.	1 no	4.00	4.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.& Ground water recharging
2	Renovation / Desilting of old Silt Detention Dam.	28˚09.319'	76˚56.610'	7.00	-	3200	4900	No	1 no	2.00	2.00	Water harvesting &Ground water recharging, Check of soil erosion.
3	Plantation in school,Panchayat land &Mandir	28˚09.345'	76˚56.150'	-	-	-	-	Hect.	1.0	0.40	0.40	To increase biomass cover
								Total cost			6.40	
								Available funds			4.57	
								Convergence			1.83	

Name of Project: IWMP I				**Name of Watershed: Sunari**							**Name of Village : Thana Alampur**	
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp.	28˚10.111'	76˚56.490'	16.50	2.30	7799	11699	No.	1 no	4.00	4.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.& Ground water recharging
2	Renovation / Desilting of old Silt Detention Dam.	28˚10.041'	76˚56.541'	21.00	-	9926	14889	No	1 no	3.00	3.00	Water harvesting &Ground water recharging, Check of soil erosion.
3	Gully plug	28˚09.834	76˚56.651'	7.00	-	3309	4963	No	3 no	1.00	3.00	Water harvesting &Ground water recharging, Check of soil erosion.
4	Plantation in school,Panchayat land &Mandir	28˚09.879'	76˚56.769'	-	-	-	-	Hect.	1.0	0.40	0.40	To increase biomass cover
								Total cost			10.40	
								Available funds			8.40	
								Convergence			2.00	

Name of Project: IWMP I		**Name of Watershed: Sunari**							**Name of Village : Chilawali**		
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp &Retaining wall.	28˚10.134'	76˚56.508'	13.35	1.80	6310	9465	No.	1 no	5.00	5.00	To provide drinking water for animals, Irrigation to fields, checking of soil erosion. & Ground water recharging
2	Renovation / Desilting of old Silt Detention Dam.	28˚10.041'	76˚56.541'	21.00	-	9926	14889	No	1 no	3.00	3.00	Water harvesting &Ground water recharging, Check of soil erosion.
3	Gully plug	28˚10.152'	76˚57.143'	8.00	-	3781	5672	No	3 no	1.00	3.00	Water harvesting &Ground water recharging, Check of soil erosion.
4	Plantation in school, Panchayat land.	28˚10.615'	76˚56.263'	-	-	-	-	Hect.	4.0	0.40	1.60	To increase biomass cover
										Total cost	12.60	
										Available funds	10.15	
										Convergence	2.45	

Name of Project: IWMP I		**Name of Watershed: Sunari**									**Name of Village : Saidpur**
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Gully plug	28˚10.373'	76˚55.274'	6.50	-	3072	4609	No	2 no	1.00	2.00	Water harvesting &Ground water recharging,Check of soil erosion.
2	Renovation / Desilting of old Silt Detention Dam.	28˚10.254'	76˚55.290'	11.60	1.00	5483	8224	No	1 no	3.00	3.00	Water harvesting &Ground water recharging,Check of soil erosion.
3	Land leveling* in panchayat land.	28˚10.230'	76˚55.255'	-	-	-	-	Hect.	1.0	0.75	0.75	To level the panchayat land &to increase the income of the panchayat.
										Total cost	5.75	
										Available funds	3.83	
										Convergence	1.92	

*** Before executing detail topographic survey and assessment must be carried out before implementation.**

Name of Project: IWMP I		**Name of Watershed: Sunari**							**Name of Village : Mundarka**		
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Gully plug	28˚09.780'	76˚55.431'	8.50	-	4018	6027	No	2 no	1.00	1.00	Water harvesting &Ground water recharging,Check of soil erosion.
2	Renovation / Desilting of old Silt Detention Dam.	28˚09.734'	76˚55.469'	10.70	0.75	5058	7586	No	1 no	3.00	3.00	Water harvesting &Ground water recharging,Check of soil erosion.
3	Renovation of pond construction of Ramp &Retaining wall.	28˚10.156'	76˚55.919'	9.80	-	4632	6948	No.	1 no	4.00	4.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.
4	Plantation in school,Panchayat land.	28˚10.738'	76˚55.431'	-	-	-	-	Hect.	1.0	0.40	0.40	To increase biomass cover
								Total cost			8.40	
								Available funds			6.92	
								Convergence			1.48	

Name of Project: IWMP I		**Name of Watershed: Sunari**							**Name of Village : Bhogipur**			
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (ha)	Storage Capacity(Ha-m)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Gully plug	28˚10.549'	76˚55.123'	4.50	-	2127	3191	No	1 no	1.00	1.00	Water harvesting &Ground water recharging,Check of soil erosion.
2	Renovation / Desilting of old Silt Detention Dam.	28˚10.552'	76˚55.125'	6.60	0.50	3120	4679	No	1no	3.00	3.00	Water harvesting &Ground water recharging,Check of soil erosion.
3	Renovation of pond construction of Ramp	28˚10.446'	76˚54.917'	19.80	2.30	9359	14038	No.	1no	4.00	4.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.
4	Plantation in school,Panchayat land.	28˚10.446'	76˚54.917'	-	-	-	-	Hect.	1.0	0.40	0.40	To increase biomass cover
							Total cost				8.40	
							Available funds				6.32	
							Convergence				2.08	

Name of Project: IWMP I		**Name of Watershed: Sunari**							**Name of Village : Naharpur**		
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity (cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Gully plug	28˚10.844'	76˚55.315'	3.50	-	1654	2482	No	2 no	1.00	2.00	Water harvesting &Ground water recharging,Check of soil erosion.
2	Renovation / Desilting of old Silt Detention Dam.	28˚10.653'	76˚55.123'	11.20	1.00	5294	7941	No	1no	3.00	3.00	Water harvesting &Ground water recharging,Check of soil erosion.
								Total cost			5.00	
								Available funds			3.96	
								Convergence			1.04	

Name of Project: IWMP I		**Name of Watershed: Sunari**							**Name of Village : Subasri**			
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (ha)	Storage Capacity(Ha-m)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp	28˚10.607'	76˚54.324'	21.00	2.00	9926	14889	No.	1no	3.00	3.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.
2	Roof Rain water harvesting in G.Middle School	28˚18.799'	76˚54.685'	0.07	-	-	-	No.	1 no	2.50	2.50	Water harvesting &Ground water recharging.
							Total cost				5.50	
							Available funds				3.70	
							Convergence				1.80	

Name of Project: IWMP I		**Name of Watershed: Sunari**						**Name of Village : Kangraka**			
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Gully plug	28˚11.353'	76˚55.463'	7.50	-	3545	5318	No	2 no	1.00	2.00	Water harvesting &Ground water recharging,Check of soil erosion.
2	Renovation of pond construction of Ramp	28˚10.950'	76˚55.463'	14.80	2.00	6995	10493	No.	1no	5.00	5.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.
3	Land levelling *	28˚10.850'	76˚55.345'		-	-	-	Hect.	3.0	0.75	2.25	To level the panchayat land &to increase the income of the panchayat.
	Total cost										9.25	
	Available funds										7.73	
	Convergence										1.52	

*** Before executing detail topographic survey and assessment must be carried out before implementation.**

Name of Project: IWMP I		**Name of Watershed: Sunari**									**Name of Village : Sewka**
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp	28˚11.052'	76˚53.547'	6.00	-	2836	4254	No.	1no	3.00	3.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.
2	Renovation of pond construction of Ramp and retaing wall	28˚11.148'	76˚53.687'	13.00	1.50	6145	9217	No.	1no	4.00	4.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.
3	Diversion channel / pipeline	28˚11.145'	76˚53.689'	8.00	-	-	-	No.	1 no	2.00	2.50	To check flooding in low lying area and to feed water to village pond.
										Total cost	9.50	
										Available funds	8.40	
										Convergence	1.10	

Name of Project: IWMP I		**Name of Watershed: Sunari**							**Name of Village : Raniyaki**		
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp & Retaining wall	28˚11.243'	76˚54.448'	15.00	2.10	7100	10600	No.	1no	5.00	5.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.
2	Roof Rain water harvesting in G.Middle School	28˚11.098'	76˚56.409'	0.05	-	-	-	No.	1no	2.50	2.50	Water harvesting &Ground water recharging.
3	Diversion channel / pipeline inlet &outlet pond	28˚11.245'	76˚54.450'	4.00	-	-	-	No.	1 no	3.00	3.00	To check flooding in low lying area and to feed water to village pond.
4	Plantation in school,Panchayat land.	28˚11.099'	76˚54.410'	-	-	-	-	Hect.	2.0	0.40	0.80	To increase biomass cover
								Total cost			11.30	
								Available funds			9.07	
								Convergence			2.23	

Name of Project: IWMP I		**Name of Watershed: Sunari**										**Name of Village : Gurnawat**
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp.	28˚11.85'	76˚54.917'	13.00	2.50	6145	9217	No.	1 no	4.00	4.00	To provide drinking water for animals, Irrigation to fields, checking of soil erosion.& Ground water recharging.
2	Excavation of pond construction of Ramp	28˚11.617'	76˚55.075'	10.00	-	4727	7090	No.	1 no	3.00	3.00	To provide drinking water for animals,checking of soil erosion. & Ground water recharging.
3	Gully plug	28˚11.785'	76˚54.752'	6.00	-	2836	4254	No	2 no	1.00	2.00	Water harvesting &Ground water recharging, Check of soil erosion.
4	Renovation / Desilting of old Silt Detention Dam &Injection well	28˚11.479' 28˚11.479'	76˚55.285' 76˚55.285'	35.00	- 4.00	16543	24815	No	1 no	5.00	5.00	Water harvesting &Ground water recharging, Check of soil erosion.
5	Land levelling *	28˚11.479'	76˚55.285'	-	-	-	-	Hect.	2.0	0.75	1.50	To level the panchayat land &to increase the income of the panchayat.
	Total cost										15.50	
	Available funds										9.21	
	Convergence										6.29	

Name of Project: IWMP I		**Name of Watershed: Sunari**						**Name of Village : Bharangapur**			
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity (cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Gully plug	28˚11.417'	76˚55.580'	4.50	-	2127	3191	No	1 no	1.00	1.50	Water harvesting &Ground water recharging,Check of soil erosion.
2	Renovation of pond construction of Ramp &Retaining wall	28˚11.585'	76˚55.699'	14.80	2.00	6995	10493	No.	1no	5.00	5.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.
3	Roof Rain water harvesting in G.Middle School	28˚11.798'	76˚55.838'	0.03	-	-	-	No.	1 no	2.50	2.00	Water harvesting &Ground water recharging.
							Total cost				8.50	
							Available funds				7.39	
							Convergence				1.11	

Name of Project: IWMP I		**Name of Watershed: Sunari**							**Name of Village : Chundhika**			
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (ha)	Storage Capacity (Ha-m)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Diversion channel / pipeline	28˚12.384'	76˚54.399	4.00	-	-	-	No.	1 no	2.50	2.50	To check flooding in low lying area and to feed water to village pond.
2	Renovation of pond construction of Ramp &Retaining wall	28˚12.389'	76˚54.401'	14.80	2.00	2127	3191	No.	1no	4.00	4.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.
3	Plantation in school,Panchayat land.	28˚12.379'	76˚54.384'	-	-	-	-	Hect.	1.0	0.40	0.40	To increase biomass cover
								Total cost			6.90	
								Available funds			5.71	
								Convergence			1.19	

Name of Project: IWMP I												**Name of Watershed: Sunari**	**Name of Village : Nizampur**
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective	
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)			
1	Renovation of pond construction of Ramp. & Retaining wall. Near p.w.d road.	28˚12.447'	76˚55.391'	13.00	2.10	6145	9217	No.	1 no	5.00	5.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.	
2	Gully plug	28˚12.609'	76˚54.958'	6.00	-	2836	4254	N	1 no	1.00	1.00	Water harvesting &Ground water recharging,Check of soil erosion.	
3	Roof Rain water harvesting in G.MiddleSchool	28˚12.430'	76˚55.310'	0.03	-	-	-	No.	1 no	3.00	3.00	Water harvesting &Ground water recharging.	
4	Renovation / Desilting of old Silt Detention Dam.	28˚12.547'	76˚54.855'	20.00	2.00	9453	14180	No	1 no	4.00	4.00	Water harvesting &Ground water recharging,Check of soil erosion.	
5	Plantation in school,Panchayat land.	28˚12.609'	76˚54.958'	-	-	-	-	Hect.	1.0	0.40	0.40	To increase biomass cover	
										Total cost	13.40		
										Available funds	11.76		
										Convergence	1.64		

Name of Project: IWMP I		**Name of Watershed: Sunari**									**Name of Village : Khori kalan**
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (ha)	Storage Capacity(Ha-m)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp &Retaining wall.	28˚12.790	76˚52.814'	12.00	1.00	5672	8508	No.	1 no	5.00	5.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.& Ground water recharging.
2	Excavation of pond construction of Ramp & Retaining wall	28˚13'219	76˚12.733'	10 .00	2.00	4727	7090	No.	1 no	5.00	5.00	To provide drinking water for animals, checking of soil erosion.& Ground water recharging.
3	Check Dam	28˚12.950'	76˚52.760'	20.00	-	-	-	Cum	200	0.02	4.00	Water harvesting &Ground water recharging,Check of soil erosion.
4	Gully plug	28˚13.247'	76˚52.247'	7.00	-	3309	4963	No	2 no	1.00	2.00	Water harvesting &Ground water recharging,Check of soil erosion.
5	Diversion channel / pipeline on face of G.School	28˚09.810'	76˚54.415'	10.00	-	-	-	No.	1 no	5.00	5.00	To check flooding in low lying area and to feed water to village pond.
	Total cost										21.50	
	Available funds										18.61	
	Convergence										2.89	

Name of Project: IWMP I		**Name of Watershed: Sunari**									**Name of Village : Khori kurd**
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity (cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp &Retaining wall.	28˚13.504'	76˚53.102'	10.00	1.00	4727	7090	No.	1 no	5.00	4.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.
2	Check Dam	28˚13.539'	76˚52.927'	10.00	-	4727	7090	Cum	150	0.02	3.00	Water harvesting &Ground water recharging,Check of soil erosion.
3	Gully plug	28˚13.247'	76˚52.247'	7.00	-	3309	4963	No	1no	1.00	1.00	Water harvesting &Ground water recharging,Check of soil erosion.
4	Diversion channel / pipeline on face of G.School	28˚13.400'	76˚52.807'	5.00	-	-	-	No.	1 no	4.00	4.00	To check flooding in low lying area and to feed water to village pond.
								Total cost			12.00	
								Available funds			10.42	
								Convergence			1.58	

Name of Project: IWMP I		**Name of Watershed: Sunari**				**Name of Village :Rangala**						
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (ha)	Storage Capacity(Ha-m)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp &Retaianing wall.	28˚13.586	76˚52.607'	13.00	1.00	6145	9217	No.	1 no	5.00	5.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.
2	Renovation / Desilting of old Silt Detention Dam.	28˚13.554'	76˚52.240'	22.00	2.00	10399	15598	No	1 no	4.00	4.00	Water harvesting &Ground water recharging,Check of soil erosion.
3	Check Dam	28˚13.608'	76˚52.132'	16.00	-	-	-	Cum	300	0.02	6.00	Water harvesting &Ground water recharging,Check of soil erosion.
4	Gully plug	28˚13.525'	76˚52.217'	6.00	-	2836	4254	No	8no	1.00	2.00	Water harvesting &Ground water recharging,Check of soil erosion.
5	Plantation in panchayat land	28˚13.580'	76˚52.296'	-	-	-	-	Hect.	5.0	0.40	2.00	To increase biomass cover
6	Land levelling*.	28˚13.530'	76˚52.130'	-	-	-	-	Hect.	2.0	0.75	1.50	To level the panchayat land &to increase the income of the panchayat.
	Total cost										20.50	
	Available funds										19.35	
	Convergence										1.15	

* **Before executing Land Leveling, Topographical Survey indicating levels be carried out.**

Name of Project: IWMP I												**Name of Watershed: Sunari**	**Name of Village : Sunari**
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity (cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective	
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)			
1	Renovation of pond construction of Ramp &Retaianing wall.	28˚13.197	76˚54.116'	11.00	1.00	5199	7799	No.	1 no	5.00	5.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion.&Ground water recharging.	
2	Renovation / Desilting of old Silt Detention Dam.	28˚13.385'	76˚54.100'	19.00	-	8981	13471	No	1 no	300	3.00	Water harvesting &Ground water recharging,Check of soil erosion.	
3	Plantation in panchayat land	28˚15.190'	76˚52.614	-	-	-	-	Hect.	5.0	0.40	2.00	To increase biomass cover	
4	Diversion channel / pipeline.on face of hill.	28˚15.193	76˚52.598	5.00	-	-	-	No.	1 no	5.00	5.00	To check flooding in low lying area and to feed water to village pond.	
										Total cost	15.00		
										Available funds	14.45		
										Convergence	1.55		

Name of Project: IWMP I				**Name of Watershed: Sunari**							**Name of Village : Utton**	
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp & Retaining wall.	28˚15.058	76˚52.642'	15.00	-	7090	10635	No.	1 no	5.00	5.00	To provide drinking water for animals, checking of soil erosion & Ground water recharging.
2	Renovation / Desilting of old Silt Detention Dam.	28˚15.060'	76˚52.631'	8.00	-	3781	5672	No	1 no	300	3.00	Water harvesting &Ground water recharging, Check of soil erosion.
3	Gully plug	28˚13.370'	76˚54.745'	7.00	-	3309	4963	No	3 no	1.00	3.00	Water harvesting &Ground water recharging, Check of soil erosion.
4	Diversion channel / pipeline on side of phirni. & Injection well.	28˚13.200'	76˚54.150'	5.00	-	-	-	No.	1 no	5.00	5.00	To check flooding in low lying area and to feed water to village pond.
5	Land levelling *in panchayat land.	28˚15.225'	76˚52.700'	-	-	-	-	Hect.	2.0	0.75	1.50	To level the panchayat land &to increase the income of the panchayat.
										Total cost	17.50	
										Available funds	15.39	
										Convergence	2.11	

Name of Project: IWMP I		**Name of Watershed: Sunari**							**Name of Village : Rathiwas**			
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity(cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp &Retaining wall.	28˚14.273	76˚52.148	21.00	-	9926	14889	No.	1 no	5.00	5.00	To provide drinking water for animals, checking of soil erosion.& Ground water recharging.
2	Renovation / Desilting of old Silt Detention Dam.	28˚14.083'	76˚51.955	5.00	-	2363	3545	No	1 no	300	3.00	Water harvesting &Ground water recharging, Check of soil erosion.
3	Gully plug	28˚14.126'	76˚52.101'	8.00	-	3781	5672	No	3 no	1.00	3.00	Water harvesting &Ground water recharging, Check of soil erosion.
4	Diversion channel / pipeline on side of phirni.&Injection well.	28˚14.531'	76˚52.271'	5.00	-	-	-	No.	1 no	6.00	6.00	To check flooding in low lying area and to feed water to village pond.
5	Plantation in panchayat land	28˚14.253'	76˚52.115'	-	-	-	-	Hect.	5.0	0.40	2.00	To increase biomass cover
	Total cost										19.00	
	Available funds										18.48	
	Convergence										0.52	

Name of Project: IWMP I		**Name of Watershed: Sunari**							**Name of Village : Jourasi**		
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sqm)	Storage Capacity (cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp &Retaining wall.	28˚14.080'	76˚54.849'	18.00	-	8508	12762	No.	1 no	4.50	4.50	To provide drinking water for animals, , checking of soil erosion.&Ground water recharging.
2	Excavation of pond. of Ramp &Retaining wall.	28˚13.995	76˚54.842	12.00	-	5672	8508	No.	1 no	5.50	5.50	To provide drinking water for animals, , checking of soil erosion.&Ground water recharging.
3	Gully plug	28˚14.410'	76˚54.565'	700	-	330867	496300	No	5no	1.00	5.00	Water harvesting &Ground water recharging,Check of soil erosion.
4	Renovation / Desilting of old Silt Detention Dam.	28˚14.425'	76˚54.590	45.00	-	21270	31905	No	5 no	2.00	10.00	Water harvesting &Ground water recharging,Check of soil erosion.
5	Check Dam	28˚14.450'	76˚54.520'	16.00	-	-	-	Cum	300	0.02	6.00	Water harvesting &Ground water recharging,Check of soil erosion.
6	Diversion channel / pipeline on side of phirni.&Injection well.	28˚14.117	76˚54.769	5.00	-	-	-	No.	1 no	6.00	6.00	To check flooding in low lying area and to feed water to village pond.
7	Diversion channel / pipeline	28˚14.410'	76˚54.564'	6.00	-	-	-	No.	1 no	5.00	5.00	To check flooding in low lying area and to feed water to

	.near Bank											village pond.
8	Plantation in panchayat land	28˚13.995'	76˚54.842'	-	-	-	-	Hect.	3.0	0.40	1.20	To increase biomass cover
9	Land levelling* in panchayat land.	28˚14.422'	76˚54.072'	-	-	-	-	Hect.	6.0	0.75	4.50	To level the panchayat land &to increase the income of the panchayat.
										Total cost	47.70	
										Available funds	46.37	
										Convergence	1.33	

*** Before executing Land Leveling, Topographical Survey indicating levels be carried out.**

Name of Project: IWMP I		**Name of Watershed: Sunari**							**Name of Village : Fatehpur**		
Sr. No.	Nature of work	Location		Catchment Area (ha)	Command Area (ha)	Submergence Area (sq m)	Storage Capacity (cum)	Unit	No. of work		Estimate cost Rs. in lacs	Objective
		Latitude (N)	Longitude (E)						Phy/ Area	Unit cost (Rs. in Lacs)		
1	Renovation of pond construction of Ramp &Retaining wall'	28˚25.612	76˚90.809	17.00	200	8035	12053	No.	1 no	4.00	4.00	To provide drinking water for animals, Irrigation to fields , checking of soil erosion. & Ground water recharging.
2	Excavation of pond construction of Ramp &Retaining wall	28˚25.265	76˚90.928	10.00	-	4727	7090	No.	1 no	3.00	5.00	To provide drinking water for animals, checking of soil erosion.& Ground water recharging.
3	Diversion channel / pipeline on the face of vijay kumar to near nala	28˚25.410'	76˚90.912'	3.00	-	-	-	No.	1 no	3.00	3.00	To check flooding in low lying area and to feed water to village pond.
4	Roof Rain water harvesting in G.MiddleSchool	28˚25.625'	76˚91.003'	0.03	-	-	-	No.	1 no	3.00	3.00	Water harvesting &Ground water recharging.
5	Land levelling *in panchayat land	28˚16.897'	76˚57.849'	-	-	-	-	Hect.	3.0	0.75	2.25	To level the panchayat land &to increase the income of the panchayat.
								Total cost			17.25	

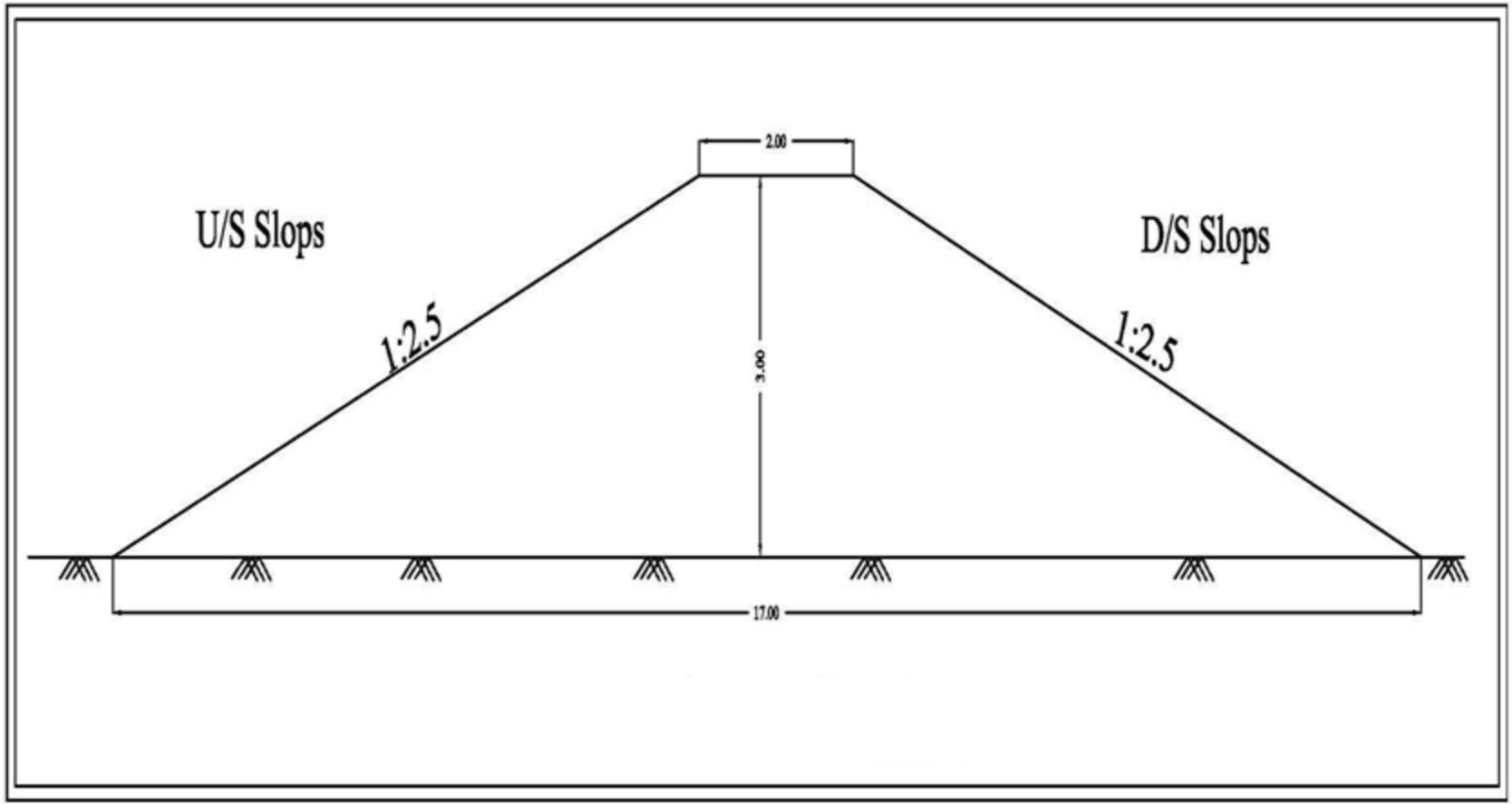
		Available funds	15.12	
		Convergence	2.13	

* **Before executing Land Leveling, Topographical Survey indicating levels be carried out.**

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-	1344.00	Rs.586.60 + 350% C.	100	35477.57

	ment undressed including breaking of Clods. H.S.R. 6.2 (b)	cum	Prem.= 2639.70	cum	
4	Extra for admixture for single or kanker Exceeding 30% but up to 40%. H.S.R. 6.2 (h) ii	1344.00 cum	Rs. 318.55 + 350% C. Prem.= 1433.48	100 cum	19265.97
5	Extra for every 7.5 meter additional lead beyond 60mt but up to 255 m by the animal or animal driven cart (5 leads) H.S.R. 6.2 (c) (ii)	1344.00 cum	[(15.00 x 5 No.)+ 350% C. Prem.= 337.50	100 cum	4536.00
6	Dressing of earthwork H.S.R. 6.3 (i)	1344.00 cum	Rs.45.90 + 350 % C. Prem.= 206.55	100 cum	2776.03
Total =					**74243.4712**
Add Contingency at the rate of 3% =					2227.30
Grand Total =					**76470.78**

Table. 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**

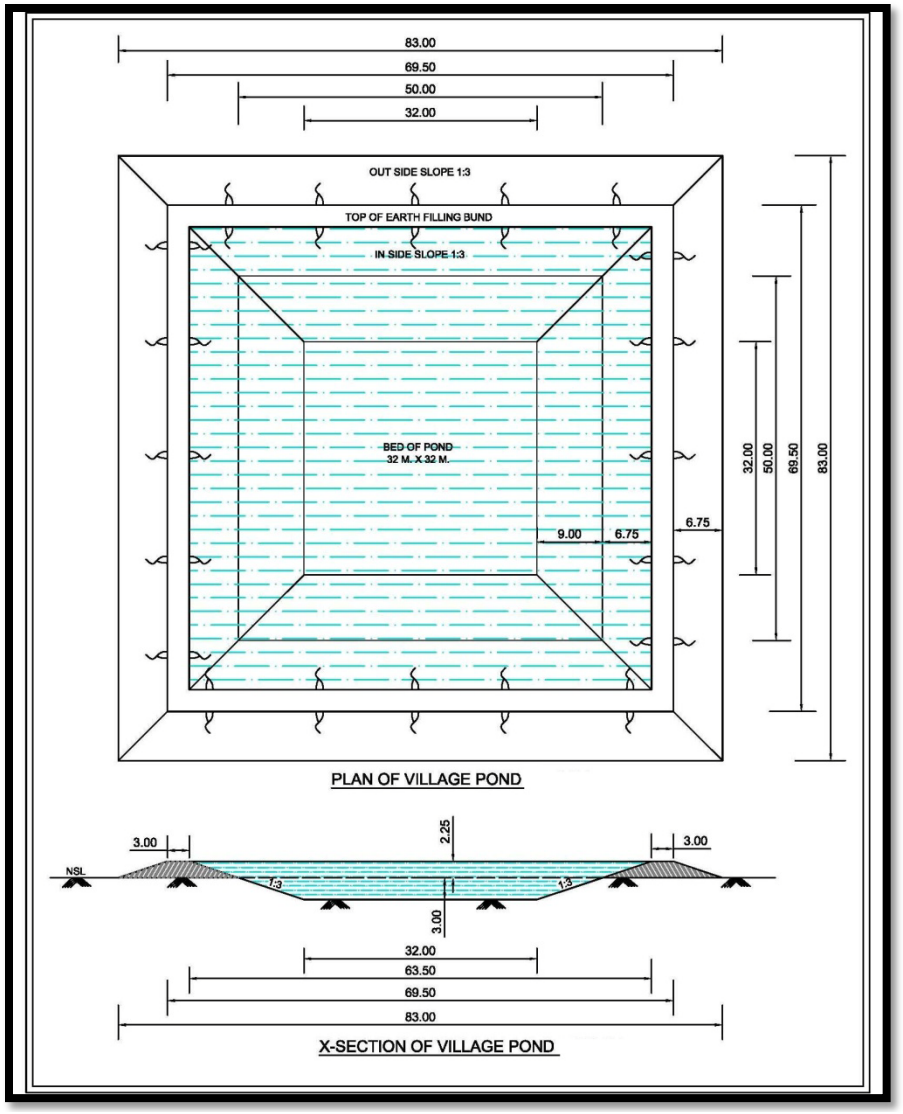

83.00
69.50
50.00
32.00
OUT SIDE SLOPE 1:3
TOP OF EARTH FILLING BUND
IN SIDE SLOPE 1:3
BED OF POND
32 M. X 32 M.
9.00
6.75
6.75
32.00
50.00
69.50
83.00
PLAN OF VILLAGE POND
3.00
2.25
3.00
NSL
1:3
1:3
3.00
32.00
63.50
69.50
83.00
X-SECTION OF VILLAGE POND

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 563 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 villages	No. of beneficiaries per village	No. of total beneficiaries	Cost per beneficiaries	Total
1	Vermi Compost	Vermi compost is organic matter that is decomposed and recycled, used as fertilizer for soil amendment which is a key ingredient in organic farming. Under IWMP, financial assistance of 25% of total cost of Rs. 24000/- is provided.	24	10	240	6000	1440000
2	Green Manuring	Addition of organic matter required, which is deficient in project area. Under IWMP, financial assistance @ Rs. 500 for 20 Kg.s per farmer for 2 Acre (0.8 ha) holding is provided.	24	30	720	500	360000
3	Bio-fertilizers	For integrated nutrient management (combination of chemical fertilizers, organic manure, crop residue and nitrogen fixing. Under IWMP, financial assistance @ Rs. 40 per farmer for 2 Acre (0.8 ha) holding is provided.	24	100	2400	40	96000

S. No.	Particulars	Contents	No. of villages	No. of beneficiaries per village	No. of total beneficiaries	Cost per beneficiaries	Total
4	Pest-Management	For integrated pest Management, the bio control technique has been reported eco-friendly for control of pests. A provision of Azadirachtin bio pesticide @ Rs. 250/lit. per farmer is provided.	24	80	1920	250	480000
5	Sprinkler irrigation	Sprinkler irrigation is a method of applying irrigation water which is similar to natural rainfall. Under IWMP, financial assistance @ 25% of Rs. 30000/- or price fixed by agriculture department is provided.	24	5	120	7500	900000
6	Drip Irrigation	Drip Irrigation is an irrigation method that saves water and fertilizer by allowing water to drip slowly to the roots of plants. Under IWMP, financial assistance @ 10% of Rs. 58000 per ha for horticulture fixed by Agriculture Department is provided.	24	5	120	5800	696000
7	Lazer Leveling	Lazer Leveling is one such proven technology that is highly useful in conversation of irrigation water. Under IWMP, financial assistance @ 30% of Rs. 1075 per farmer is provided	24	80	1920	322.5	619200

S. No.	Particulars	Contents	No. of villages	No. of beneficiaries per village	No. of total beneficiaries	Cost per beneficiaries	Total
8	Kitchen Gardening	To facilitate with inputs, seeds and equipments etc., for development of Kitchen Gardening. Under IWMP, financial assistance @ Rs. 50 per farmer per season (Rs. 100 per year) is provided.	24	110	2640	100	264000
9	Horticulture	Potential for Grafted Horticulture plants. Supply of plants @ Rs. 40/- per plant under IWMP 50 % cost share for cultivation of fruits like Citrus fruits, Guava, Amla, Ber floriculture and vegetables (especially, turmeric, garlic, onion and tomato)	24	45	1080 (10800 plants)	Rs.20 per plant	216000
Total							5071200
Contingency, printing material other unforeseen items							28800
Total fund available under this component							5100000

The provision of additional subsidy component under IWMP would be utilized by linking with the line department.

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 HSRLM pattern and it is proposed to impart them trainings at Krishi Vigyan Kender (CCSHAU) Mewat 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.

The scheme would be implemented in phased manner in the project area and the project implementation agency will co-ordinate with the Community Resource Persons(CRP) already posted at the grass root level under Haryana State Rural Livelihood Mission(HSRLM). The SHG should follow five Sutras i.e.

1. Regular Meetings
2. Financial saving in the meetings
3. Internal Lending
4. Regular Recovery.
5. Proper maintenance of Account books.

Based on the above five Sutras, grading of SHG should be done.

The following activities are proposed in consultation with the Watershed committees.

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	Silkhoh	3	3	25000	75000
2	Chilawali	4	4	25000	100000
3	Naharpur	5	5	25000	125000
4	Gurnawat	4	4	25000	100000
5	Khori Kalan	2	2	25000	50000
6	Rangala	2	2	25000	50000
7	Jaurasi	1	1	25000	25000
8	Uton	3	3	25000	75000
	Total	**24**	**24**		**600000**

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	Silkhoh	3	3	35000	105000
2	Chilawali	4	4	35000	140000
3	Naharpur	5	5	35000	175000
4	Gurnawat	4	4	35000	140000
5	Khori Kalan	2	2	35000	70000

6	Rangala	2	2	35000	70000
7	Jaurasi	1	1	35000	35000
8	Uton	3	3	35000	105000
	Total	**24**	**24**		**840000**

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 watersheds	No. of villages	No. of Persons in micro watershed	Amount of Training per trainee for 6 month	Total
1	Silkhoh	3	6	10000	60000
2	Chilawali	4	8	10000	80000
3	Naharpur	5	10	10000	100000
4	Gurnawat	4	8	10000	80000
5	Khori Kalan	2	4	10000	40000
6	Rangala	2	4	10000	40000
7	Jaurasi	1	2	10000	20000
8	Uton	3	6	10000	60000
	Total	**24**	**48**		**480000**

Note: The beneficiaries will contribute 10% as cost sharing of the livelihood support programme Rs. 480000 @ 10% cost sharing.

= 480000- 48000

= 432000/-

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	Silkhoh	3	3	25000	75000
2	Chilawali	4	4	25000	100000
3	Naharpur	5	5	25000	125000
4	Gurnawat	4	4	25000	100000
5	Khori Kalan	2	2	25000	50000
6	Rangala	2	2	25000	50000
7	Jaurasi	1	1	25000	25000
8	Uton	3	3	25000	75000
	Total	**24**	**24**		**600000**

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. 600000 @ 10% cost sharing.

= 600000- 60000
= 540000/-

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	Silkhoh	3	3	6	2000	6	36000
2	Chilawali	4	4	8	2000	6	48000
3	Naharpur	5	5	10	2000	6	60000
4	Gurnawat	4	4	8	2000	6	48000

5	Khori Kalan	2	2	4	2000	6	24000
6	Rangala	2	2	4	2000	6	24000
7	Jaurasi	1	1	**2**	2000	6	**12000**
8	Uton	3	3	**6**	2000	6	**36000**
	Total	**24**	**24**	**48**			**288000**

Total cost for 24 Centres

1. Payment to trainers 288000/-
2. Sewing Machine Cost 288000/- @ Rs. 6000 per machine
3. Total cost 576000/-

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	Silkhoh	3	3	2000	6	12000	3	36000
2	Chilawali	4	4	2000	6	12000	4	48000
3	Naharpur	5	5	2000	6	12000	5	60000
4	Gurnawat	4	4	2000	6	12000	4	48000
5	Khori Kalan	2	2	2000	6	12000	2	24000
6	Rangala	2	2	2000	6	12000	2	24000
7	Jaurasi	1	1	2000	6	12000	1	**12000**
8	Uton	3	3	2000	6	12000	3	**36000**
	Total	**24**	**24**				**24**	**288000**

Payment to trainer: Rs.288000/-

Cost of machines: Rs. 480000/- @ Rs. 20000 per machine

Total cost: Rs. 768000/-

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	Fish Farming
1	Silkhoh	3	3	9	3
2	Chilawali	4	4	12	4
3	Naharpur	5	5	15	5
4	Gurnawat	4	4	12	4
5	Khori Kalan	2	2	6	2
6	Rangala	2	2	6	2
7	Jaurasi	1	1	3	1
8	Uton	3	3	9	3
	Total	**24**	**24**	**72**	**24**
	Rate (Rs)		**2400**	**2400**	**24000**
	Cost (Lakh Rs)		**0.576**	**1.728**	**5.76**

Contingency, printing material and other unseen items: Rs. 27600/-

Total funds available under this component are Rs. 459000/-

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), Mewat

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	Silkhoh	40.30	33.26	7.04	7.04
2	Chilawali	35.15	27.22	7.93	7.93
3	Naharpur	40.75	32.86	7.89	7.89
4	Gurnawat	44.30	34.07	10.23	10.23
5	Khori Kalan	33.50	29.03	4.47	4.47
6	Rangala	35.50	33.80	1.70	1.70
7	Jaurasi	47.70	46.37	1.33	1.33
8	Uton	53.76	48.99	4.77	4.77
		330.96	**285.60**	**45.36**	**45.36**

- 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 63.5 ha horticulture development programme with the financial assistance of Rs. 31.75 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	Silkhoh	495	59,40,000	59,400
2	Chilawali	405	48,60,000	48,600
3	Naharpur	489	58,68,000	58,680
4	Gurnawat	507	60,84,000	60,840
5	Khori Kalan	432	51,84,000	51,840
6	Rangala	503	60,36,000	60,360
7	Jaurasi	690	82,80,000	82,800
8	Uton	729	87,48,000	87,480

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	Silkhoh	495	59,40,000	59,400
2	Chilawali	405	48,60,000	48,600
3	Naharpur	489	58,68,000	58,680
4	Gurnawat	507	60,84,000	60,840
5	Khori Kalan	432	51,84,000	51,840
6	Rangala	503	60,36,000	60,360
7	Jaurasi	690	82,80,000	82,800
8	Uton	729	87,48,000	87,480

CONSOLIDATION PHASE- 3 %

Consolidation Phase = Rs. 15, 30,000 /-

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: Silkhoh

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	0.35
2	Preparation of Project completion report	0.09
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.27
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.89

Total: 1.78 lacs

Name of Micro watershed: Chilawali

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	0.29
2	Preparation of Project completion report	0.08
3	Documentation of success stories	0.07
4	Management of proper utilization of WDF	0.22
5	Mechanism for quality and sustainability issues under the Project	0.07
6	Watershed activities	0.73

Total: 1.46 lacs

Name of Micro watershed: Naharpur

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	0.35
2	Preparation of Project completion report	0.09
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.26
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.88

Total: 1.76 lacs

Name of Micro watershed: Gurnawat

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	0.37
2	Preparation of Project completion report	0.09
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.27
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.92

Total: 1.83 lacs

Name of Micro watershed: Khori Kalan

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	0.31
2	Preparation of Project completion report	0.08
3	Documentation of success stories	0.08
4	Management of proper utilization of WDF	0.23
5	Mechanism for quality and sustainability issues under the Project	0.08
6	Watershed activities	0.78

Total: 1.56 lacs

Name of Micro watershed: Rangala

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	0.36
2	Preparation of Project completion report	0.09
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.27
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.91

Total: 1.81 lacs

Name of Micro watershed: Jaurasi

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	0.50
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: 2.48 lacs

Name of Micro watershed: Uton

Table 10. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. In lacs)
1	Managing/ upgrading of all activities taken up under the project	0.52
2	Preparation of Project completion report	0.14
3	Documentation of success stories	0.13
4	Management of proper utilization of WDF	0.39
5	Mechanism for quality and sustainability issues under the Project	0.13
6	Watershed activities	1.31

Total: 2.62 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 4250 ha and the Project Cost is 510.00 lacs covering 8 no. micro watersheds and in all 24 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 Sunari 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 Delhi, Gurgaon Industrial Complex**.**

Table 1. Expected Employment Generation in the Project area

S. No.	Name of micro watersheds	Wage employment						Self employment			
		No of man days			No. of Beneficiaries			No. of Beneficiaries			
		SC	others	Total	SC	others	Total	SC	others	Women	Total
1	Silkhoh	639	4683	5322	80	585	665	11	11	11	33
2	Chilawali	671	3684	4355	84	461	544	11	11	22	44
3	Naharpur	862	4396	5258	108	550	657	11	22	22	55
4	Gurnawat	425	5026	5451	53	628	681	22	11	11	44
5	Khori Kalan	797	3848	4645	100	481	581	-	11	11	22
6	Rangala	876	4532	5408	110	567	676	11	-	11	22
7	Jaurasi	1269	6150	7419	159	769	927	11	-	-	11
8	Uton	1639	6307	7946	205	788	993	11	11	11	33
	Total	7178	38626	45804	897	4828	5726	**88**	**77**	**99**	**264**

45804 man days would be generated with the implementation of the project in Sunari Watershed (IWMP I), which means 90 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 Sunari 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	Silkhoh	481	241	70	35	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
2	Chilawali	484	242	90	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
3	Naharpur	766	383	90	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
4	Gurnawat	923	462	80	40	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
5	Khori Kalan	339	170	90	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
6	Rangala	638	319	80	40	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
	Jaurasi	599	300	120	60	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
	Uton	715	358	90	45	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 13 to 32 m.

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

Sr. No.	Name of Micro Watersheds	Name of Villages	Ground Water Table level (m)
1	Sikhoh	Silkhoh	30.40
2		Nanuka	30.40
3		Thana Alam Alias Masit	30.40
4	Chilawali	Chilawali	30.40
5		Saidpur	30.40
6		Mundarka	30.40
7		Bhogipur	21.85
8	Naharpur	Naharpur	--
9		Subasheri	21.85
10		Kangarka	30.40
11		Sewka	21.85
12		Raniaki	21.85

13	Gurnawat	Gurnawat	23.10
14		Bharangpur	32.65
15		Chundhika	23.10
16		Nijampur Taoru	32.65
17	Khori Kalan	Khori Kalan	25.72
18		Khori Khurd	25.72
19	Rangala	Rangala	25.72
20		Sunari	23.10
21	Jaurasi	Jaurasi	13.05
22	Uton	Uton	13.05
23		Fatehpur	13.05
24		Rathiwas	13.05

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 Sunari Watershed (IWMP I)

Name of	Name of	Pre project	Total	Total	Expected post	Total	Total

Micro-Watersheds	Crops			Production(in Kg)	Value Rs (in lacs)	project		Production (in Kg)	Value Rs (in lacs)
		Area ha	Average yield Kg. Per ha			Area ha	Average yield Kg. Per ha		
Silkhoh	Wheat	191	2851	544541	76.24	210	3136	658895	92.25
	Oilseed	168	1175	197400	69.09	185	1293	238854	83.60
	Bajra	342	1562	534204	66.78	376	1718	646387	80.80
Chilawali	Wheat	218	2835	618030	86.52	240	3119	747816	104.69
	Oilseeds	120	1140	136800	47.88	132	1254	165528	57.93
	Bajra	314	1554	487956	60.99	345	1709	590427	73.80
Naharpur	Wheat	274	2836	777064	108.79	301	3120	940247	131.63
	Oilseeds	151	1162	175462	61.41	166	1278	212309	74.31
	Bajra	372	1570	584040	73.01	409	1727	706688	88.34
Gurnawat	Wheat	433	2829	1224957	171.49	476	3112	1482198	207.51
	Oilseeds	68	1141	77588	27.16	75	1255	93881	32.86
	Bajra	388	1567	607996	76.00	427	1724	735675	91.96
Khori Kalan	Wheat	232	2820	654240	91.59	255	3102	791630	110.83
	Oilseeds	72	1143	82296	28.80	79	1257	99578	34.85
	Bajra	203	1573	319319	39.91	223	1730	386376	48.30
Rangala	Wheat	416	2847	1184352	165.81	458	3132	1433066	200.63
	Oilseeds	108	1151	124308	43.51	119	1266	150413	52.64
	Bajra	453	1572	712116	89.01	498	1729	861660	107.71
Jaurasi	Wheat	399	2863	1142337	159.93	439	3149	1382228	193.51
	Oilseeds	201	1148	230748	80.76	221	1263	279205	97.72
	Bajra	392	1534	601328	75.17	431	1687	727607	90.95
Uton	Wheat	584	2838	1657392	232.03	642	3122	2005444	280.76
	Oilseeds	129	1548	199692	69.89	142	1703	241627	84.57
	Bajra	643	1561	1003723	125.47	707	1717	1214505	151.81
Total				13877889	2127.25			16792246	2573.97

Source: Revenue Department and Department of Agriculture, Mewat (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	Silkhoh	1	5.5	6.5
2	Chilawali	5.5	9.5	15.0
3	Naharpur	5.5	10.5	16.0
4	Gurnawat	18.5	14.5	33.0
5	Khori Kalan	29.0	7.5	36.5
6	Rangala	2.0	5.0	7.0
7	Jaurasi	5.5	4.0	9.5
8	Uton	2	7.0	9.0
		69	**63.5**	**132.5**

9.6 AFFORESTATION/ VEGETATIVE COVER

Table 6. Pre and post project forest and vegetative cover

S.No.	Name of micro watersheds	Existing area under tree covered, ha	Area under tree cover proposed ha	Total
1	Silkhoh	4.75	3.5	8.25
2	Chilawali	6.75	3.75	10.5

3	Naharpur	10.75	5.25	16
4	Gurnawat	8.0	5.5	13.5
5	Khori Kalan	5.25	4	9.25
6	Rangala	17	7	24
7	Jaurasi	2.5	1.5	4
8	Uton	7	3.5	10.5
		62	34	96

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	Silkhoh	Buffalo	298	7-10	580-400	343	9-12	378-504	Increase in milk yield and number of animals by approx. 15%
		Cow	141	5-6	75-90	162	7-8	140-160	Increase in milk yield and number of animals by approx. 15%
2	Chilawali	Buffalo	254	8-10	320-400	292	10-12	420-504	Increase in milk yield and number of animals by approx. 15%
		Cow	78	6-7	90-105	90	8-9	160-180	Increase in milk yield and number of animals by approx. 15%
3	Naharpur	Buffalo	516	10-11	400-440	593	12-13	504-546	Increase in milk yield and number of animals by approx. 15%
		Cow	109	5-6	75-90	125	7-8	140-160	Increase in milk yield and number of animals by approx. 15%
4	Gurnawat	Buffalo	522	8-10	320-400	600	10-12	420-504	Increase in milk yield and number of animals by approx. 15%
		Cow	117	6-7	90-105	135	8-9	160-180	Increase in milk yield and number

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	
									of animals by approx. 15%
5	Khori Kalan	Buffalo	615	10-11	400-440	707	12-13	504-546	Increase in milk yield and number of animals by approx. 15%
		Cow	43	5-6	75-90	49	7-8	140-160	Increase in milk yield and number of animals by approx. 15%
6	Rangala	Buffalo	605	11-12	440-480	696	13-14	546-588	Increase in milk yield and number of animals by approx. 15%
		Cow	197	6-7	90-105	227	8-9	160-180	Increase in milk yield and number of animals by approx. 15%
7	Jaurasi	Buffalo	650	11-12	440-480	748	13-14	546-588	Increase in milk yield and number of animals by approx. 15%
		Cow	125	6-7	90-105	144	8-9	160-180	Increase in milk yield and number of animals by approx. 15%
8	Uton	Buffalo	785	10-11	400-440	903	12-13	504-546	Increase in milk yield and number of animals by approx. 15%
		Cow	95	5-6	75-90	109	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	Sunari 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 suppliers	Subsides	Educate by Extension & Training	Supplies would be improved
		Price support system	Major crops	-	Needs for all crops
		Labour	-	Employment generate through works activities	Migration reduce
		Any other (please specify)	-	-	-
		Road network	Available	Coordinate with lined department	Would be strengthen
		Transport facilities	Moderate	Coordinate with lined department	Would be promoted
		Markets / Mandies	Exists	Coordinate with lined department	Intensity would be increased
		Agro and other industries	-	Coordinate with lined department to establish Cottage industries (Kutir Udyog) for landless and unemployed youth	Would be strengthen
		Milk and other collection centres	Milk collection centre in long distance	Coordinate with lined department	For installation on nearest door steps
		Any other (please specify)	-	-	-
			Vermi-compost unit	Convergence with NHM (Horticulture) department	To be increased

			Mushroom Cultivation	Convergence with NHM (Horticulture) department	To be increased
			Animal vitamins/ Minerals Deficit	Coordinate with lined department, to organize camps in watershed area	Animal vitamins feeds Would be promoted

9.8.1 LOGICAL FRAMEWORK ANALYSIS

Table 9. Logical Framework Analysis

Components	Activities	Outputs	Effect	Impact
Village Institution Formation	Formation of Watershed 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 (I.E.C. Activities). • Capacity Building	• Awareness camps to be organized • Trainings and exposure visits UGs and WCs to be held Capacity building workshops to be organized one. • Federations of UGs and WC to be	• Quality of management of common resources improved. • Quality of distribution of benefits between people improved. • Increased awareness amongst	

Components	Activities	Outputs	Effect	Impact
	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. • Sensitize Village communities to involve children	formed.	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
	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 fruits and forest species. • Input trainings, conduct	• Common and private lands to be brought under new plantations and agro-horti- forestry like Neem, Adussa, prosopis, Banyan and Peepul. • Forest lands to be brought under new plantations and protection. • Trainings, exposure visits and meetings to be organized for	• Fodder availability from common and private land increased. • Accessibility to common and forest lands increased with removal of encroachments and resolution of conflicts	• Better Ecological order in the area. • Increase in the proportion of households having more security of fodder. • Reduction in drudgery of fodder and fuel collection, especially women

Components	Activities	Outputs	Effect	Impact
	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.	communities, village volunteers and staff. • Income generation intervention promoted		
Rainfed Area Development	• Treatment of land through improved soil and moisture conservation practices on watershed basis.	• Land to be brought under improved soil moisture conservation practices. • Good agricultural practices to be promoted.	• Improved productivity of treated land. • Increased availability of water in cells. • Increase in annual agricultural	Increase in proportion of households having more security of food Increase in contribution of agricultural income to the household income

Components	Activities	Outputs	Effect	Impact
	• 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 generation activities like grading, processing and packaging.	• 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.	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.	

Components	Activities	Outputs	Effect	Impact
	• 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 institutions	• Women's SHG groups to be formed. • Federation of Women's SHGs to be formed. • Trainings to be conducted for preparation of woolen products from sheep and goats	• Enhanced capacities of leaders of women's group in taking initiatives to solve problems at different levels. • Improved access to credit for livelihood purposes Increased household income.	• Position of women in household, community, society (politically, socially and economically) as perceived by women and community at large. • Performance enhancement of SHGs in terms of participation, decision-making, leadership and fund management. • Equality and equity in gender relations at

Components	Activities	Outputs	Effect	Impact
				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.