Contents (IWMP III)

CHAPTER- 1

METHODOLOGY

INTRODUCTION

The Government of India (GOI) adopted watershed management as a strategy to address the sustainable agricultural productivity in the rainfed areas since the last three decades. Further, GOI has adopted watershed management as a national policy since 2003. Several studies have highlighted that appropriate rain water management and utilization results in enhanced agricultural productivity. To achieve food security, minimize the water conflicts and reduce poverty, it has become essential to increase productivity of rainfed systems by harnessing the existing potential.

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 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.

To implement watershed area program systematically the survey has been conducted for knowing the potentiality of the village. With this view baseline survey was conducted in four micro- watersheds Mirzapur **Micro- Watershed**, Taprian Micro- Watershed, Atari **Micro- Watershed,** Fazilpur Micro watershed . The survey will serve as a bench mark against which the results of project could be compared at the end of the implementation. It would also helpful in guiding watershed

programme to plan its goal in identifiable terms for future reference. PRA techniques and transect walk were conducted with the Gram Sabha members and beneficiaries for building confidence for 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 of 4 micro watersheds namely Mirzapur (6D2D8m4) ,Taprian (6D2D8m3) , Atari (6D2D8k3), Fazilpur (6D2D8m2) with their respective codes. This watershed is in continuation to with other watershed projects namely Lower Sukar Rao Nadi watershed (IWMP III).

1.1.2 Base Line Survey

Bench mark survey was conducted for collection of base line data on various bio-physical and socio-economic aspects initiated by the following methods.

1.1.3 Collection of Primary Data

Though the project was sanctioned by the September, 2011 but the preparatory phase started in 2012.Initially, a meeting was arranged with officials of concerned departments and technical experts located at Mirzapur, Taprian, Atari, and Fazilpur micro- watersheds. During this meeting, preliminary details of the proposed project including location of villages and criteria of selection and PPR were 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, important villages, drain system, main land use and other problems related to the area were assessed. Sarpanches and local people were involved in the discussions and a note of the local needs and scope of watershed works was taken up.

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

The primary data was also compiled from revenue records, Anganwari workers and statistical officers of the district. Rainfall data was collected from rain gauge station located in the Sub division/district headquarter of the project area.

1.1.4 Collection of Secondary data

The data with regard to Demographic, socio-economic, infrastructure, land use, primary and secondary occupation, major crops grown and the yield level of fruits and vegetable crops, marketing facilities, fodder production, agro-forestry crops, live stock and milk production, status of self help groups, previous watershed schemes and works undertaken under MGNREGA etc. was gathered with the help of a specially designed Performa by social development associates. Additional information were 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 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 transit 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 discussion were held on production activities and new innovative techniques of improving crop, fruit and milk production. The women groups were sensitized about income generating activities and skill improvement by various types of trainings. The department field staff facilitated the process of participation at the planning stage. The department officials simultaneously stated the process of forming watershed committees for each village. The roles and responsibilities of all stake holders as per guidelines , the mechanism of fund flows, cost sharing arrangement in different components , and operational mechanism of the projects was thoroughly discussed with the community and to the WC in detail.

1.2.1 Participatory Net Planning

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

Based on the experience of the experts working in the area and catchment area characteristics each structures like Silt Detention Dam's, Earthen Gully Plug/Earthen Embankment, Crate Wire Structure/Spurs, Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls, Guide Bandh's etc. were recommended to conserve and store water used for life saving additional irrigation potential in the rain fed area and to avoid 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.

1.2.3Transect Walk

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


Transect walk and site visit

1.2.4 Focus Group Discussions

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

Gram Sabha member's participation in group discussion

1.3 Use of GIS Technology for Planning

Use of high scientific tools has been promoted at various stages of watershed development planning.

Geographical Information System (GIS) has been used in planning. Various layer maps were created likes Base map, Present Land Use, Geo-hydrological, Micro Watershed, Drainage, Contours, Soil Classification, Land Capability Classification, Ground Water, Proposed and existing Activities or works. All Watershed maps (micro- watershed wise) have been prepared according to watershed maps issued by Soil and Land use Survey of India (SLUSI) with coding.

1.3.1 Prioritization

With the assistance of Geographical Information System (GIS), various layers were created like Geo morphological, Soils, Groundwater conditions, Slope percent and Land Capability classes. All these parameters were given weightage as per the guidelines issued by Govt. of India. This has helped in prioritization of various watershed areas.

1.3.2 Planning

Based on the land use and hydrology 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 based on 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 structure like Silt Detention Dam's, Earthen Gully Plug/Earthen Embankment, Crate Wire Structure/Spurs, Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls, Guide Bandh's etc. were provided.

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 stream orders (I to V orders), stream flow, stream width and length, stream diversions, run- off and topography. 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/crop/run off cover	Yes
	Ridge to valley treatment	Yes
	Online IT connectivity between	Yes

S.No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	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
	7. Watershed boundaries	Yes
	8. Activities	Yes
	Crop simulation model	NA
	Integrated coupled analyzer/near infrared visible spectroscopy/medium/high	-
	Normalize difference vegetation index(NDVI)#	-
	Weather station	-
B	Inputs	-
	Bio pesticides	Yes
	Organic manure	Yes
	Vermin- compost	Yes

S.No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	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 deliberation and incorporation of relevant suggestions into the plan, the action plan was approved in the meeting of Gram Sabha. The resolution of each village falling in the watershed has been received. The record is available with the PIA and WAPCOS.

CHAPTER – 2

PROJECT BACKGROUND

2.1 PROJECT BACKGROUND

Integrated Watershed Management Programme (IWMP III) project is located in Sadhaura block, Yamunanagar district of Haryana state. The project is a cluster of four micro- watersheds namely Mirzapur (6D2D8m4) ,Taprian (6D2D8m3) , Atari (6D2D8k3), Fazilpur (6D2D8m). The total geographical area of the project is 3973 **ha** out of which 2978 **ha** has been undertaken to be treated under IWMP-III starting from year 2011-2012. The project is divided into four micro watersheds. The Base map is shown in Annexure I.

Table 1: BASIC PROJECT INFORMATION

S. No.	Name of the project	Name of the micro watershed	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	Lower Sukar Rao nadi watershed (IWMP III)	Mirzapur	6D2D8m4	Mirzapur Kotla Tewar Bijauli Safilpur	Sadhaura	Yamunanagar	3973	1311	157.32	ASCO Yamuna nagar
2	Lower Sukar Rao nadi watershed	Taprian	6D2D8m3	Tunde ki taprian	Sadhaura	Yamunanagar		109	13.08	ASCO Yamuna nagar

S. No.	Name of the project	Name of the micro watershed	Code No.	Name of the villages	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
	(IWMP III)									
3	Lower Sukar Rao nadi Watershed (IWMP III)	Atari	6D2D8k3	Kalianpur Atari Bana Bahadur Islam nagar Sultanpur	Sadhaura	Yamunanagar		838	100.56	ASCO Yamuna nagar
4	Lower Sukar Rao nadi watershed (IWMP III)	Fazilpur	6D2D8m2	Fazilpur Ismailpur Salempur	Sadhaura	Yamunanagar		720	86.40	ASCO Yamuna nagar
				Grand Total			**3973**	**2978**	**357.36**	

2.2 NEED OF WATERSHED DEVELOPMENT PROGRAMME

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

i. poverty index,
ii. percentage of SC,
iii. actual wages,
iv. percentage of small and marginal farmers,
v. ground water status,
vi. moisture index,
vii. area under rain fed agriculture,

viii. drinking water situation in the area ,

ix. percentage of degraded land,

x. productivity potential of land,

xi. continuity of any other watershed already developed/treated,

xii. cluster approach for plain terrain,

xiii. cluster approach for hilly terrain,

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

Table 2. Criteria and Weight Age 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	Partially covered	Fully

S. No.	Criteria	Maximum Score	Ranges and Scores			
				(7.5)	(5)	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 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	15	Above 5 micro-watersheds in cluster (15)	3 to 5 micro-watersheds in cluster (10)	2 to 3 micro-watersheds in cluster (5)	

S. No.	Criteria	Maximum Score	Ranges and Scores			
	the project)					
	Total	**150**	**150**	**93**	**37**	**2.5**

Based on above criteria and weight age of 86 concerning these thirteen parameters, a composite ranking was given to Lower Sukar Rao Nadi Watershed (IWMP III) project as given in **Table 3.**

The total numbers of families under BPL are less than the total number of households in the village. Hence a score of 5 was allotted. Rain fed agriculture is more and more than 80 percent of the farmers are small and marginal. So the scoring was done as 5 and 2 respectively. So accordingly, scoring was done like project area comes under foothill and piedmont plains of Haryana in northern part, and has no canal network, erratic rainfall, deep and poor ground water discharge aquifer conditions; hence the ground water status score is 3. The percentage of schedule castes in this watershed is about 30 percent of the total population, hence 5 score was allotted. Due to high percentage of the poor population i.e. about 70 percent thus the scope of poverty index is 5. More than 60 percent of the farmers are small and marginal by nature and the actual wages earned by them are less than the minimum wages. Hence a composite rank of 10 is allotted. With all the parameters taken together gives the watershed score to be 86.

Table 3: Weight-age of the Project

1	2	3	4	5	6	7	8	9														
S. No.	District	Name of the project	No. of micro-water-sheds proposed to be covered	Geographical area (ha)	Proposed Area for Development	Type of project (Hilly/ Desert/ Others)	Proposed cost (Rs. In Lakh)	Weightage under the criteria														
								i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	Total	
1.	Yamuna nagar	Lower Sukar Rao Nadi watershed (IWMP III)	4	3973	2978	Sub Hilly/ others	357.36	5	5	5	10	3	0	5	5	15	10	5	5	10	86	

Table 4: Watershed Information

Name of the Project	No. of Watersheds to be Treated	Watershed code	Watershed regime/type/order
Lower Sukar Rao Nadi Watershed (IWMP III)	4	6D2D8m4, 6D2D8m3, 6D2D8k3 and 6D2D8m2	Sub-Hilly

2.3 OTHER ONGOING DEVELOPMENT PROJECTS / SCHEMES IN THE PROJECT VILLAGES

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

Table 5. Ongoing Developmental Programs in the Project Area

S. No.	Name of the Program/ Project	Name of Micro watersheds	Sponsoring agency	Objective	Estimated number of beneficiaries for year 2011-12 (Job card issued)
1	MGNREGA	Mirzapur	DRDA, Yamunanagar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	614
2	MGNREGA	Taprian	DRDA, Yamunanagar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	Nil
3	MGNREGA	Atari	DRDA, Yamunanagar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	312
4	MGNREGA	Fazilpur	DRDA, Yamunanagar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	211

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

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

Watershed Area Development Treated/Sanctioned											
1	2	3		4						5	
S. No.	Names of District	Total micro watersheds in the District		Deptt. of Land Resources Pre- IWMP projects		Other Ministries/ Deptt. Any other watershed include settlement etc. project		Total watersheds covered		Net watersheds to be covered	
		No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)
1	Yamunanagar	230	175600	10	6158	82	66446	92	72604	138	102996

CHAPTER – 3

BASIC INFORMATION OF THE PROJECT AREA

GEOGRAPHY AND GEOHYDROLOGY

The Lower Sukar Rao Nadi Watershed (IWMP III) falls in Sadhaura Block of District Yamunanagar. The area is occupied by Indo- Gangetic alluvium and area is traversed and drained by seasonal streams namely Sukar Rao Nadi. Physiographically, the area is divided by shivalik hills and falls in the zone of "Dissected Rolling Plain". The area of Watershed lies in between 30º22'30'' to 30º22'30'' north latitude and 77º15'30''to 77º20'30' east longitude with general elevation varies between 312 to 317 m (MSL) above mean sea level. Area experiences the second highest rainfall in the state about 80 percent of its annual rainfall is received in the month of June to September. Despite heavy rainfall in this area, water retention is very low. It is due to high surface run off and water is drained through the seasonal streams namely Lower Sukar Rao Nadi which flows to the east and causing erosion in the agriculture fields. The Contour and Drainage map is presented in Annexure II.

3.1 LAND USE PATTERN

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

Table 1. Land use pattern of Lower Sukar Rao Nadi Watershed (IWMP III)

S.No	Name of Micro watersheds with codes	Name of Villages	Treatable area of the village(ha)	Forest area (ha)	Land under agriculture use (ha)	Rain fed area (ha)	Permanent pastures (ha)	Wasteland	
								Cultivable	Non-Cultivable
1	Mirzapur	Mirzapur	292	-	247	247	-	8	37

S.No	Name of Micro watersheds with codes	Name of Villages	Treatable area of the village(ha)	Forest area (ha)	Land under agriculture use (ha)	Rain fed area (ha)	Permanent pastures (ha)	Wasteland	
								Cultivable	Non-Cultivable
	(6D2D8m4)	Kotla	179	-	144	144	-	3	32
		Tewar	79	-	69	69	-	3	7
		Bijauli	181	-	137	137	-	7	37
		Safilpur	580	-	418	418	-	66	96
2	Taprian (6D2D8m3)	Tunde ki taprian	109	-	69	69	-	4	14
3	Atari (6D2D8k3)	Kalianpur Atari	276	-	252	252	-	2	22
		Bana Bahadur	288	-	239	239	-	35	14
		Islam nagar	102	-	73	73	-	8	21
		Sultanpur	73	3	60	60	-	2	8
		Govt Forest & River	99	99	-	-	-	-	22
4	Fazilpur (6D2D8m2)	Fazilpur	248	2	184	184	-	4	58
		Ismailpur	315	-	238	238	-	16	61
		Salempur	157	-	138	138	-	1	18
		Grand total	**2978**	**104**	**2268**	**2268**		**159**	**447**

(Source: - Census 2001)

3.2 SOIL AND TOPOGRAPHY

The soils of Lower Sukar Rao Nadi Watershed (IWMP III) are very deep, coarse loamy to fine loamy, typic and udic, ustorthent, ustipssamant and ustocreptes developed on level to gentle sloping land of watershed. The topography of the area ranges from level to gentle sloping land of Watershed. Soils are subject to susceptible to severe to very severe water erosion along river and streams banks, moderate erosion in intensive cropping fields. The slope ranges from 1 to 5% and above, most of the area of micro watersheds falls under nearly level to gentle slopes. Slope map is presented in Annexure IV.

Table 2. Soil type and Topography

S. No.	Name of Micro Watershed	Code	Geographical area (ha)	Major Soil types	Topography
				Type	
1.	Mirzapur	6D2D8m4	3973	Loamy sand, sandy loam, loam and sandy clay loam	Level to nearly level
2.	Taprian	6D2D8m3		Do	Do
3.	Atari	6D2D8k3		Do and coarse fragments in some pockets under sub surface horizon.	Nearly level to gentle
4.	Fazilpur	6D2D8m2		Do	Level to nearly level

Source: - Department of Agriculture, Haryana

3.2.1 FLOOD AND DROUGHT CONDITION

There has been incidence of flood and drought as well in watershed villages. The data collected from the revenue department reveals the instances of flood on an average once in five years and drought once in 10 years. The flood and drought resulted in low to very low yields of the crops.

Table 3. Flood and Drought condition

S.No	Name of Micro-watersheds	Flood Incidence	Drought Incidence
1.	Mirzapur	One time in five years adjoining rivers	One time in 10 years
2.	Taprian	One time in five years adjoining rivers	One time in 10 years
3.	Atari	One time in five years adjoining rivers	One time in 10 years
4.	Fazilpur	One time in five years adjoining rivers	One time in 10 years

3.3 SOILS

3.3.1 Soil Erosion

In the identified four micro watersheds, it is observed that due to heavy rains, heavy loss of soil has occurred along river and stream banks. This results in degradation of agricultural land, deforestation and low organic matter contents. The erosion materials brought by the chaos/rivers are deposited in the slopes and along the rivulets make recent alluvium /active flood plains. The repeated deposition of course sediments render these areas comparatively low in agriculture

production. Average annual rainfall of the area falling under these micro watersheds gets washed away in the form of runoff which also carries valuable top soil (sheet). Soil erosion in respect of sheet is quite high. Majority of the watershed Community are dependent on rainfed agriculture. Farmers suffer due to area being rain fed and due to excess run off in the region, resulting in further deterioration of socio economic conditions of community. On an average soil loss is estimated 15/25 tonnes /ha/year. The type of erosion, affected area and average soil loss in the Lower Sukar Rao Nadi Watershed (IWMP III) is exhibited in **Table 4.**

Table 4:- Soil Erosion

Cause of erosion	Types of erosion	Area affected (ha)	Average soil loss (Tonnes/ha/year)
Water Erosion			
Lower Sukar Rao Nadi Watershed (IWMP- III)			15- 25 tonnes per ha/year
		1850	
		1125	
		998	
	Sub- Total	**3973**	

Source: Department of Agriculture, Haryana)

3.3.2 Soil Salinity/Alkalinity (Salinity ingress):

Based on the soil samples analysis and reports the village wise distribution of PH is tabulated and shown in Table. 5.

Sheet
Rill
Gully

Table 5. Soil pH and Salinity

S.No.	Name of Micro Watersheds	Soil pH	Type of salinity/alkalinity
1.	Mirzapur	Neutral	Nil
2.	Taprian	Neutral	Nil
3.	Atari	Neutral	Nil
4.	Fazilpur	Neutral	Nil

3.3.3 Soil Classification

Major soils associations' fall in the watershed are five soil associations unit. The detail description of all soil associations are given below. The Soil map is presented in Annexure V.

Soil Mapping Unit- 14 (Nanakpur- Bhud Soil Association)

The Nanakpur soil series is dominated series in this soil association and Bhud is associated series. The dominant soil series is well drained, loamy, mixed hyperthermic, dystric haplustepts and associate soil series Bhud is well drained, fine loamy, mixed hyperthermic, typic haplustepts. The dominant soil series is sandy clay loam soil in texture, non calcareous, deep, pH 5.67- 6.67, dark reddish brown to reddish brown in colour (5YR 3/3- 5YR 4/3) developed on moderate to gentle sloping piedmont plains over colluviio alluvial material and associate soil series have sandy clay loam in texture, non calcareous, deep, pH 6.39- 6.83, dark brown to dark yellowish brown in colour (10YR 4/3- 10YR 3/4) developed on colluviio alluvial deposits/ gentle to moderate slopping/ piedmont plains.

Soil Mapping Unit- 17 (Budha Khera- Malikpur- Khora Soil Association)

The Budha Khera soil series is dominated in this soil association and associated soil series 1st is Malikpur soil series and 2nd Khora soil series. The dominant soils are well drained, fine loamy, mixed hyperthermic, typic haplustepts, 1st associate soil series is slightly calcareous, moderately well drained, silty clay, fine mixed hyperthermic, sodic, typic haplustepts and 2nd associated soil series is well drained, loamy- skeletal, mixed hyperthermic, dystric haplustepts. Budha Khera soil series is sandy clay loam to sandy loam in texture, slightly calcareous, very deep, pH 6.25- 6.83, dark yellowish brown to dark brown in colour (10YR 3/4- 10YR 4/6, 7.5YR 4/4) developed on dissected alluvial plains over recent to sub- recent alluvium, Malikpur soil series is silty clay in texture, non calcareous, very deep, pH 7.38- 9.28, dark brown to brown in colour (10YR 4/3- 10YR 5/3) developed on gently to moderate slopping dissected alluvium plains over alluvial material and Khora soil series is Loamy sand to Sandy clay loam to Sandy clay in texture, non calcareous, very deep, pH 6.90- 7.40, brown to reddish brown in colour (7.5YR 5/4- 5YR 5/4) developed on colluviio- alluvial material/ gentle moderate slopes/ dissected piedmont plains.

Soil Mapping Unit- 26 (Jasar- Beri Soil Association)

The Jasar soil series is dominated in this soil association and associated soil series 1st is Beri soil series. The dominant soil series is moderately well drained, fine, mixed hyperthermic, typic haplustepts, 1st associate soil series is moderately well to imperfect drained, fine loamy, calcareous, mixed hyperthermic, typic haplustepts. The dominant soil series have clay loam to clay in texture, strong to very strong calcareous, very deep, pH 8.05- 8.24, dark brown to dark yellowish brown in colour (10YR 4/3- 10YR 3/4) developed on level to very gentle sloping/ alluvial plains over alluvium. The calcium concretions are found in lower horizons, 1st associated soil series have loam to silty loam in texture, moderate to very strong calcareous, very deep, pH 7.90- 8.50, dark brown, light brownish gray to light yellowish brown in colour (10YR 4/3, 2.5Y 6/3- 2.5Y 6/4) developed on basin/ slight depressions/ fluvio aeolian plain over alluvium.

Soil Mapping Unit- 30 (Jhundpur- Sitaura- Morkhi Soil Association)

The Jhundpur soil series is dominated in this soil association associated soil series 1st is Sitaura soil series and 2nd Morkhi soil series. The dominant soil series is well drained coarse loamy, mixed hyperthermic, typic ustorthent 1st associate soil series is well to imperfect drained, fine loamy, mixed hyperthermic, fluvientic haplustepts and 2nd associate soil series is well drained coarse loamy, calcareous, mixed hyperthermic, typic haplustepts. The dominant soil series is sandy loam in textures, slightly calcareous, very deep, pH 7.58- 8.51, dark grayish brown to olive brown in colour (2.5Y 4/3- 2.5Y 4/4) developed on gentle sloping floods/ alluvial plains over recent and sub- recent alluvium, 1st The dominant soil series is clay loam to sandy clay loam in texture, strong to violent calcareousness, very deep, pH 8.44- 8.78, dark grayish brown to light yellowish brown in colour (10YR 4/2- 10YR 6/4) developed on level to very gentle sloping flood/ alluvial plain over alluvium and 2nd associate soil series have sand to sandy loam in texture, slight to strong calcareous, very deep, pH 7.80-7.90, dark brown to Yellowish brown and grayish brown in colour (10YR 4/3-10YR 5/4, 2.5Y 5/2-2.5Y 5/3) developed on alluvial plains. The few fine hard calcium carbonate concretions found in C horizon of 2nd associated soil series.

Soil Mapping Unit- 31 (Sitaura- Beri- Mohna Soil Association)

The Sitaura soil series is dominated in this soil association and associated soil series 1st is Beri soil series and 2nd Mohna soil series. The dominant soil series is well to imperfect drained, fine loamy, mixed hyperthermic, fluvientic haplustepts, 1st associate soil series is moderately well to imperfect drained, fine loamy, calcareous, mixed hyperthermic, typic haplustepts and 2nd associate soil series is well drained, fine montmorillonitic/ verm hyperthermic saline typic haplustepts. The dominant soil series is clay loam to sandy clay loam in texture, strong to violent calcareousness, very deep, pH 8.44-8.78, dark grayish brown to light yellowish brown in colour (10YR 4/2- 10YR 6/4) developed on level to very gentle sloping flood/ alluvial plain over alluvium, 1st associated soil series have loam to silty loam in texture, moderate to very strong calcareous, very deep, pH 7.90- 8.50, dark brown, light brownish gray to light yellowish brown in colour (10YR 4/3, 2.5Y 6/3- 2.5Y 6/4)developed on basin/ slight depressions/ fluvio aeolian plain over alluvium and 2nd associate soil series have

well drained, clay loam in texture slight to very strong calcareous, very deep, pH 8.02- 8.46, dark grayish brown to olive brown in colour (2.5Y 4/3- 2.5Y 3/4) developed on level to very gentle slopping/ alluvial plains over alluvium. Both associated series have few very fine concretions of calcium in lower horizons.

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

3.3.4 Land Capability Classification

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

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

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

Land capability subclass II e1s1

These soils are very deep, coarse loamy, fine loamy, textured, slightly too moderately eroded located nearly leveled to gently sloping land, slight susceptible to water erosion. It includes total area **990 Ha** of the Watershed.

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

1. Suitable soil conservation measures to be adopted to provide sufficient vegetation cover.
2. Crate wire structure or Masonry structure should be constructed.
3. Proper drainage should be provided during rainy season.
4. More irrigation facilities should be developed for intensive use of land.
5. Weeds should be controlled to reduce nutrient and moisture losses.

Land capability subclass III e2s2

These soils are moderately deep to deep soils, light to coarse loamy texture located on slight to gentle slope. These soils are well drained, moderately permeable and moderate to severe erosion hazard. It includes total area**1883 Ha** of the Watershed.

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

1. Land leveling should be done at 50% subsidy, because formers are not economically capable to bear the rate of land leveling.
2. Engineering measures like contour bunding should with others be under taken.
3. Agronomic measures, mainly strip cropping, soil & conservation measures mixed cropping and cover cropping are recommended.
4. Crate wire structure or Masonry structure should be constructed for rills and gullies control..

Land capability subclass VI es

These soils are deep, gravely/ bouldry light to medium textured soils on gently to steeply slopping severly eroded lands. The water holding capacity is very poor and the water erosion hazard is severe. It includes total area**105 Ha** of the Watershed.

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 (Aforestation) cover to check further deterioration of soils.
2. Soils would be suitable for pasture development; forestation, recreation activity and other major water conservation structutures (Water harvesting structure, silt detention dam, etc).

3.3.5 Climatic Conditions

The average rainfall of this area is 1002 mm (during the past 12 year's data). The highest rainfall is 1538m during the year 2010. The uneven rainfall distribution is leading to run off soil every year to the steams, rivulets and depressed area of the Lower Sukar Rao Nadi Watershed (IWMP III). The year wise rainfall from 2000 to 2011 is presented in Table 6.

Table-6. Rainfall during the years 2000-11

S.No.	Year	Rainfall (in mm)
1	2000	1237
2	2001	832
3	2002	1143
4	2003	964
5	2004	778
6	2005	1005
7	2006	662
8	2007	890
9	2008	1105
10	2009	942
11	2010	1538
12	2011	924

Source: **-** Ground Water Cell, Yamunanagar (Dadupur station)

In general, May is the hottest month with mean daily maximum temperature of 40.8˚ C and record 6.8 to 7.1˚ C as minimum. After the withdrawl of monsoon, day temperature continuous to remain as high during monsoon but night becomes cooler. After October, there is decrease in both the day and night temperature and decrease is more rapid after mid Nov. January is the coldest month when the mean temperature varying from 6.8 to 7.1˚C. **(Source: State Water Plan)**.

3.3.6 Physiography and Reliefs

Physiographically, the area is divided into two parts from North to South –West. The general Elevation in the area belongs to Recent Alluvial Plains, active flood plains and old alluvial plain 312 to 317 m above mean sea level. Area experiences second highest rainfall of state and water is drained through seasonal streams namely: Sukar Rao Nadi which flows north to south west and ultimately merge in Markanda river**.** Area adjoining the rivers/nala's is badly dissected by these drainage pattern and mining activities. The elevation range and percentage slope distribution has been presented in **Table 7.**

Table 7 Physiography and Relief

Project Name	Elevation (MSL)	Slope Range (%)	Major Streams
Lower Sukar Rao Nadi Watershed (IWMP III)	312 to 317m	> 3% (2978 ha)	Sukar rao nadi and its tributaries

3.4 LAND AND AGRICULTURE

The land holding pattern of the villages under Lower Sukar Rao Nadi Watershed (IWMP III) shows that the majority of the land holding is below 3.0 ha. The lack of irrigation source has forced the some of the farmers of Watershed to migrate

from villages to ensure their employment, livelihood and availability of fodder. The nearest Industrial Area is Kala amb, Jagadhari and Yamunanagar. This affects directly the demographic profile of the village.

The major crops maize, green fodder and pulses in Kharif under rain fed conditions and paddy, sugarcane and seasonal vegetables in the area where irrigation potential exists. The major crops during Rabi wheat, green fodder and seasonal vegetables, gram, oilseed in rain fed and irrigated conditions. The soil and water conservation measures such as Engineering like small check dam, earthen gully plugs, crate wire structures, drop structures, guide bandhs and rainwater harvesting. 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 8.**

Table 8. NATURAL VEGETATION

S.No.	Trees	Fruits	Grasses and Shurbs
1	Khair	Mango	Bhabbar
2	Black Siris	Ber	Lantana
3	Simbal	Lemon	Mehander
4	Shisham	Galgal	Narkul
5	Safeda	guava	Dob
6	Toon	Jamun	Curry Patta

3.4.1 Land Ownership Details

The Caste wise land owned (in ha) is Tabulated in Table 9:

Table-9:- Land Ownership Details

GENERAL	OBC	SC	ST	Total owners
588	684	205	-	1477

3.4.2 Agriculture/Pattern

Table 10. Agriculture/ Pattern

S.No.	Name of Micro Watersheds	Village	Net Sown area (ha)	
			One time	Two times
1.	Mirzapur	Mirzapur	195	173
		Kotla	115	92
		Tewar	49	45
		Bijauli	103	87
		Safilpur	290	272
2	Taprian	Tunde ki taprian	58	45
3	Atari	Kalianpur Atari	189	168
		Bana Bahadur	192	165
		Islam nagar	55	49
		Sultanpur	48	40
4	Fazilpur	Fazilpur	145	125
		Ismailpur	191	163
		Salempur	108	95
			1738	**1519**

(Source: Department of Agriculture, Haryana)

3.4.3 Irrigation

Lack of Assured Irrigation Facilities

The present source of irrigation is rain which is also scanty and erratic. A few farmers have installed deep tube wells as the ground water is available at about 120 m depth whereas the sub- surface water level ranges from 10 to 20m depth, yielding small quantity of water. This results into severely inadequate supply of water for irrigation. The present source of irrigation in the watershed has been tabulated in Table 11.

Table 11. Irrigation Pattern.

S. No.	Name of Micro Watersheds	Village	Source 1: Canal		Source 2: Check Dam/ pond/ natural source		Source 3: Well		Source 4: Groundwater (Tube wells)	
			Availability months	Net area (ha)	Availability months	Net area (ha)	Availability months	Net area (ha)	Availability months	Net area (ha)
1.	Mirzapur	Mirzapur	-	-	-	-	-	-	July- June	157
		Kotla	-	-	-	-	-	-	July- June	10
		Tewar	-	-	-	-	-	-	-	-
		Bijauli	-	-	-	-	-	-	July- June	56
		Safilpur	-	-	-	-	-	-	July- June	145
2	Taprian	Tunde ki taprian	-	-	-	-	-	-	July- June	24
3	Atari	Kalianpur Atari	-	-	-	-	-	-	July- June	44
		Bana Bahadur	-	-	-	-	-	-	July- June	36
		Islam nagar	-	-	-	-	-	-	July- June	50
		Sultanpur	-	-	-	-	-	-	July- June	28
4	Fazilpur	Fazilpur	-	-	-	-	-	-	July- June	140
		Ismailpur	-	-	-	-	-	-	July- June	55

S. No.	Name of Micro Watersheds	Village	Source 1: Canal		Source 2: Check Dam/ pond/ natural source		Source 3: Well		Source 4: Groundwater (Tube wells)	
			Availability months	Net area (ha)	Availability months	Net area (ha)	Availability months	Net area (ha)	Availability months	Net area (ha)
		Salempur	-	-	-	-	-	-	July- June	103

(Source – District Census 2001)

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3.4.4 CROPPING PATTERN (crop details)

Cropping Pattern

The village wise area production and productivity of each crop is tabulated in **Table 12 A and 12 B** (Rabi and Kharif)**.**

Table 12 A. Crop Details (Rabi)

Name of Micro Watersheds	Village	Rabi crops(Wheat)				(Oilseed)				(Pulses)			
		Area (ha)	Production (000'kg)	Productivity (kg/ha) Average	Use of fertilizer	Area (ha)	Production (000'kg)	Productivity (kg/ha) Average	Use of fertilizer	Area (ha)	Production (000'kg)	Productivity (kg/ha) Average	Use of fertilizer
Mirzapur	Mirzapur	125	568125	4545	Yes	14	19880	1420	Yes	15	16500	1100	Nil
	Kotla	45	204525	4545	Yes	10	10500	1050	Yes	6	6300	1050	Nil
	Tewar	28	127260	4545	Yes	5	7050	1410	Yes	4	4500	1125	Nil
Taprian	Bijauli	45	204525	4545	Yes	17	24650	1450	Yes	9	10350	1150	Nil
	Safilpur	192	872640	4545	Yes	41	45920	1120	Yes	19	21280	1120	Nil
	Tunde ki taprian	24	109080	4545	Yes	11	11220	1020	Yes	5	6750	1350	Nil
Atari	Kalianpur Atari	85	386325	4545	Yes	15	23400	1560	Yes	8	11400	1425	Nil
	Bana Bahadur	82	372690	4545	Yes	11	18480	1680	Yes	9	12375	1375	Nil
	Islam nagar	21	95445	4545	Yes	5	8750	1750	Yes	5	7125	1425	Nil

Name of Micro Watersheds	Village	Rabi crops(Wheat)				(Oilseed)				(Pulses)			
		Area (ha)	Production (000'kg)	Productivity (kg/ha) Average	Use of fertilizer	Area (ha)	Production (000'kg)	Productivity (kg/ha) Average	Use of fertilizer	Area (ha)	Production (000'kg)	Productivity (kg/ha) Average	Use of fertilizer
Fazilpur	Sultanpur	22	99990	4545	Yes	4	5700	1425	Yes	4	5000	1250	Nil
	Fazilpur	65	295425	4545	Yes	15	21750	1450	Yes	9	11025	1225	Nil
	Ismailpur	97	440865	4545	Yes	27	41850	1550	Yes	12	14160	1180	Nil
	Salempur	57	259065	4545	Yes	12	16920	1410	Yes	7	9940	1420	Nil
	Total	**888**				**187**				**112**			

Table 12 B. Crop Details (Kharif)

Name of Micro Watersheds	Village	(Paddy)				(Maize)				(Pulses)			
		Area (ha)	Produc. (000'kg)	Produc. (kg/ha) Avg.	Use of Ferti lizer	Area (ha)	Produc. (000'kg)	Produ c. (kg/ha) Avg.	Use of Ferti lizer	Area (ha)	Produc. (000'kg)	Produ c. (kg/ha) Avg.	Use of Ferti lizer
Mirzapur	Mirzapur	45	151200	3360	Yes	36	55800	1550	Yes	14	15400	1100	Nil
	Kotla	15	50400	3360	Yes	26	37440	1440	Yes	17	17850	1050	Nil
	Tewar	7	23520	3360	Yes	15	23250	1550	Yes	10	11750	1175	Nil
Taprian	Bijauli	35	117600	3360	Yes	22	33550	1525	Yes	17	19550	1150	Nil
	Safilpur	68	228480	3360	Yes	102	155040	1520	Yes	38	42560	1120	Nil
	Tunde ki taprian	14	47040	3360	Yes	15	24750	1650	Yes	11	11550	1050	Nil
Atari	Kalianpur Atari	25	84000	3360	Yes	23	37375	1625	Yes	26	32500	1250	Nil
	Bana Bahadur	24	80640	3360	Yes	85	140250	1650	Yes	21	25725	1225	Nil
	Islam nagar	8	26880	3360	Yes	11	18425	1675	Yes	7	9030	1290	Nil
Fazilpur	Sultanpur	7	23520	3360	Yes	22	37950	1725	Yes	8	10000	1250	Nil
	Fazilpur	22	73920	3360	Yes	15	25200	1680	Yes	30	36450	1215	Nil
	Ismailpur	26	87360	3360	Yes	68	114580	1685	Yes	21	26775	1275	Nil
	Salempur	21	70560	3360	Yes	19	32585	1715	Yes	12	13800	1150	Nil
	Total	317				**459**				**232**			

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 13)**. There is a need for the improvement of the local breed through artificial insemination, proper vaccination and nutritive feed. Introduction of cross breed cows and murrah buffalo with better milk production will popularize dairy farming in the area. Also, the farmyard manure procured from these animals will help improve the soil health.

Table 13. Village wise distribution of milk production in Lower Sukar Rao Nadi Watershed (IWMP III)

S. No.	Name of Micro Watersheds	Village	Buffalo(Lit/ day/annum) for 6 months	Cow(lit/ day/annum) for 6 months	Sheep	Goat	Camel
1.	Mirzapur	Mirzapur	227/1930/347310(Lit/ day/annum)	652/1956/352080(Lit/day/annum)	-		-
		Kotla	55/523/94050(Lit/ day/annum)	96/384/69120(Lit/ day/annum)	-	43	-
		Tewar	70/630/113400(Lit/ day/annum)	127/445/80010(Lit/ day/annum)	-	28	-
		Bijauli	385/3850/693000(Lit/ day/annum)	174/957/172260(Lit/ day/annum)	-	-	-
		Safilpur	516/4386/789480(Lit/ day/annum)	222/666/119880(Lit/ day/annum)	50	68	-
2	Taprian	Tunde ki taprian	34/323/58140(Lit/ day/annum)	-	-	-	-
3	Atari	Kalianpur Atari	242/2178/392040(Lit/ day/annum)	462/1848/332640(Lit/day/annum)	-		-
		Bana	42/399/71820(Lit/	62/279/50220(Lit/ day/annum)	66	27	-

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S. No.	Name of Micro Watersheds	Village	Buffalo(Lit/ day/annum) for 6 months	Cow(lit/ day/annum) for 6 months	Sheep	Goat	Camel
		Bahadur	day/annum)				
		Islam nagar	77/770/138600(Lit/ day/annum)	223/892/160560(Lit/ day/annum)	-	5	-
		Sultanpur	146/1241/223380(Lit/ day/annum)	30/105/18900(Lit/ day/annum)	-	-	-
4	Fazilpur	Fazilpur	255/2550/459000(Lit/ day/annum)	80/240/43200(Lit/ day/annum)	-	-	-
		Ismailpur	211/2005/360810(Lit/ day/annum)	25/113/20250(Lit/ day/annum)	-	-	-
		Salempur	169/1437/258570(Lit/ day/annum)	56/224/40320(Lit/ day/annum)	-	-	-

(Source: Animal Husbandry, Yamunanagar)

3.4.6 Ground Water Concern

a) Depth to Water

The study of ground water hydrology focuses the occurrence and distribution of movement of water below the surface. The ground water characteristics of the small streams falling in the watershed reveal both influent and effluent behavior within the watershed.

The depth to water table of the villages falling in Lower Sukar Rao Nadi Watershed (IWMP III) has been collected from the Ground Water Cell data where the water levels of hydro- graph stations are observed during pre and post monsoon period. The depth to water table of the villages have been observed during the survey from time to time. The water level data of the villages falling under Watershed has been tabulated in **Table 14.**

Table 14. Village wise depth to water level range in Lower Sukar Rao Nadi Watershed (IWMP III)

S. No.	Name of Micro Watersheds	Village	Average Water (m) Table June 2001-06	Average Water (m) Table June 2007-12
1.	Mirzapur	Mirzapur	13.00	14.00
		Kotla	12.00	12.50
		Tewar	11.00	12.00
		Bijauli	11.50	12.55
		Safilpur	10.50	11.00
2	Taprian	Tunde ki taprian	11.50	12.00
3	Atari	Kalianpur Atari	10.00	11.00
		Bana Bahadur	9.00	10.00
		Islam nagar	8.00	9.50
		Sultanpur	9.00	10.00
4	Fazilpur	Fazilpur	3.50	4.50
		Ismailpur	4.00	5.00
		Salempur	4.00	5.00

Depth to water level map has been prepared and presented in the Annexure VII.A comparison of five year average depth (2001- 06 and 2007-12) which reveals that the area is under falling water table conditions. The present depth to water table ranges from 4.50 to 14.00 m.

The source of drinking water supply is through the tube wells installed in absence of canal network in the area. There is adequate availability of drinking water in the villages. Availability of potable water is almost throughout the year except scarcity during May and June.

b) Water table fluctuation

From the availability of the data from the period June 1999 to June 2012, it is observed that the water table is declining at the rate of 20 cm per year. This is due to the development of minor irrigation unit and absence of recharging. The seasonal fluctuation i.e. Pre and Post monsoon period is 0- 2.00 m. The pattern of ground water depletion is almost uniform in the project area.

c) Rain water harvesting and Recharging

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

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

The Modern Methods

The modern methods of rainwater harvesting can be broadly categorized under two -

(a) Collection and storage of rainwater for direct use, and

(b) Groundwater recharging.

The combination of the above two methods would be implemented. The run off generated from the projected villages will not be allowed to run away. The rain water harvesting will involve three components (i) treatment of catchment area (ii) collection system (iii) the utilization.

The project proposals on rainwater harvesting/ recharging by utilizing existing ponds/ depressions and proposed water harvesting and recharging structures.

3.4.7 DETAILS OF COMMON PROPERTY RESOURCES: The department of panchayats has maintained the record of common property resources of area under various institutions. The data has been taken has been collected DDPO, Yamunanagar. The detail of common property resource in Lower Sukar Rao Nadi Watershed (IWMP III) is tabulated in Table 15.

Table 15. 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
Lower Sukar Rao Nadi Watershed (IWMP III)	Waste land	-	-	447	-	-	-	447	-
	Pasture	-	-	-	-	-	-	-	-
	Orchards	21	-	-	-	20	-	-	-
	Village wood lot	-	-	-	-	-	-	-	-
	Forest	-	104	-	-	-	-	-	-
	Village ponds, lake	-	-	25	-	-	25	-	-
	Community Buildings	-	-	-	-	-	-	-	-
	Weekly Mkts	-	-	-	-	-	-	-	-
	Permanent Mkts	-	-	-	-	-	-	-	-
	Temples/place of worship	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-

3.5 SOCIO ECONOMIC AND LITERACY PROFILE

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

Poor economic conditions of farmers: The general 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 16. The literacy rate of micro watershed wise distribution is also exhibited in table 17.

3.5.1 Demographic Status

Table 16. Demographic Status/ Population Pattern

S. No.	Name of Micro Watersheds	Village	Total no. of houses	Total Population			SC			
				Male	Female	Total	Male	Female	Total	%age
1.	Mirzapur	Mirzapur	132	441	389	830	150	131	281	34
		Kotla	84	239	218	457	19	17	36	8
		Tewar	60	198	190	388	-	-	-	-
		Bijauli	165	556	479	1035	140	114	254	25
		Safilpur	268	810	693	1503	410	366	776	52
2	Taprian	Tunde ki taprian	23	84	67	151	-	-	-	-
3	Atari	Kalianpur Atari	148	478	455	933	96	87	183	20
		Bana Bahadur	30	93	90	183	-	-	-	-

S. No.	Name of Micro Watersheds	Village	Total no. of houses	Total Population			SC			
				Male	Female	Total	Male	Female	Total	%age
		Islam nagar	103	286	256	542	151	138	289	53
		Sultanpur	66	185	166	351	155	134	289	82
4	Fazilpur	Fazilpur	122	387	352	739	23	11	34	5
		Ismailpur	151	491	426	917	126	112	238	26
		Salempur	125	322	311	633	95	96	191	30
			1477	**4570**	**4092**	**8662**	**1365**	**1206**	**2571**	**30**

Source: Census 2001, Yamunanagar

Table 17. Village wise Literacy Rate in Lower Sukar Rao Nadi Watershed (IWMP III)

S. No.	Name of the Micro watershed	Name of villages	Total population	Literacy					
				Total Literates	% age	Male	% age	Female	% age
1.	Mirzapur	Mirzapur	830	435	52	275	63	160	37
		Kotla	457	218	48	137	63	81	37
2			388	123	32	92	75	31	25
		Bijauli	1035	398	38	280	70	118	30
3		Safilpur	1503	729	49	459	63	270	37
	Tunde ki taprian	Tunde ki taprian	151	108	71	61	56	47	44
	Atari	Kalianpur Atari	933	346	37	233	67	113	33
		Bana Bahadur	183	75	41	52	69	23	31
4	Fazilpur	Islam nagar	542	230	42	140	61	90	39
		Sultanpur	351	159	45	95	60	64	40
			739	263	35	176	67	87	33
		Ismailpur	917	453	49	277	61	176	39
		Salempur	633	321	51	170	53	151	47
			8662	**3858**	**44**	**2447**	**63**	**1411**	**37**

(Source- District Census- 2001)

Table 18. EMPLOYMENT STATUS

S. No.	Name of Micro Watersheds	Name of villages	Schedule caste		Cultivators		Agricultural labourers		Household industry workers		Other workers	
			Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	Mirzapur	Mirzapur	150	131	64	-	83	-	-	-	57	62
		Kotla	19	17	12	-	28	-	5	8	59	10
		Tewar	-	-	19	-	2	-	-	-	37	1
		Bijauli	140	114	81	15	3	-	1	-	89	34
		Safilpur	410	366	95	3	150	3	2	-	47	192
2	Taprian	Tuned ki taprian	-	-	17	-	6	-	-	-	19	2
3	Atari	Kalianpur Atari	96	87	148	23	41	1	-	-	31	58
		Bana Bahadur	-	-	20	-	2	-	-	-	15	7
		Islam nagar	151	138	32	16	34	1	61	51	34	31
		Sultanpur	155	134	8	-	12	3	1	59	13	-
		Govt. Forest & River										
4	Fazilpur	fazilpur	23	11	63	1	2	-	7	-	15	-
		Ismailpur	126	112	59	32	94	91	12	2	52	56
		Salempur	95	96	17	-	28	-	-	-	45	5
		Total	**1365**	**1206**	**635**	**90**	**485**	**99**	**89**	**120**	**513**	**458**

(Source- District Census- 2001)

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 19.**

Table 19. Migration Pattern in Lower Sukar Rao Nadi Watershed (IWMP III)

S. No.	Name of Micro Watersheds	Name of villages	Total Population	Migration(in %age)			Migration by months			Main reason for migration	Income during migration/ month/person
				Male	Female	Total	0-3 months	3-6 months	More than 6 months		
1.	Mirzapur	Mirzapur	830		-	-	-	-	-	-	-
		Kotla	457						-	-	-
		Tewar	388						-	-	-
		Bijauli	1035		-				-	-	-
		Safilpur	1503		-				-	-	-
2	Taprian	Tunde ki taprian	151	- -		- -			-	-	-
3	Atari	Kalianpur Atari	933	37	-	37 -	-	37	-	Lack of availability of fodder for cattle	1000-2500
		Bana Bahadur	183	8	-	8	-	8	-	Lack of availability of fodder for cattle	1000-2500
		Islam nagar	542	27	-	27	-	27	-	Lack of availability of fodder for cattle	1000-2500
		Sultanpur	351	14	-	14	-	14	-	Lack of availability of fodder for cattle	1000-2500
4	Fazilpur	Fazilpur	739						-	-	-
		Ismailpur	917						-	-	-
		Salempur	633						-	-	-

Source: Baseline Survey

- -
- -
- -

POVERTY: Most of the residents are very poor; having poverty had been mostly accepted as inevitable as traditional modes of production were insufficient to give an entire population a comfortable standard of living. The distribution of the BPL and their percentage is presented in table 20.

Table 20. BPL Pattern

S. No.	Name of Micro watersheds	Name of villages	Total houses	Total Household-BPL	% of BPL HH
1.	Mirzapur	Mirzapur	132	47	36
		Kotla	84	29	34
		Tewar	60	37	62
		Bijauli	165	76	46
		Safilpur	268	118	44
2	Taprian	Tunde ki taprian	23	2	9
3	Atari	Kalianpur Atari	148	35	24
		Bana Bahadur	30	12	40
		Islam nagar	103	9	9
		Sultanpur	66	4	6
4	Fazilpur	Fazilpur	122	43	35
		Ismailpur	151	26	17
		Salempur	125	28	22
			1477	**466**	**32**

(Source: District Administration Yamunanagar, 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 21** and the facilities/ household assets in the villages under watershed is shown in **Table 22**.

Table 21. Village Infrastructure

S. No.	Name of Micro watersheds	Name of villages	Bank Y/N	Post office Y/N	School Primary/ High/ Sr.Sec	Milk Collection Centre Y/N	Pucca Road to Village Y/N	Health Facility Govt/Private Y/N	Veterinary facility Y/N
1.	Mirzapur	Mirzapur	N	N	Middle School	N	Y	N	N
		Kotla	N	N	High School	N	Y	Y	Y
		Tewar	N	N	-	N	Y	N	N
		Bijauli	N	N	Middle School	N	Y	N	N
		Safilpur	N	N	Middle School	N	Y	N	N
2	Taprian	Tunde ki taprian	N	N	-	N	Y	N	N
3	Atari	Kalianpur Atari	N	N	Middle School	N	Y	N	N
		Bana Bahadur	N	N	-	N	Y	N	N
		Islam nagar	N	N	-	N	Y	N	N
		Sultanpur	N	N	Middle School	N	Y	N	N
4	Fazilpur	Fazilpur	N	N	Middle School	N	Y	N	N
		Ismailpur	N	N	Middle School	N	Y	N	N
		Salempur	N	N	Sr. Sec. School	N	Y	N	N

Source: District Administration, Yamunanagar)

FACILITIES/ HOUSEHOLD ASSETS

Table 22. Facilities/ Household assets in Lower Sukar Rao Nadi Watershed (IWMP III)

S. No.	Name of micro water sheds	Name of villages	Total no. of Houses	HHs with Safe latrines	HHs with phones		HHs with vehicles		HHs with TV sets	HHs with cooking gas	HHs with drinking water	HHs with fridge
					Landline	Mobile	2 wheelers	4 wheelers				
1.	Mirzapur	Mirzapur	132	523	7	125	82	10	14	8	132	8
		Kotla	84	34	4	80	52	7	9	5	84	5
		Tewar	60	24	3	57	37	5	7	4	60	4
		Bijauli	165	58	8	156	132	11	18	11	165	10
		Safilpur	268	94	13	245	12	198	29	17	268	16
2	Taprian	Tunde ki taprian	23	8	2	14	12	3	2	1	23	1
3	Atari	Kalianpur Atari	148	59	7	141	92	12	16	10	148	9
		Bana Bahadur	30	12	2	28	19	2	3	2	30	2
		Islam nagar	103	41	5	98	64	8	11	7	103	6
		Sultanpur	66	26	3	63	41	5	7	4	66	4
4	Fazilpur	Fazilpur	122	49	6	116	76	10	13	8	122	7
		Ismailpur	151	60	7	143	94	12	16	10	151	9
		Salempur	125	50	6	119	77	10	14	8	125	7

Source: Baseline Survey

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 23.There is no major income from the common property resource to the individuals.

Table 23 Per capita (Household) income Lower Sukar Rao Nadi Watershed (IWMP III)

S. No.	Name of micro watersheds	Name of villages	Agriculture in Rs. P.A	Animal Husbandry in Rs. P.A	Casual labour in Rs. P.A	Others in Rs. P.A	Total in Rs.
1.	Mirzapur	Mirzapur	20100	15400	4500	4200	44200
		Kotla	21300	16500	4500	4100	46400
		Tewar	22400	15400	4800	3900	46500
		Bijauli	20600	15200	4600	3800	44200
		Safilpur	20100	15400	4500	4200	44200
2	Taprian	Tunde ki taprian	21300	16500	4500	4100	46400
3	Atari	Kalianpur Atari	22500	18600	5800	4400	51300
		Bana Bahadur	21600	18400	5400	4300	49700
		Islam nagar	20500	17400	4900	5200	48000
		Sultanpur	20100	15400	4500	4200	44200
4	Fazilpur	Fazilpur	21300	16500	4500	4100	46400
		Ismailpur	22400	15400	4800	3900	46500
		Salempur	20600	15200	4600	3800	44200

3.5.4 Comparative Status of crop Productivity

Three major crops namely Wheat, Maize and Paddy are sown in Watershed villages. Though main crops grown in the area are wheat and maize, Paddy is also cultivated in some of the villages where irrigation facilities are available through the privately owned tube wells. Compared to rest of the district and the state, the average yield of these crops is quite low. **Table 24** exhibits the average yield of major crops in the watershed and comparisons have been made at block, district, and state and India level.

Table 24. Average yield (kg/hectare) of crops in Lower Sukar Rao Nadi Watershed (IWMP III)

Name of the Crop	India	State	District	Block	Watershed Villages
Wheat	4307	4624	3608	2945	1768
Maize	3519	2600	2979	2470	1412
Paddy	3990	3044	3884	3679	2415

The Project area has low productivity because of the following reasons:

- Full dependence of monsoon.
- Low use of fertilizer per unit cropped area.
- Lack of finances for farmers.
- Lack of good quality of seeds and fertilizer.
- Lack of other facilities such as storage and marketing.

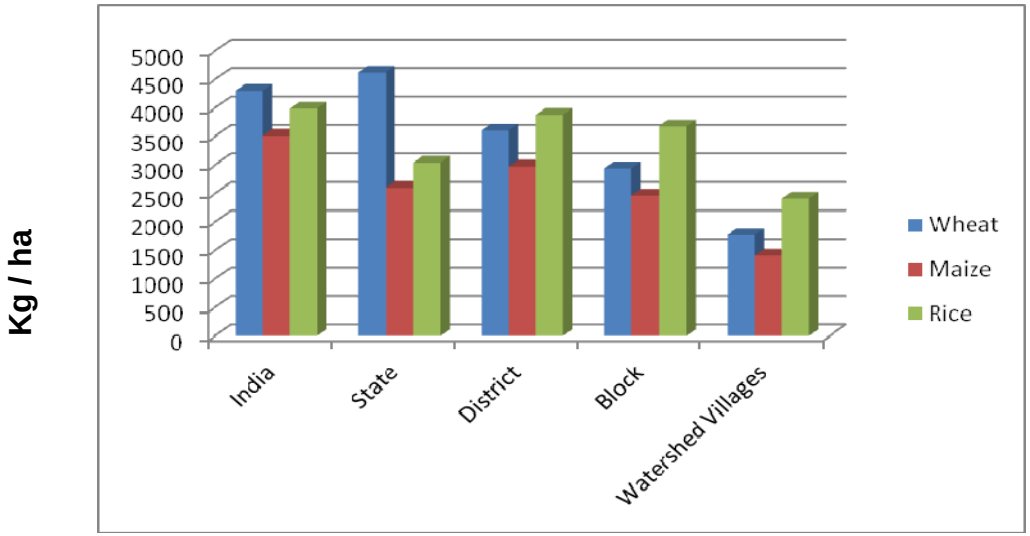


Fig. 1 Average yield of major crops

3.6 REASON FOR LOW PRODUCTIVITY

- Moderate to severe erosion hazard
- Physical properties of the soils are light in texture and with boulders here and there.
- Low water holding capacity.
- Moderate to rapid permeability.
- Low organic carbon.
- Poor phosphorous and medium potash nutrients.
- Lack of assured irrigation facility.

- Acceptance of hybrid/ high yielding varieties are nil to negligible.
- 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.

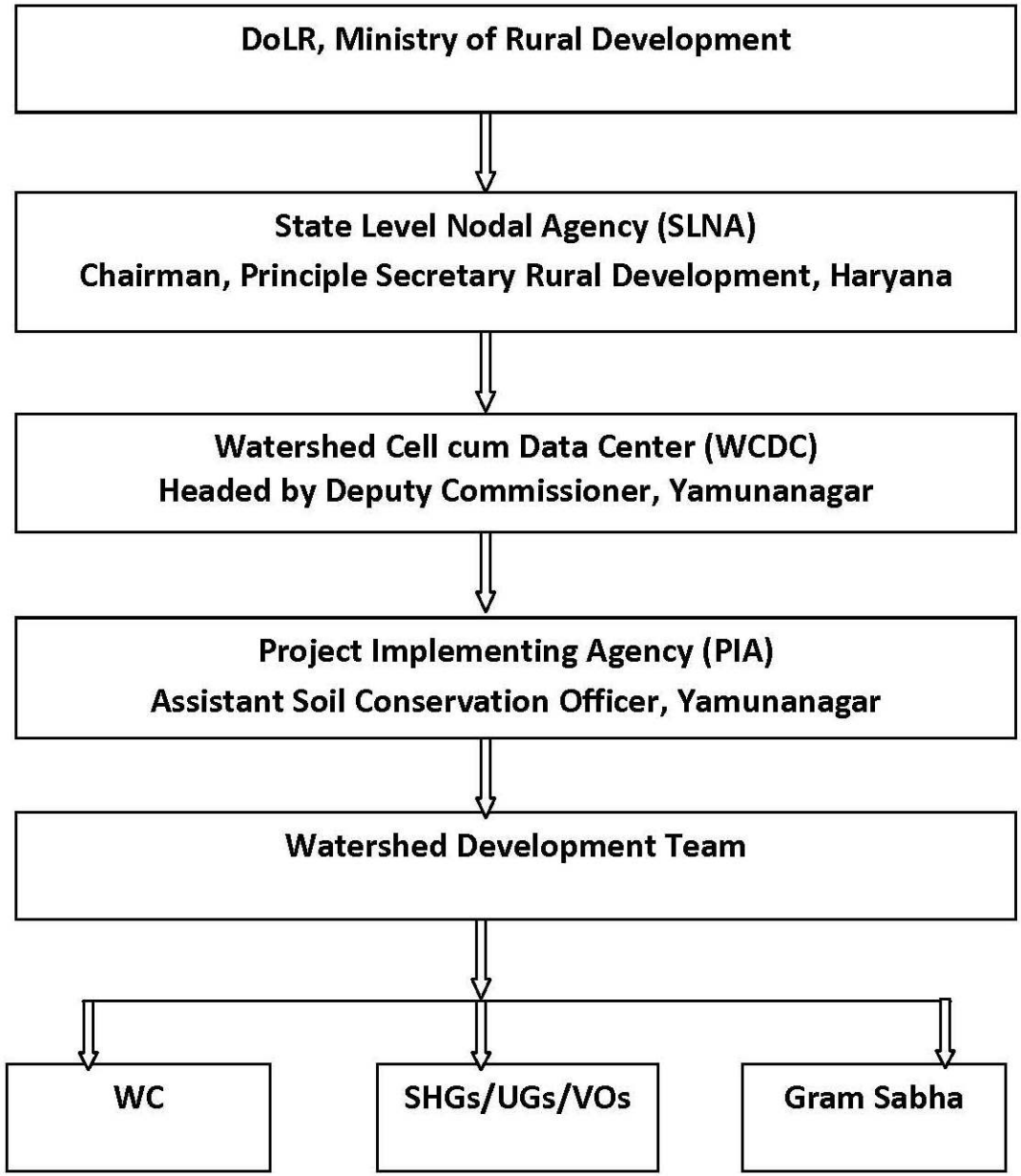
CHAPTER-4

PROJECT MANAGEMENT AGENCIES

4.1 INSTITUTIONAL ARRANGEMENT

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

The institutional set up is given below:


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

4.2 STATE LEVEL NODAL AGENCY, HARYANA

State Level Nodal Agency (SLNA) is headed by Chief Executive Officer and supported by Technical Experts is fully functional. The regular meetings with PIA and other stake holders are held to provide necessary guidance to them 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, YAMUNANAGAR

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 Yamunanagar is selected by the State Level Nodal Agency (SLNA) for Integrated Watershed Management Programme (IWMP) in Haryana. In the district Yamunanagar, where the area of development is 25321 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, Yamunanagar. 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 No. 1 PIA/ Project Implementing Agency

S.No.	Name of the Project	Details of PIA	
1	Lower Sukar Rao Nadi Watershed (IWMP-III)	i) Type of organization	Soil Conservation
		ii) Name of organization	Department of Agriculture,YNR, Haryana
		iii) Designation and Address	ASCO, Yamuna Nagar
		iv) Telephone	09416269705
		v) Fax	-----
		vi) E-mail	ascoyamunanagar@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 for its 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 Yamunanagar 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 below: **(Table 2)**

Table 2. Watershed Committees (WC) Details

Name of Micro Watershed	Name of Villages	Name of President	Name of Secretary	Name of Members
Jafar pur	Jafar pur	Ram Kumar	Kusum Devi	Raj Kumar, Sahida , Rishal Singh , Pawan Kumar, Hari Ram Naresh, Ashra,Sandori Devi, Zakmiri Devi, Bala Devi,Rishal Singh, Pawan Kumar, Mustak , Nisha Sandhu,Yashpal Singh
Nanhri	Nanhri	Star	Shakeel	Yusuf , Sukman, Gafardin, Nait Mohammad, Khas Mohammad, Nasro, Manisha, Satara, Fakiria, Suleman, Yameen , Mustak , Laldin, Nisha Sandhu, Yashpal Singh

Name of Micro Watershed	Name of Villages	Name of President	Name of Secretary	Name of Members
	Singholi	Chaman Lal	Pardeep Kumaar	Ratni Devi, Ram Lal, Alamdin, Jamila, Kamlesh ,Sulochana Jamilo, Husan, Barkha Raj, Telu, Mal Singh, Mustak , Nisha Sandhu, Yash Pal Singh
	Bholi Wala	Surender Pal	Sanjeev Kumar	Bachana Ram, Pala Ram, Ranbir, Bachana Ram , Jogindro , Paramjeet Kaur , Jogindro Devi, Amer Singh, Barkha Ram, ustak , Nisha Sandhu , Yashpal Singh
	Naya Gaon	Mauldin	Sardin	Validin, Maherdin , Kadarkhan, Asgar, Jeetram, Lilawati,Reena Devi, Aliyas, Meer Hasan, Aslam, Mustak , Nisha Sandhu,Yashpal Singh
Toder Pur	Toder Pur	Prem Chand	Ishwar Dyal	Sanjeev Kumar , Balbeer , Sandeep , Meena Devi, Mamta Rani , Shreedevi, Naresh Devi, Surjit, Nirmal Singh, Sarvan Kumar, ameshwer, Surjit, Balbeer, Nisha Sandhu, Yashpal Singh
	Pipli Wala	Shishupal	Naresh Kumar	Ram Singh, Mamta Devi, Kanta Devi, Rajpal, Ramsingh, Jai Singh , Karm Chand, Jagmal, Jyoti Ram, Balwan Mamraj, Rameshwa, Rangeel Singh, Jai Parkash, Gulbir Singh
Nathan Pur	Nathan Pur	Aslam Khan	Masrul	Jarnail Singh, Karam Chand, Bachni Devi, Parkash, Rani Devi, Jannat, , Mam Chand, Rani , Yaseen, Jagmata, Asha Devi, Rangita , Jai Parkash, Gulbir Singh
Hasangarh	Sadikpur	Banto Devi	Jaswinder Singh	Prieeto Devi, Ranbir Singh, Banti Devi, Sarvan Singh, Moh. Shareefdin, Shish Kumar, Mahinder Singh, Surender, Bhupinder Singh, Gurdial Singh, Jagmal, Ram Parkash, Yash Pal Singh. Rameshwer Das, Nisha Sandhu.

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 is 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- III LOWER SUKAR RAO NADI 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- III

Area in Hectares and Funds in Rs.

Table 1. PHASING YEAR WISE (IWMP- III Lower Sukar Rao Nadi Watershed)

(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
Lower Sukar Rao Watershed (IWMP III)	3973	2978	35736000	Administrative costs	357360	357360	1072080	1072080	714720	3573600
				Monitoring	0	0	0	357360	0	357360
				Evaluation	0	0	0	0	357360	357360
				Entry point activities	1429440	0	0	0	0	1429440
				Institution and capacity building	0	1786800	0	0	0	1786800
				Detailed project report	357360	0	0	0	0	357360
				Watershed development works	0	2858880	5717760	6075120	5360400	20012160
				Livelihood activities for the asset less persons	0	0	1072080	1786800	357360	3216240
				Production system and micro enterprises	0	0	1072080	1429440	1072080	3573600
				Consolidation phase	0	0	0	0	1072080	1072080
				Total	**2144160**	**5003040**	**8934000**	**10720800**	**8934000**	**35736000**
				Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and Funds in Rs.

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
1311	15732000	Administrative costs	157320	157320	471960	471960	314640	1573200
		Monitoring	0	0	0	157320	0	157320
		Evaluation	0	0	0	0	157320	157320
		Entry point activities	629280	0	0	0	0	629280
		Institution and capacity building	0	786600	0	0	0	786600
		Detailed project report	157320	0	0	0	0	157320
		Watershed development works	0	1258560	2517120	2674440	2359800	8809920
		Livelihood activities for the asset less persons	0	0	471960	786600	157320	1415880
		Production system and micro enterprises	0	0	471960	629280	471960	1573200
		Consolidation phase	0	0	0	0	471960	471960
		Total	**943920**	**2202480**	**3933000**	**4719600**	**3933000**	**15732000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and Funds in Rs.

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
109	1308000	Administrative costs	13080	13080	39240	39240	26160	130800
		Monitoring	0	0	0	13080	0	13080
		Evaluation	0	0	0	0	13080	13080
		Entry point activities	52320	0	0	0	0	52320
		Institution and capacity building	0	65400	0	0	0	65400
		Detailed project report	13080	0	0	0	0	13080
		Watershed development works	0	104640	209280	222360	196200	732480
		Livelihood activities for the asset less persons	0	0	39240	65400	13080	117720
		Production system and micro enterprises	0	0	39240	52320	39240	130800
		Consolidation phase	0	0	0	0	39240	39240
		Total	**78480**	**183120**	**327000**	**392400**	**327000**	**1308000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and

Funds in Rs

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
838	10056000	Administrative costs	100560	100560	301680	301680	201120	1005600
		Monitoring	0	0	0	100560	0	100560
		Evaluation	0	0	0	0	100560	100560
		Entry point activities	402240	0	0	0	0	402240
		Institution and capacity building	0	502800	0	0	0	502800
		Detailed project report	100560	0	0	0	0	100560
		Watershed development works	0	804480	1608960	1709520	1508400	5631360
		Livelihood activities for the asset less persons	0	0	301680	502800	100560	905040
		Production system and micro enterprises	0	0	301680	402240	301680	1005600
		Consolidation phase	0	0	0	0	301680	301680
		Total	**603360**	**1407840**	**2514000**	**3016800**	**2514000**	**10056000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and Funds in Rs.

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
720	8640000	Administrative costs	86400	86400	259200	259200	172800	864000
		Monitoring	0	0	0	86400	0	86400
		Evaluation	0	0	0	0	86400	86400
		Entry point activities	345600	0	0	0	0	345600
		Institution and capacity building	0	432000	0	0	0	432000
		Detailed project report	86400	0	0	0	0	86400
		Watershed development works	0	691200	1382400	1468800	1296000	4838400
		Livelihood activities for the asset less persons	0	0	259200	432000	86400	777600
		Production system and micro enterprises	0	0	259200	345600	259200	864000
		Consolidation phase	0	0	0	0	259200	259200
		Total	**518400**	**1209600**	**2160000**	**2592000**	**2160000**	**8640000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

CHAPTER – 6
PREPARATORY PHASES

The Preparatory Phase of the project will be the first year of the project. The major objective of this phase is to build appropriate mechanism for adoption of participatory approach and empowerment of local institutions (WC, SHG, and UG). WDT will assume the role of facilitator during this phase. In this phase, the main activities will include:

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. Those groups will be revived and new ones were formed depending upon willingness of the interest groups. The type of activities these groups want pursue and their capacity building requirements were 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, micro-watershed wise and village wise with the lined 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. Since the DPR will be part of MIS from which details are arranged on two various layers on GIS. 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 Yamunanagar district.

Strengths

- Good Rain fall
- Strong linkage with national and state level institutes and KGK for capacity building and technical guidance.
- Favorable environment for raising fruits, vegetables and medicinal plants.
- 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 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.
- Frequent droughts.
- Poor avenues for employment.
- Wild life menance.

CAPACITY BUILDING- 5%
Rs. 17, 86,800/-

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

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

4. Rationale

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

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

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

5. Objectives

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

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

Table 1. Statement of Targets under Proposed Training Action Plan at Micro Watershed Level to be conducted by WDT members of Yamunanagar 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**				
	Yamunanagar District	Members of Watershed Committees @ 10 per committee would also include accompanying WDT Members.	1100	300-350	3
02	Block Level Functional Programmes for Secretaries of Watershed Committees. **Two Days**				
	Yamunanagar District	Secretaries of Village Watershed	110	35-40	3
03	Project Level Sensitization Camps for WC **One Days**				
	Yamunanagar District	Members of Watershed Committees @ 10 Persons (Tentative) per WC	1100	50	22
04	Village Level Awareness Camps on IWMP at Micro Watershed Level for User Groups **One Day**				
	Yamunanagar District	Approximately 50 prospective user groups per micro watershed.	1850	50	35
05	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP **One Day**				
	Yamunanagar District	Three persons (Leader, Secretary and Treasurer) per Self Help Group @ around one SHG per village.	330	50	7

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	65473
2	Block Level Functional Programmes for Secretaries of Watershed Committees. Two Days	9009
3	Village Level Sensitization Camps for WC One Days	39787
4	Village Level Awareness Camps on IWMP at Micro Watershed Level for Prospective User Groups One Day	35107
5	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP One Day	18159
	Total	**167535**

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

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-village level	Orientation on IWMP, SHGs cum Exposure Visit	2	22400	5	16	11200	700	1400	112000
2	User groups from each village	NRM, Post Project Management etc. –Exposure Visit	2	22400	5	16	11200	700	1400	112000
3	Watershed Level-WDT Members	Part II-Module I to V-Exposure Visit Outside State-Conceptual, Technical, Social, Management of Finance, Monitoring and Evaluation.	4	24000	5	4	6000	1500	6000	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
4	Watershed Level-PIA	Exposure Visit-Within and outside State. Fundamentals of Watershed, Finance Management, Final Report on WDP etc.	2	48000	5	16	24000	1500	3000	240000
5	District Level-WDC	Exposure visit to successful watershed, University.	2	22400	5	16	11200	700	1400	112000
6	District Level-Line Deptt., WDC	Exposure visit to successful watersheds within state.	2	22400	5	16	11200	700	1400	112000
7	District Level trainers/Resource	Exposure visit to successful	4	24000	5	4	6000	1500	6000	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
	Persons	watersheds outside state								
	Total									**928000**

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

S. No.	District	No. Micro watershed	No. of Camps/ Year/ Micro watershed	Total No. of camp per Year	Total No. of camps for 5 Years	Amount of per Camp	Amount per Micro watershed	Total Budget
1	Farmer Training Camp in each season	4	2	8	40	12000	120000	480000
2	Propaganda & Documentation (Puppet show, documentary movies show, videography, Photography, wall Painting, Display Board, pamphlets, leaf lets. Etc)	4	2	8	40	5000	50000	200000
3	Contingency charges							11265
	Total							**691265**

i) **Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD = 1,67,535/-**

ii) **Micro Watershed Wise Exposure cum training Visit For SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members**
= 9,28,000/-

iii) **Farmer's / Beneficiaries training camps with Extension Program's = 6,91,265/-**

Grand Total = 17, 86,800/-

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. 14, 29,440/-** 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 Lower Sukar Rao Nadi Watershed (IWMP III)

Block	Name of Project	No. of EPA Targeted/ Identified	No. of EPAs not yet started	No. of EPA undertaken / in-Progress	No. of EPAs Completed	Name/Nature of EPA	Location Village	Exp. of EPAs completed (Rs. In lacs)
Sadhaura	Lower sukar rao nadi watershed (IWMP III)	7	0	0	7	Cattle Creech	Mirjapur	0.30790
						Cattle Drinking water Khol 2 nos		0.58726
						Drinking Water Hodi in School		0.30251

Block	Name of Project	No. of EPA Targeted/ Identified	No. of EPAs not yet started	No. of EPA undertaken / in-Progress	No. of EPAs Completed	Name/Nature of EPA	Location Village	Exp. of EPAs completed (Rs. In lacs)
						Cattle Creech	Kotla	0.30790
						Cattle Drinking water Khol 2 nos		0.31851
						Drinking Water Hodi in School		0.30252
						Cattle Creech	Tewar	0.42949
Bilaspur		9	2	0	7	Cattle Creech	Bijoli	0.39988
						Cattle Drinking Water Khol		0.16456
						Hand Pump		0
						Cattle Creech	Safilpur	0.43008
						Cattle Drinking Water Khol		0.28098
						Hand Pump		0
						*****Dirty Water Channel		1.5619
						Cattle Creech	Tunde ki taprian	0.43008
						Cattle Drinking Water Khol		0.15907
Sadhaura		20	3	0	17	Cattle Creech	Kalyanpur antri	0.32130
						Cattle Drinking Water Khol		0.16562
						Dirty Water Channel		0.76874

Block	Name of Project	No. of EPA Targeted/ Identified	No. of EPAs not yet started	No. of EPA undertaken / in-Progress	No. of EPAs Completed	Name/Nature of EPA	Location Village	Exp. of EPAs completed (Rs. In lacs)
						Cattle Creech	Bana Bahadurpur	0.32130
						Cattle Drinking Water Khol		0.15629
						Dirty Water Channel		0.88281
						Cattle Creech	Islam Nagar	0.30789
						Cattle Drinking Water Khol		0.13164
						Cattle Creech	Sultanpur	0.30790
						Cattle Drinking Water Khol		0.13164
						Strengthening of river bank	Govt. Forest & River	0
						Cattle drinking water khol	Fazilpur	0.26307
						Drinking Water Hodi in School		0
						Retaining wall in old pond		0.8431
						Dirty Water Channel	Ismailpur	0.98893
						Drinking Water Hodi in School		0.23507
						Cattle drinking water khol		0.26298

Block	Name of Project	No. of EPA Targeted/ Identified	No. of EPAs not yet started	No. of EPA undertaken / in-Progress	No. of EPAs Completed	Name/Nature of EPA	Location Village	Exp. of EPAs completed (Rs. In lacs)
						Cattle drinking water khol	Salempur	0.27496
						Drinking Water Hodi in School		0
						Retaining wall in old pond		0.50095
		36	**5**	**0**	**31**		**TOTAL**	**12.84683**

Total Cost of project area @ 4%: Rs. 14, 29,440/-

CHAPTER - 7
WORK PHASE

7.1 WATERSHED DEVELOPMENT WORKS - 56%

All the Works under the project have been identified after detailed survey of the Project Area and discussions held with team of experts consisted of DSCO, ASCO, Hydrologist from Haryana supported by Livelihood expert, Agriculture and Horticulture expert and expert in Animal Husbandry. Participatory approach has been adopted to identify the activities under the project. The detailed discussions were held with watershed committees and works identified along with villagers after making visits to affected sites. The works mainly relate to soil moisture conservation activities, renovation of ponds, structures for protecting fields etc. The proposed project proposals were presented in the Gram Sabha meeting as per the schedule and were approved with certain changes. The works thus identified are given in the attached sheets along with estimates – micro watershed wise.

A. Drainage line Treatment

7.1.1 Crate Wire Structures (Gabian type and Spur): Where ever local stones are available in prescribe size in the drainage lines, crate wire structures (Gabian type) have been proposed. The height of such structure has 1 to 1.2 meters of each step. Simultaneously in seasonal torrents have high velocity due to steep slope and meander quite often. In this process, lands located along banks are eroded and converted to stony gully beds. The infrastructure like local paths, culverts, buildings are also damaged and threatened by flash floods.

Proposed system: There is pertinent need to afforest the area and reduce runoff. The crate wire (Gabian type)/woven spurs supported by live hedges are proposed to protect the land. Incidentally stones of suitable size are available in some khads. This type of work has already been done under different schemes by agriculture, forest and drainage wing of irrigation department and is quite successful but lot more needs to be done.

7.1.2 Drop Structures/ Cement stone Masonry Structure

Present Status: The rainwater from upper lands located at hill slopes passes through the farm lands and forms a network of shallow and deep gullies which keep on widening and deepening. These gullies not only damage the lands located along their banks but are source of debris which is carried down and deposited in gully beds and cause meandering patterns, again a cause of bank erosion source.

Proposed Activity: Drop Structures/ Cement stone Masonry Structure in series are proposed to break the velocity and safe disposal of rain water and induce deposition of sediment in nala beds and terraces also. Such structures planned as per size of the gully and discharge carried by them. Number of check dams is requested by the farmers to save the land. Such check dams have already been constructed under Kandi Project and State Soil Conservation schemes of agriculture and forest department but many more are needed at strategic locations.

A check dam constructed under Kandi Project in many villages of hills and foothills of Shivalik area has saved the houses from under cutting by the gully.

7.1.3 Construction of Retaining Walls for Bank Protection

Existing System: The whole project area is infested with large network of gullies which are damaging the farm lands/ habitation located along the banks of nalas and rivers. The land holdings are small and any loss of land and its conversion

to a Nala badly affects the economy of the family. Under, the Kandi Project stone masonry retaining walls were constructed at strategic locations which saved the land of the farmers and banks of village ponds.

Proposed System: Run-off from upper area shall be reduced and flood peaks moderated by afforestation and rain water harvesting structures. Then as per need, retaining walls are proposed at strategic locations to protect the farm lands, bank of ponds, habitation and infrastructure.

B. Water Resources Development

7.2.1 Earthen Gully Plug, Silt Detention Dam and Earthen Embankment

Present Status: Rain-fed agriculture is gambling with rains. There is no assured irrigation facility available in the project area to stabilize crop production through limited supplemented irrigation. There are sites where water harvesting structures can be constructed but people do not get organize for common cause. Moreover, they are unable to spend money from their own resources. Only few harvesting dams were constructed earlier under Kandi project and state schemes but demand was always more than supply.

Suggested Interventions: In quite a number of villages, sites have been identified for Water Harvesting Structures, Earthen Gully Plug, Silt Detention Dam, Earthen Embankment, Guide Bandh and Percolation tank etc. but GPs are interested to get the dams constructed from other schemes of the Department. In some watershed village paths have converted in nalas due to erosion to be strengthened by construction of earthen embankments. As such no earthen dam for water harvesting was planned in this project.

This phase would start after the preparatory phase is by and large complete. It was 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 mechanical conservation measures adopting ridge to valley approach. The protective vegetation cover would be regenerated in forest and common lands. The drainage lines treatment is proposed after afforestation of hill slopes. This includes vegetative barriers, shall scale dry stone, crate wire and stone masonry check dams and silt detention structures. In this water stressed project area, rainwater harvesting to reduce soil erosion, recharge ground water, improve moisture regime and use of harvesting water for human and livestock use and in some case for irrigation was given very high priority. 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 III Yamunanagar) is given below and The Existing location of works and Proposed Action/ Treatment Plan map shown in Annexure VIII and IX.

Village wise distribution of 56% developments works

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

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Earthen Gully Plug/Earthen Embankment (the outlet structure from CSMS/ CBMS)	Along the main drainage line	No.	7	0.77	5.39	To divert the runoff/Soil conservation.	-----
2	Crate Wire Structure/Spurs	At suitable land of UGs/Panchayat land&village area.	Cum.	45	0.0228	1.03	To improve environment and helf in water /soil conservation to increase income.	-----
3	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land&village area.	Ha.	6	0.15	0.90	For the control of soil erosion /recharging runoff management.	-----
4	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land&village area.	Cum.	268	0.0326	8.74	To improve environment and helf in water /soil conservation to increase income.	-----
5	Rain fed Horticulture	At suitable land of UGs/Panchayat land&village area.	Ha.	4	0.4	1.60	To break the speed of runoff.	-----
6	Guide Bandh's	-----	No.	1	3	3.00	-----	-----
Total Cost						**20.65**		
Available funds						**19.62**		
Convergence						**1.03**		

Table 2. Name of Project IWMP-3 Name of Micro Watershed: Mirzapur Name of Village: Kotla

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Earthen Gully Plug/Earthen Embankment (the outlet structure from CSMS/ CBMS)	Along the main drainage line	No.	2	0.77	1.54	To divert the runoff/Soil conservation.	-----
2	Crate Wire Structure/Spurs	At suitable land of UGs/Panchayat land&village area.	Cum.	26	0.0228	0.59	To improve environment and helf in water /soil conservation to increase income.	-----
3	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land&village area.	Ha.	5	0.15	0.75	For the control of soil erosion /recharging runoff management.	-----
4	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land&village area.	Cum.	146	0.0326	4.76	To improve environment and helf in water /soil conservation to increase income.	-----
5	Rain fed Horticulture	At suitable land of UGs/Panchayat land&village area.	Ha.	5	0.4	2.00	To break the speed of runoff.	-----
6	Guide Bandh's	-----	No.	1	3	3.00	-----	-----
Total Cost						**12.64**		
Available funds						**12.03**		
Convergence						**0.61**		

Table 3. Name of Project IWMP-3 Name of Micro Watershed: Mirzapur Name of Village: Tewar

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land&village area.	Ha.	2	0.15	0.30	For the control of soil erosion /recharging runoff management.	-----
2	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land&village area.	Cum.	60	0.0326	1.96	To improve environment and helf in water /soil conservation to increase income.	-----
3	Rain fed Horticulture	At suitable land of UGs/Panchayat land&village area.	Ha.	1	0.4	0.40	To break the speed of runoff.	-----
4	Guide Bandh's	-----	No.	1	3	3.00	-----	-----
Total Cost						**5.66**		
Available funds						**5.31**		
Convergence						**0.35**		

Table 4. Name of Project IWMP-3 Name of Micro Watershed: Mirzapur Name of Village: Bijauli

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Earthen Gully Plug/Earthen Embankment (the outlet structure from CSMS/ CBMS)	Along the main drainage line	No.	3	0.77	2.31	To divert the runoff/Soil conservation.	-----
2	Crate Wire Structure/Spurs	At suitable land of UGs/Panchayat land&village area.	Cum.	27	0.0228	0.62	To improve environment and helf in water /soil conservation to increase income.	-----

3	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land&village area.	Ha.	7	0.15	1.05	For the control of soil erosion /recharging runoff management.	-----
4	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land&village area.	Cum.	155	0.0326	5.05	To improve environment and helf in water /soil conservation to increase income.	-----
5	Rain fed Horticulture	At suitable land of UGs/Panchayat land&village area.	Ha.	2	0.4	0.80	To break the speed of runoff.	-----
6	Guide Bandh's	-----	No.	1	3	3.00	-----	-----
Total Cost						**12.83**		
Available funds						**12.16**		
Convergence						**0.67**		

Table 5. Name of Project IWMP-3 Name of Micro Watershed: Mirzapur Name of Village: Safilpur

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Earthen Gully Plug/Earthen Embankment (the outlet structure from CSMS/ CBMS)	Along the main drainage line	No.	17	0.77	13.09	To divert the runoff/Soil conservation.	-----
2	Crate Wire Structure/Spurs	At suitable land of UGs/Panchayat land&village area.	Cum.	52	0.0228	1.19	To improve environment and helf in water /soil conservation to increase income.	-----

3	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land&village area.	Ha.	9	0.15	1.35	For the control of soil erosion /recharging runoff management.	-----
4	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land&village area.	Cum.	453	0.0326	14.77	To improve environment and helf in water /soil conservation to increase income.	-----
5	Rain fed Horticulture	At suitable land of UGs/Panchayat land&village area.	Ha.	4	0.4	1.60	To break the speed of runoff.	-----
6	Guide Bandh's	-----	No.	3	3	9.00	-----	-----
Total Cost						**40.99**		
Available funds						**38.98**		
Convergence						**2.01**		

Table 6. Name of Project IWMP-3 Name of Micro Watershed: Tunde Ki Taprian Name of Village: Tunde Ki Taprian

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Earthen Gully Plug/Earthen Embankment (the outlet structure from CSMS/ CBMS)	Along the main drainage line	No.	4	0.77	3.08	To divert the runoff/Soil conservation.	-----
2	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land & village area.	Ha.	2	0.15	0.30	For the control of soil erosion /recharging runoff management.	-----
3	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land & village area.	Cum.	110	0.0326	3.59	To improve environment and helf in water /soil conservation to increase income.	-----

4	Rain fed Horticulture	At suitable land of UGs/Panchayat land & village area.	Ha.	2	0.4	0.80	To break the speed of runoff.	-----
Total Cost						**7.77**		
Available funds						**7.32**		
Convergence						**0.45**		

Table 7. Name of Project IWMP-3 Name of Micro Watershed: Atari Name of Village: Kalyanpur Atari

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Earthen Gully Plug/Earthen Embankment (the outlet structure from CSMS/ CBMS)	Along the main drainage line	No.	5	0.77	3.85	To divert the runoff/Soil conservation.	-----
2	Crate Wire Structure/Spurs	At suitable land of UGs/Panchayat land&village area.	Cum.	79	0.0228	1.80	To improve environment and helf in water /soil conservation.	-----
3	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land&village area.	Ha.	7	0.15	1.05	For the control of soil erosion /recharging runoff management.	-----
4	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land&village area.	Cum.	160	0.0326	5.22	To improve environment and helf in water /soil conservation to increase income.	-----
5	Rain fed Horticulture	At suitable land of UGs/Panchayat land&village area.	Ha.	4	0.4	1.60	To break the speed of runoff.	-----
6	Guide Bandh's	-----	No.	2	3	6.00	-----	-----
Total Cost						**19.52**		
Available funds						**18.55**		
Convergence						**0.97**		

Table 8. Name of Project IWMP-3 Name of Micro Watershed: Atari Name of Village: Bana bahadurpur

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Silt Detention Dam's/	At suitable land of UGs/Panchayat land &village area.	No.	1	4.95	4.95	To take the runoff water & waste &water of the portion of the village.	-----
2	Earthen Gully Plug/Earthen Embankment (the outlet structure from CSMS/ CBMS)	Along the main drainage line	No.	6	0.77	4.62	To divert the runoff/Soil conservation.	-----
3	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land &village area.	Ha.	5	0.15	0.75	For the control of soil erosion /recharging runoff management.	-----
4	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land &village area.	Cum.	205	0.0326	6.68	To improve environment and helf in water /soil conservation to increase income.	-----
5	Rain fed Horticulture	At suitable land of UGs/Panchayat land &village area.	Ha.	2	0.4	0.80	To break the speed of runoff.	-----
6	Guide Bandh's	-----	No.	1	3	3.00	-----	-----
Total Cost						**20.80**		
Available funds						**19.35**		
Convergence						**1.45**		

Table 9. Name of Project IWMP-3 Name of Micro Watershed: Atari Name of Village: Islam Nagar

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Crate Wire Structure/Spurs	At suitable land of UGs/Panchayat land &village area.	Cum.	28	0.0228	0.64	To improve environment and helf in water /soil conservation to increase income.	-----
2	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land &village area.	Ha.	2	0.15	0.30	For the control of soil erosion /recharging runoff management.	-----
3	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land &village area.	Cum.	87	0.0326	2.84	To improve environment and helf in water /soil conservation to increase income.	-----
4	Rain fed Horticulture	At suitable land of UGs/Panchayat land &village area.	Ha.	1	0.4	0.40	To break the speed of runoff.	-----
5	Guide Bandh's	-----	No.	1	3	3.00	-----	-----
Total Cost						**7.17**		
Available funds						**6.85**		
Convergence						**0.32**		

Table 10. Name of Project IWMP-3 Name of Micro Watershed: Atari Name of Village: Sultanpur

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Crate Wire Structure/Spurs	At suitable land of UGs/Panchayat land &village area.	Cum.	11	0.0228	0.25	To improve environment and helf in water /soil conservation to increase income.	-----
2	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land &village area.	Ha.	2	0.15	0.30	For the control of soil erosion /recharging runoff management.	-----
3	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land &village area.	Cum.	29	0.0326	0.95	To improve environment and helf in water /soil conservation to increase income.	-----
4	Rain fed Horticulture	At suitable land of UGs/Panchayat land &village area.	Ha.	2	0.4	0.80	To break the speed of runoff.	-----
5	Guide Bandh's	-----	No.	1	3	3.00	-----	-----
Total Cost						**5.30**		
Available funds						**4.91**		
Convergence						**0.39**		

Table 11. Name of Project IWMP-3 Name of Micro Watershed: Atari Name of Village: Govt. Forest & River

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Earthen Gully Plug/Earthen Embankment (the outlet structure from CSMS/ CBMS)	Along the main drainage line	No.	3	0.77	2.31	To divert the runoff/Soil conservation.	-----

2	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land &village area.	Cum.	67	0.0326	2.18	To improve environment and helf in water /soil conservation to increase income.	-----
3	Guide Bandh's	-----	No.	1	3	3.00	-----	-----
Total Cost						**7.49**		
Available funds						**6.65**		
Convergence						**0.84**		

Table 12. Name of Project IWMP-3 Name of Micro Watershed: Fazilpur Name of Village: Fazilpur

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Earthen Gully Plug/Earthen Embankment (the outlet structure from CSMS/ CBMS)	Along the main drainage line	No.	3	0.77	2.31	To divert the runoff/Soil conservation.	-----
2	Crate Wire Structure/Spurs	At suitable land of UGs/Panchayat land &village area.	Cum.	37	0.0228	0.84	To improve environment and helf in water /soil conservation to increase income.	-----
3	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land &village area.	Ha.	4	0.15	0.60	For the control of soil erosion /recharging runoff management.	-----
4	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land &village area.	Cum.	306	0.0326	9.98	To improve environment and helf in water /soil conservation to increase income.	-----
5	Rain fed Horticulture	At suitable land of UGs/Panchayat land &village area.	Ha.	2	0.4	0.80	To break the speed of runoff.	-----

6	Guide Bandh's	-----	No.	1	3	3.00	-----	-----
Total Cost						**17.53**		
Available funds						**16.67**		
Convergence						**0.86**		

Table 13. Name of Project IWMP-3 Name of Micro Watershed: Fazilpur Name of Village: Ismailpur

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Earthen Gully Plug/Earthen Embankment (the outlet structure from CSMS/ CBMS)	Along the main drainage line	No.	7	0.77	5.39	To divert the runoff/Soil conservation.	-----
2	Crate Wire Structure/Spurs	At suitable land of UGs/Panchayat land &village area.	Cum.	57	0.0228	1.30	To improve environment and helf in water /soil conservation to increase income.	-----
3	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land &village area.	Ha.	4	0.15	0.60	For the control of soil erosion /recharging runoff management.	-----
4	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land &village area.	Cum.	251	0.0326	8.18	To improve environment and helf in water /soil conservation to increase income.	-----
5	Rain fed Horticulture	At suitable land of UGs/Panchayat land &village area.	Ha.	2	0.4	0.80	To break the speed of runoff.	-----
6	Guide Bandh's	-----	No.	2	3	6.00	-----	-----
Total Cost						**22.27**		
Available funds						**21.17**		
Convergence						**1.10**		

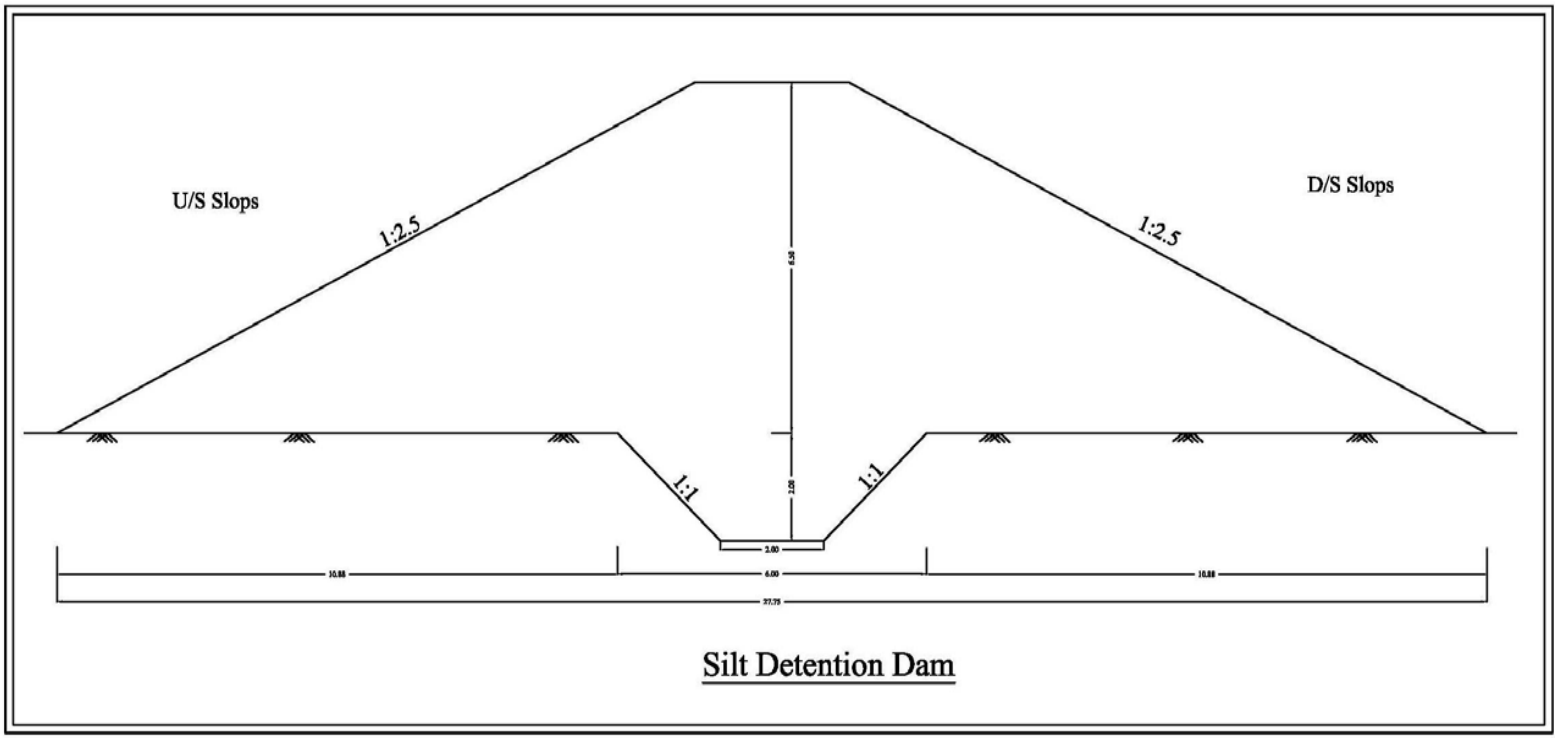
Table 14. Name of Project IWMP-3 Name of Micro Watershed: Fazilpur Name of Village: Salempur

Sr. No.	Nature of Works	Location	Unit	No. of Works		Estimated Cost Rs. In Lacs	Objective	Remarks
				Phy	Unit Cost Rs. in Lacs			
1	Crate Wire Structure/Spurs	At suitable land of UGs/Panchayat land&village area.	Cum.	66	0.0228	1.50	To improve environment and helf in water /soil conservation to increase income.	-----
2	Agro Forestry/Afforestation	At suitable land of UGs/Panchayat land&village area.	Ha.	2	0.15	0.30	For the control of soil erosion /recharging runoff management.	-----
3	Cement Stone/Brick Masonry Structures/Drop Structures/Retaining walls	At suitable land of UGs/Panchayat land&village area.	Cum.	94	0.0326	3.06	To improve environment and helf in water /soil conservation to increase income.	-----
4	Rain fed Horticulture	At suitable land of UGs/Panchayat land&village area.	Ha.	1	0.4	0.40	To break the speed of runoff.	-----
5	Guide Bandh's	-----	No.	2	3	6.00	-----	-----
Total Cost						**11.27**		
Available funds						**10.55**		
Convergence						**0.72**		

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 15. DETAILED ESTIMATE OF SILT DETENTION DAM

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



Silt Detention Dam

Table 16. Leads Statement

Leads Statement :-			
Cross Section Area = (Base + Top) ÷ 2 x Height i.e {(27.75 +3.00) ÷ 2} x 4.50 = 69.19 Square meters			
Horizontal leads = (Base/2) + (Cross section area/ 2 x 0.6) i.e. (27.75/2) + [{69.19}/(2 x 0.6)] =71.54 meters			
Vertical leads = (Height +0.60) x 0.4 x 10 i.e. (4.50 +0.60) x 0.4 x 10 = 20.40 meters			
Total leads = 71.54 meters + 20.40 meters = 91.94 meters			

Number of leads = (91.94 - 15.00) / 7.5 = 10.25 leads Or Say 11 No. of Leads							
Area of Jungle Clearance :-							
Area to be covered by the body of Dam = Length x Average base i.e. 50.00 x 27.75 = 1387.50 Sq. meters							
Area from where E/W is to be excavated = Av. Length x leads i.e. 50.00 x 91.94 = 4597.00 Sq. meters							
Total Area = 1387.50 + 4597.00 =		5984.50	Sq. meters.				
Volume of Key Trench :-							
(Length - 2 x 2.50) x Av. Width x Height i.e (50.00 - 2 x 2.50) x (6.00 +2.00)/2 x 2.00=						360.00	cum
Volume of Loose soil to be removed :-							
Area to be covered by the body of Dam X Depth of loose soil i.e (1387.50 x 0.30) =						416.25	cum
Volume of Earthwork in bund filling :-							
(Cross Section Area X Length) + Loose soil to be removed i.e.(69.19 x 50.00)+ 416.25 =						3875.75	cum
DETAILED ESTIMATE OF CHUTE SPILLWAY							
S.No.	**Description**	**No.**	**Length (mts)**	**Breadth (mts)**	**Height (mts)**	**Content (cums)**	
1	**Excavation of earthwork in foundation And plinth**				**6.6**		
	Crest wall	1	2.00	1.00	1.50 **H.S.R**	3.00	
	Side walls	2	24.00	1.00	1.50	72.00	
	Wing walls	2	2.00	1.00	1.50	6.00	
	Toe with extension	1	4.00	1.00	1.50	6.00	
	Apron	1	24.00	2.00	(2.0+1.0)/2 =1.50	72.00	
				Total =		**159.00**	
2	**Cement concrete work 1 : 4 : 8 in the Foundation and plinth**				**H.S.R 10.39**		

	Crest wall	1	2.00	0.90	0.20	0.36	
	Side walls	2	24.00	0.90	0.20	8.64	
	Wing walls	2	2.00	0.90	0.20	0.72	
	Toe with extension	1	4.00	0.90	0.20	0.72	
	Apron	1	24.00	2.00	0.20	9.60	
				Total =		**20.04**	
3	**Square rubble stone masonry course 1: 5 in foundation and plinth H.S.R 12.23**						
	Crest wall	1	2.00	0.70	1.30	1.82	
	Side walls	2	24.00	0.70	0.30	10.08	
	Wing walls	2	2.00	0.70	1.30	3.64	
	Toe with extension	1	4.00	0.70	0.30	0.84	
				Total =		**16.38**	
4	**Square rubble stone masonry course 1: 5 above G.L. H.S.R 12.23 and 12.31**						
	Side walls	2	24.00	0.50	(1.0+0.6)/2=0.80	19.20	
	Wing walls	2	2.00	0.50	1.00	2.00	
	Toe with extension	1	6.00	0.50	0.20	0.60	
	Toe wall extensions	1	1.00	0.50	0.60	0.30	
				Total =		**22.10**	
5	**Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41**						
	On top of crest wall	1	2.00	0.50	0.05	0.05	
	On top of side walls	2	24.00	0.50	0.05	1.20	
	On top of wing walls	2	2.00	0.50	0.05	0.10	

	On top of Toe wall	1	4.00	0.50	0.05	0.10	
		1	24.00	2.00	0.10	4.80	
	Apron			**Total =**		**6.25**	
	Cement plastering work 1:4 on the						
	Crest wall both side	2	2.00	_	1.30	5.20	
	Side walls	2	24.00	_	(1.0+0.6)/2=0.80	38.40	
	Wing walls	2	2.00	_	2.30	9.20	
	Toe with extensions	1	4.00	_	0.20	0.80	
		2 x 2	1.00	_	0.60	2.40	
6	Toe wall extensions			**Total =**		**56.00**	
	Material Statement and cost of Material:-						
S.No.	**Item of Work**	**Quantity (cum)**	**Cement (bags)**	**Sand (cum)**	**Stone blast (cum)**	**Bajri 20 mm (cum)**	**Stone boulders (cum)**
1	C.C work 1 : 4 : 8	20.04	68.136	9.6192	19.2384	_	_
2	Sq. Rub. Masonry 1: 5 in foundation.	16.38	28.1736	4.914	_	_	18.018
3	Sq. Rub. Masonry 1: 5 above ground level.	22.10	38.012	6.63	_	_	24.31
4	C.C work 1 : 2 : 4		39.375	2.75	_	5.50	_
5	C. plastering work 1 : 4	56.00 sqm 6.25	6.16	0.84	_	_	_
	Total =		**179.8566**	**24.7532**	**19.2384**	**5.5**	**42.328**

	Rates of material	245.00 per bag	950.00 per cum	965.00 per cum	985.00 per cum	945.00 per cum
	Cost of Materials	**44065**	**23516**	**18565**	**5418**	**40000**
Total Cost of Materials =		**Rupees**	**131563**	**/-only**		
ABSTRACT OF COST						
S.No.	**Item of Work**	**Quantity**	**Rate**		**Unit**	**Amount**
1	Jungle clearance including uprooting of rank vegetarian, grass, bush woods etc H.S.R.6.26	5984.50 sq.m	Rs.66.80 + 300% C. Prem. =267.20		100 sq.m	15990.58
2	Removal of loose soil up to 0.3 m below Natural surface level H.S.R. 6.2 (b)	416.25 cum	Rs.586.60 + 350% C. Prem.= 2639.70		100 cum	10987.75
3	E/Work excavation for digging of the key trench	360.00 cum	Rs.1108.10 + 350% C. Prem.= 4986.45		100 cum	17951.22
4	Excavation of E/Work for clay filling in Key trench including lead up to 495 mts. H.S.R. 6.2(b)and 6.2 (c) H.S.R. 6.6	360.00 cum	586.60+(6x15)+(32x13.25)+ (26x12.00) + 350% C. Prem.= 6356.70		100 cum	22884.12
5	Extra for puddling work in key trench H.S.R. 6.6 (f)	360.00 cum	Rs. 498.60 + 350% C. Prem.= 2243.70		100 cum	8077.32
6	E/work excavation for making	3875.75 cum	Rs.586.60 + 350% C.		100 cum	102308.17

	embank- ment undressed including breaking of Clods. H.S.R. 6.2 (b)		Prem.= 2639.70		
7	Extra for admixture for single or kanker Exceeding 30% but up to 40%. H.S.R. 6.2 (h) ii	3875.75 cum	Rs. 318.55 + 350% C. Prem.= 1433.48	100 cum	55558.10
8	Extra for every 7.5 meter additional lead beyond 60mt but up to 255 m by the animal or animal driven cart (11 leads) H.S.R. 6.2 (c) (ii)	3875.75 cum	[(15.00 x 6 No.)+ (13.25 x 5 No.)] + 350% C. Prem.= 703.12	100 cum	27251.17
9	Extra for compaction and watering earth laying in 25cm layers source of water leads up to 1 km. H.S.R. 6.2 (g) (ii),(i)	3875.75 cum	Rs.(75.00+ 68.10)+350% C. Prem.= 643.95	100 cum	24957.89
10	Extra for rolling with road roller / tractor H.S.R. 6.2 (g) (v)	3875.75 cum	Rs.225.00 + 110 % C. Prem.= 472.50	100 cum	18312.92
11	Excavation of earthwork in foundation and plinth H.S.R 6.6	159.00 cum	Rs.1108.10 + 350 % C. Prem. =4986.45	100 cum	**7928.46**
12	Cement concrete work 1 : 4 : 8 in the Foundation and plinth	20.04 cum	Rs. 64.95 + 370 % C. Prem. =305.27	cum	**6117.61**

	H.S.R 10.39				
13	Square rubble stone masonry course1: 5 in foundation and plinth H.S.R 12.23	16.38 cum	Rs. (160.35+26.00) +250% C. Prem. =652.22	cum	**10683.36**
14	Square rubble stone masonry course1: 5 above G.L. H.S.R 12.23 and 12.31	22.10 cum	Rs. (160.35+26.00+27.20) +200% C. Prem.= 747.42	cum	**16517.98**
15	Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41	6.25 cum	Rs.64.95 + 370 % C. Prem. =305.27	cum	**1907.94**
16	Cement plastering work 1:4 on the stone walls 15.5	56.00 sqm	Rs. 5.50 + 340 % C. Prem. =24.20	cum	**1355.20**
17	Total Cost of Materials H.S.R				**131562.923**
Total =					**480352.726**
Add Contingency at the rate of 3% =					14410.5818
Grand Total =					**494763.31**
Say Rs. 4.95 Lacs					

Table 17. DETAILED ESTIMATE OF EARTHEN GULLY PLUG

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

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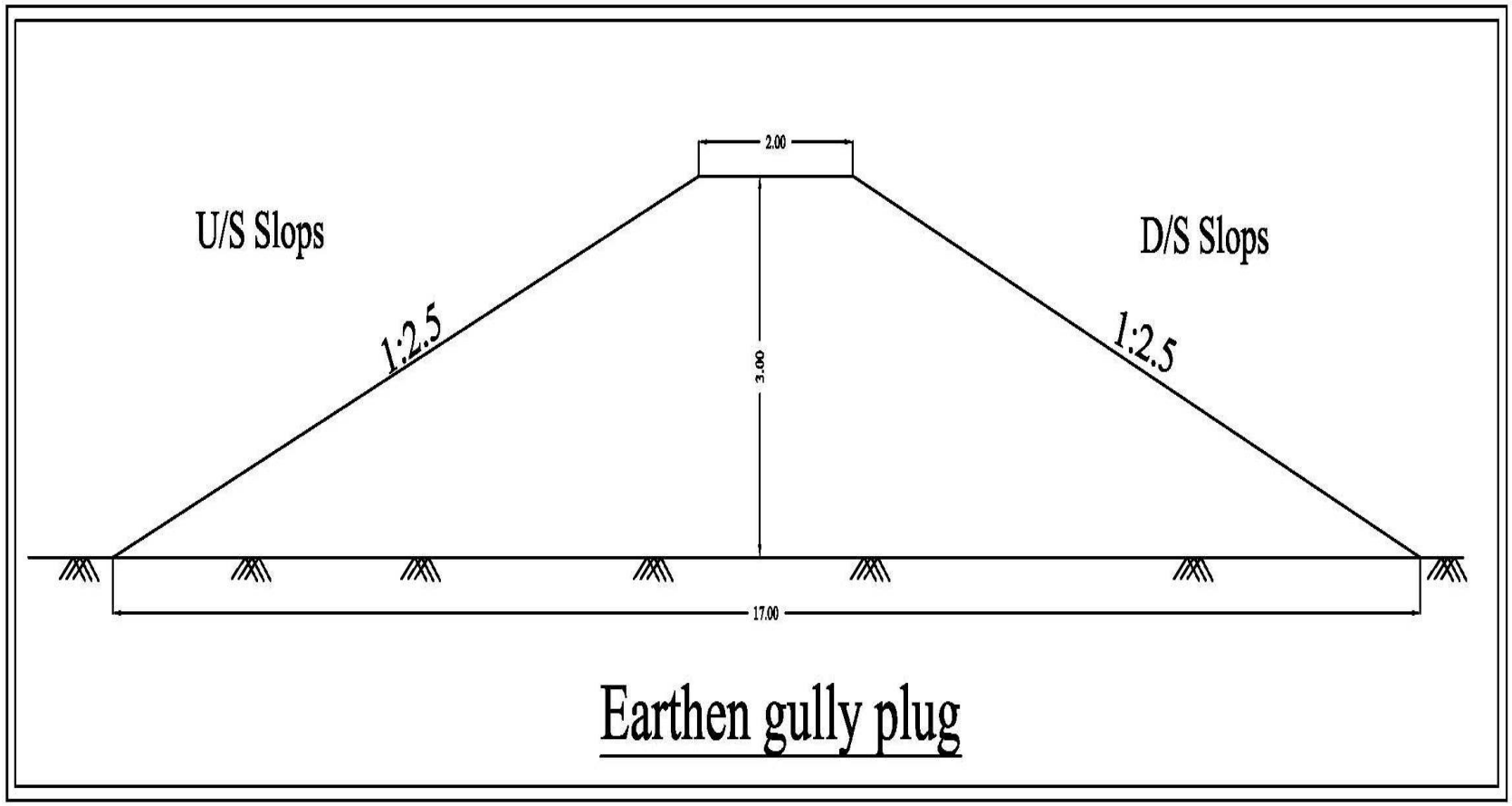


Earthen gully plug

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	2546.00	Rs.66.80 + 300%	100	6802.91

	of rank vegetarian, grass, bush woods etc H.S.R.6.26	sq.m	C. Prem. =267.20	sq.m	
2	Removal of loose soil up to 0.3 m below Natural surface level H.S.R. 6.2 (b)	204.00 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	5384.99
3	E/work excavation for making embank- ment undressed including breaking of Clods. H.S.R. 6.2 (b)	1344.00 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	35477.57
4	Extra for admixture for single or kanker Exceeding 30% but up to 40%. H.S.R. 6.2 (h) ii	1344.00 cum	Rs. 318.55 + 350% C. Prem.= 1433.48	100 cum	19265.97
5	Extra for every 7.5 meter additional lead beyond 60mt but up to 255 m by the animal or animal driven cart (5 leads) H.S.R. 6.2 (c) (ii)	1344.00 cum	[(15.00 x 5 No.)+ 350% C. Prem.= 337.50	100 cum	4536.00
6	Dressing of earthwork H.S.R. 6.3 (i)	1344.00 cum	Rs.45.90 + 350 % C. Prem.= 206.55	100 cum	2776.03
Total =					**74243.4712**
Add Contingency at the rate of 3% =					2227.30
Grand Total =					**76470.78**

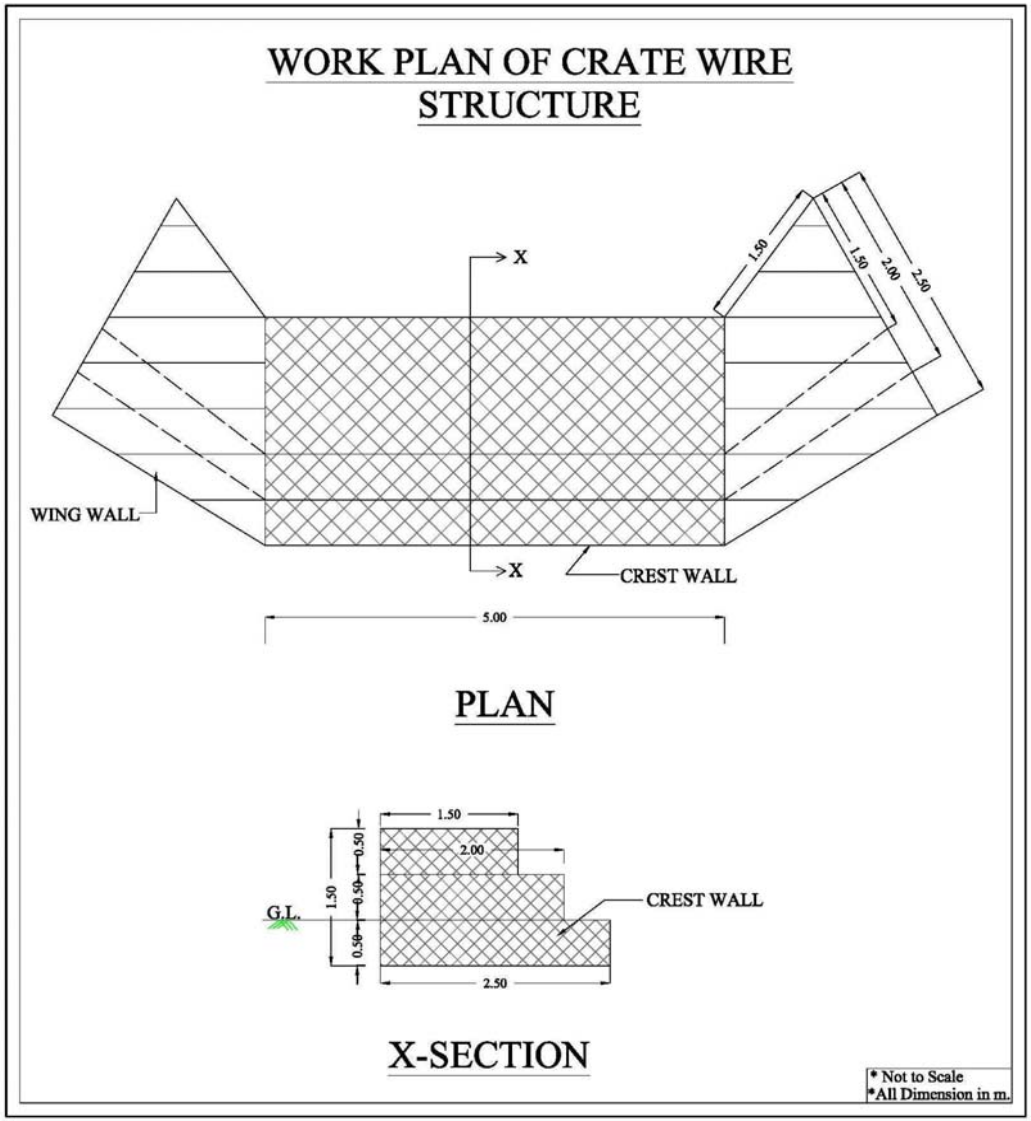
Table 18. DETAIL ESTIMATE OF CRATE WIRE STRUCTURE

S.No.	Particulars	No.	Length (Mts)	Breadth (Mts)	Height/ Depth(M)	Content (Cums)
1	Excavation of Earthwork in foundation H.S.R. 6.6					
	C.W.S.	1	5.00	3.00	0.50	7.50
	Wing walls	1	1.50	3.00	1.50	6.75
-					**Total**	**14.25**
2	Weaving of wire knitting 15 cm x 15 cm H.S.R.23.29					
	C.W.S first step					
	Top And Bottom	2	5.00	2.50		25.00
	Sides	2	5.00		0.50	5.00
	Edges	2		2.50	0.50	2.50
	Second step					
	Top	1	5.00	2.00		10.00
	Sides	2	5.00		0.50	5.00
	Edges	2		2.00	0.50	2.00
	Third step					
	Top	1	5.00	1.50		7.50
	Sides	2	5.00		0.50	5.00
	Edges	2		2.00	0.50	2.00
	Wing walls					
	Top	2	1.50	1.50		4.50
	Sides	4	1.50		0.50	3.00
	Edges	4		1.50	0.50	3.00
					Total	**74.50**
Quantity of G.I wire 4 mm dia for 88.50 Sq.m @ 2.31kg per Sqaremetre =					**172**	**kilograms**
3	Stone Filling in to wire crates HSR23.32					
	C.W.S. First step	1	5.00	2.50	0.50	6.25
	C.W.S. Second step	1	5.00	2.00	0.50	5.00
	C.W.S. Third step	1	5.00	1.50	0.50	3.75
	Wing walls	2	1.50	1.50	0.50	2.25

S.No.	Particulars	No.	Length (Mts)	Breadth (Mts)	Height/ Depth(M)	Content (Cums)
					Total	**17.25**
4	Earth work in bund filling for making	2	3.00	(4.0+1.0)/2=2.50	1.50	**22.50**

ABSTRACT OF COST

S No.	Particulars	Qty	Rates		Unit	Amount
1	Excavation of Earthwork in foundation H.S.R.6.6	14.25 cums	1108.10 + 350% Prem. =4986.45		100 cums	710.57
2	Weaving of wire knitting 15 cm x 15 cm H.S.R.23.29	74.50 sqm	3.50 + 400% Prem. =17.5		sqm	1303.75
3	Hammer dressing of stone boulders for face work H.S.R. 12.56	74.50 sqm	14.25 + 250% Prem. =49.88		sqm	3716.06
4	Stone Filling in to the wire crates H.S.R.23.32	17.25 cums	15.35 + 300% Prem. =61.4		cum	1059.15
5	Tipping of the wire crates H.S.R.23.33	17.25 cums	11.10 + 300% Prem. =44.4		cum	765.90
6	Earth work in bund filling for making embankment. H.S.R. 6.2 (b)	22.50 cum	586.60 +350 % C. Prem. =2639.7		100 cum	593.93
	stone boulders manually locally @ 0.50	17.25 cums	Rupees	945.00	cum	16301.25
7	Cost of G.I wire 4 mm dia hot dip 8 No.	172.00 kgs	Rupees	80.00	Kg	13760.00
					Total =	**38210.61**
					Add contingency at the rate of 3%	1146.32
					Grand Total =	**39356.93**
	Per cum Rate = 39356.93 /17.25 = 2281.56or say Rs.2280- only					



Work plan of crate wire structure

Table 19. Detail Estimate of Cement Stone Masonry Structure

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
1	**Excavation of earthwork in foundation And plinth**				**6.6**	
	Crest wall with extensions	1	8.00	2.00 **H.S.R**	1.20	19.20
	Side walls	2	1.50	1.00	1.20	3.60
	Wing walls	2	2.00	1.00	1.20	4.80
	Toe wall with extensions	1	6.00	1.00	1.20	7.20
	Appron	1	4.00	1.50	0.30	1.80
				Total =		**36.60**
2	**Cement concrete work 1 : 4 : 8 in the Foundation and plinth**				**10.39**	
	Crest wall with extensions	1	8.00	1.70 **H.S.R**	0.20	2.72
	Side walls	2	1.50	0.70	0.20	0.42
	Wing walls	2	2.00	0.70	0.20	0.56
	Toe wall with extensions	1	6.00	0.70	0.20	0.84
	Appron	1	4.00	1.50	0.20	1.20
				Total =		**5.74**
3	**Square rubble stone masonry course1: 5 in foundation and plinth H.S.R 12.23**					
	Crest wall with extensions	1	8.00	(1.5+1.0)/2= 1.25	1.00	**10.00**
	Side walls	2	1.50	0.50	1.00	**1.50**
	Wing walls	2	2.00	0.50	1.00	**2.00**
	Toe wall with extensions	1	6.00	0.50	1.00	**3.00**
				Total =		**16.50**
4	**Square rubble stone masonry course1: 5 above G.L. H.S.R 12.23 and 12.31**					
	Crest wall with extensions	1	8.00	(1.0+0.5)/2= 0.75	1.20	7.20
	Side walls	2	(1.5+2.0)/2= 1.75	0.50	(1.7+0.5)/2= 1.1	1.93
	Wing walls	2	2.00	0.50	1.70	3.40
	Toe wall with extensions	1	6.00	0.50	0.20	0.60

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
	Toe wall extensions	1	1.00	0.50	0.50	0.25
				Total =		**13.38**
5	**Cement concrete work 1 : 2 : 4 in the Foundation and plinth**					**10.41**
	On the top of crest wall	1	4.00	(1.0+0.5)/2= 0.75	0.05	0.15
	On the top of crest wall extensions	2	2.00	0.50	0.05	0.10
	On the top of side walls	2	1.50	0.50	0.05	0.08
	On the top of wing walls	2	2.00	0.50	0.05	0.10
	Toe wall with extensions	1	6.00	0.50	0.05	0.15
	Apron	1	4.00	1.50	0.10	0.60
				Total =		**1.18**
6	**Cement plastering work 1:4 on the**					
	Crest wall both side	2	4.00	_	1.20	9.60
	Crest wall extensions	2 x 2	2.00	_	0.50	4.00
	Side walls	2	(1.5+2.0)/2= 1.75	_	(1.7+0.5)/2= 1.1	3.85
	Wing walls	2	2.00	_	1.70	6.80
	Toe wall with extensions	1	6.00	_	0.20	1.20
	Toe wall extensions	2 x 2	1.00	_	0.50	2.00
				Total =		**27.45**

H.S.R.

Table 20. MATERIAL STATEMENT AND COST OF MATERIAL

S.No.	Item of workQuantity	Cement	Sand	Stone blast	Bajri 20 mm	Stone boulders
		(bags)	(cum)	(cum)	(cum)	(cum)
1	C.C work 1 : 4 : 8 5.74	19.516	2.7552	5.5104	_	_
2	Sq. stone masonry work (cum) 16.50	28.38	4.95	_	_	18.15

	1: 5 in foundation.					
3	Sq. stone masonry work	23.005	4.0125	_	_	14.7125
	1: 4 above ground level. 13.38					
4	C.C work 1 : 2 : 4 1.18	7.4025	0.517	_	1.034	_
5	C. plastering work 1 : 4 27.45 sqm	3.02	0.41	_	_	_
	Total =	**81.323**	**12.64645**	**5.5104**	**1.034**	**32.8625**
	Rates of material	245.00 per bag	950.00 per cum	965.00 per cum	985.00 per cum	945.00 per cum
	Cost of Materials	**19924**	**12014**	**5318**	**1018**	**31055**
	Total Cost of Materials =	**Rupees**	**69329**	**/-only**		

Table 21. LABOUR COST

S.No.	**Item of workQuantity**		**Rate**	**Unit**	**Amount**
1	Excavation of earthwork in foundation and plinth H.S.R 6.6	36.60 cum	1108.10 +350% C. Prem. =4986.45	100 cum	**1825.04**
2	Cement concrete work 1 : 8 : 16 in the Foundation and plinth H.S.R 10.39	5.74 cum	64.95 +370% C. Prem. =305.27	cum	**1752.25**
3	Square rubble stone masonry course1: 5 in foundation and plinth H.S.R 12.23	16.50 cum	(160.35+26.00) +250% C. Prem. =652.22	cum	**10761.63**
4	Square rubble stone masonry course1: 5 above G.L. H.S.R 12.23 and 12.31	13.38 cum	(160.35+26.00+27.20) +200% Prem.= 747.42	cum	**9996.74**
5	Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41	1.18 cum	64.95 +370% C. Prem. =305.27	cum	**358.69**
6	Cement plastering work 1:4 on the stone walls	27.45 sqm	5.50 +340 % C. Prem. =24.2	cum	**664.29**
	Total =	29.875			**25358.64525**

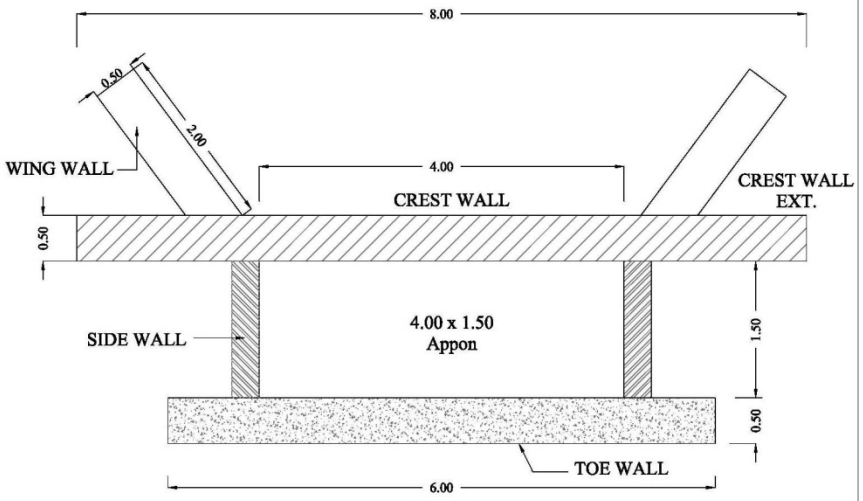
H.S.R 15.5

S.No.	Item of workQuantity		Rate		Unit	Amount
		cum				
					or say Rs.25359/- only	

Table 22. ABSTRACT OF COST

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

WORK PLAN OF CEMENT STONE MASONRY STRUCTURE



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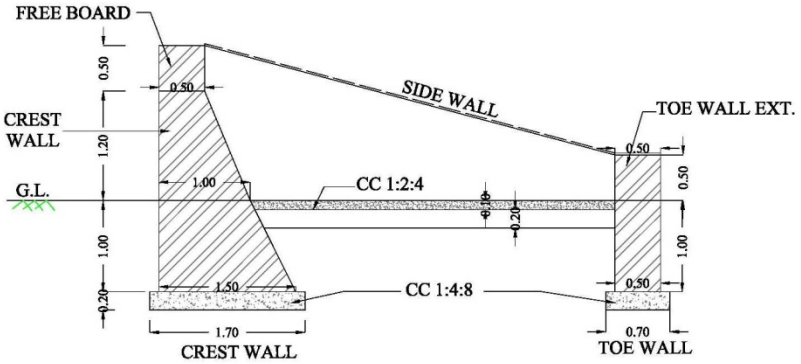


X-SECTION

* Not to Scale
*All Dimension in m.

X-section of Masonry Structure

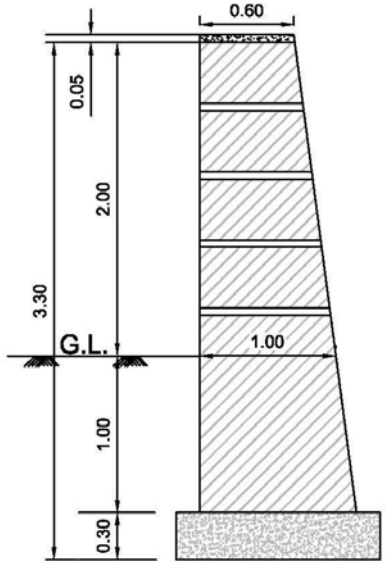
Table 23. Work Detail Estimate For Retaining Wall

Sr. No.	Particulars	No.	L	B	D	Contents	Unit
1	Earth Work Excavtion for R/wal	1	8.00	1.00	1.30	10.40	cum.
2	C.C. 1:3:6 in foundation	1	8.00	1.00	0.30	2.40	cum.
3	Sq. Rubble Masonary work 1:4 For R/wall	1	8.00	0.80	3.00	19.20	cum.
4	C.C. 1:2:4	1	8.00	1.00	0.05	0.40	cum.
5	20 mm Thick plaster 1:3						
i	R/wall outer side	1	8.00	--	3.00	24.00	sqm.
Material Statement							
Sr. No.	**Particulars**	**Qty.**	**Cement**	**Sand**	**Concrete**	**Gatka**	**Stone**
1	C.C. 1:3:6 in foundation	240	10.56	1.10	--	2.20	--
2	Masonry work in 1:4	19.2	41.28	5.76	--	--	21.12
3	C.C. 1:2:4	0.24	1.51	0.10	0.20	--	--
4	20 mm Thick Plaster in 1:3	24.00 Sqm.	6.00	0.36	--	--	--
	Total		**59.35**	**7.32**	**0.20**	**2.20**	**21.12**
	Rate		340/- P/bag	1400/- P/cum	1500/- Per cum.	1450/- Per cum.	
	Total		**21539.00**	**10248.00**	**300.00**	**3190.00**	
	Grand Total		**35298.12**				

Table 24. Abstract Cost of Retaining Wall

Sr. No.	Particular	Qty.	Rate	Unit	Amount
1	Earth work excavation in foundation and trench with pick and jumper HSR 7.2	10.40 cum	1745+400% = 8725	Per 100 cum	907.40
2	C.C. 1:3:6 in foundation per HSR 10.40	2.40 cum	64.85+550% = 422.18	per cum	1013.23
3	Sq. Rubble masonry work in 1:4 HSR 12.23+12.31	19.20 cum	(160.35+27.20)+300% = 750.20	per cum	14403.84
4	C.C. 1:2:4 on top as per HSR 10.41	0.24 cum	64.95+550% = 422.18	per cum	101.32
5	20mm. Thick plaster work in 1:3 as HSR 10.41	40 sqm.	8.15 + 500% = 48.90	Per sq.m.	1956.00
6	Collection the stone by donkey load upto 1 qtl. 'and distance upto 10 km excluding donkey man HSR. 5.3(a)	21.12 x 23.20 = 489.00	8.00 + 200% = 24.00	each	11736.00
7	Donkeies as HSR. 5.3 (b)	489.98/6	20.52+200% = 61.56	each	5027.19
8	Tipping work of Crate as HSR. 23.33	7.20 cum	11.10+450% = 61.05	Per cum	439.56
				Total	**35584.55**
				Cost of material as per detail attached	**35494.00**
				G. Total	**71078.55**
				or Say Rs. =	**71100.00**

RETAINING WALL



SECTION-AA'

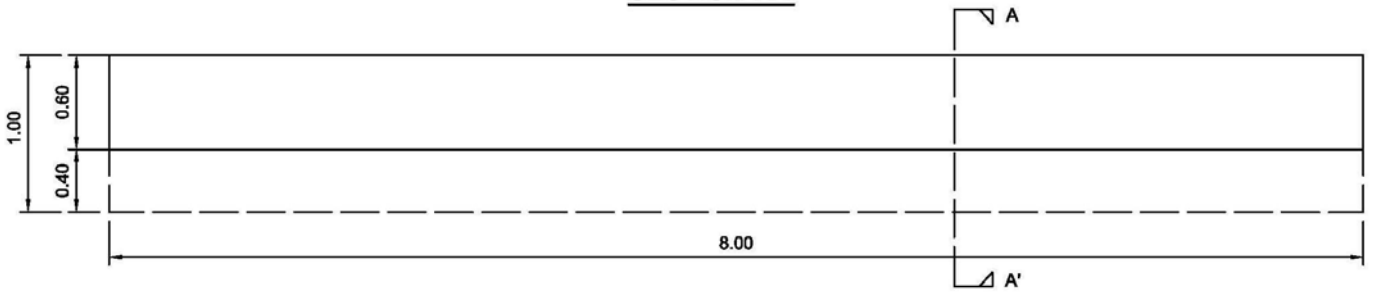


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Table 25. Estimate of Orchard Development in the Watersheds Per Hectare (Lemen, Each, &Kinnoo)

A. Horticulture

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

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

A. Horticulture

Sr. No.	Particulars	Quantity	Unit	Rate	Amount
1	Soil working 1m x 1m x 1m size pits (225 Nos.) including cost of refilling(At the distance 20'x20')	225.00	cum	36.66	8248.50
2	Application of Farmyard Manure, including cost			L.S.	450.00
3	Cost of Fertiliser/ pesticide @250gm/plant			L.S.	450.00
4	Cost of plants (including 15% etc. for mortality) including	260.00	Nos.	30/Plant	7800.00

	transportation and planting				
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**

Estimate of Orchard Development in the Watersheds Per Hectare (Mango, Chikoo & Lichi)

A. Horticulture

Sr. No.	Particulars	Quantity	Unit	Rate	Amount
1	Soil working 1m x 1m x 1m size pits (105 Nos.) including cost of refilling(At the distance 30'x30')	105.00	cum	36.66	3849.30
2	Application of Farmyard Manure, including cost			L.S.	250.00
3	Cost of Fertiliser/ pesticide @250gm/plant			L.S.	250.00
4	Cost of plants (including 15% etc. for mortality) including transportation and planting	121.00	Nos.	30/Plant	3630.00
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	**9476.30**

				Say `	**9500.00**
	Maintenance cost 2nd year			L.S.	**800.00**
	For next 5 years i.e. , ` 800 x 5				**4000.00**
				Total	**14300.00**
				Say `	**14300.00**

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 upto 100 mtr.	Nos.	605	21.18	1.36	128.139
ii	Multistage carriage of plants					
a)	By tractor upto 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 rain-fed and people gamble with the uncertain rains. Rain-fed Wheat and Maize 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 tree farming and 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 use of chemical fertilizer is limited to urea upto 50 Kg/acre in maize and wheat. Pulses are not raised due to the fear of wildlife damage. Soil testing has never 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 elated 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 maize. Intercropping of Rajmah is suggested with maize.
- 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 KrishiVigyanKendras.
- The concept of precision farming and non-monetary inputs shall be introduced.
- Agro-forestry by integrating Eucalyptus, Drake and Popular 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: Desi mango and guava are the most preferred fruit crop of the farmers and scattered plants of local galgal are seen in farm lands. The main problem in mango is the alternate year bearing and shedding of fruit during wind storms in the month of March. Some farmers have started raising Guava and Kinnow where irrigation facilities are available. Lemon and galgal are also raised but mostly for domestic use. There is no well organized marketing system in fruit plants. In case of mango for example; the produce is sold to the local traders. During the month of May, Mango contractors visit these villages and buy the standing crop. The fruit is plucked in a bit raw form and transported to market.

Proposed System: The annual rainfall is 1107 mm in the project area. All the areas are well connected by road 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. 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 Lemon, Kinnou, Galgal, Chikkoo. 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 90 cm depth to ensure suitability of soil for fruit plants.
- Proper back up technical support on orchard management by involving HAU Farm Advisory Service and department of horticulture.

- Appropriate safeguards from wildlife damage, frost damage and wind breaks.
- Arrangements for limited irrigation at least for first few years.
- Proper planning for raising filler plants like Papaya, pomegranate and shade loving crops like turmeric and ginger.
- 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. Rain-fed tomato was seen in some villages. Some poly houses have come up in the area with financial support from 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 and parthenium, the most obnoxious weeds have invaded such area. Palatable grasses and commercial grass like Bhabar (Eulaliopsis binate) are getting eliminated.

The following interventions are proposed to popularize agro-forestry as an alternate source of income.

- Raising of improved cultivars of Bamboo in moist drainage lines for soil conservation and income generation.
- Planting of improved cultivars of Eucalyptus, Drake and Poplars in the project both as single rows on field bunds and also as blocks.

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 Kandi project 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 demos.
- Rising of protein rich fodder plants by promoting Napier Bajra Hybrid and Leucaena hedge rows on field bunds.

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 and paddy is not a problem because of fixed prices and government controlled procurement system. There is no organized system of marketing of mango and milk though both are source of income with many families.

The efforts through the project are directed towards diversification of agriculture to include fruit and vegetable crops and dairy development. The transfer of area to these high value crops would depend on development of irrigation facilities, facilitation in input supplies, transfer of production technology, easy credit and market linkages. Efforts have been made to reactivate the non-functional SHGs and UGs. New watershed committees have been formed in each village. Farmers have shown interest in joint management of resources and join hands for processing, value addition and marketing.

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

7.3.7 Detail of production system to be promoted

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

Table 27. Detail of Production System proposed to be promoted in the project village

S. No.	Particulars	Contents	No. of micro watershed	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
1	Animal Husbandry	Problems being faced due to some diseases in the animals and low yield of milk. Production of free life saving medicines for animals – the provision for 50 farmers of each micro watershed/year @ Rs.225 has been provided.	4	200	1000	225	225000
	Animal Husbandry	Livestock Management supply of feed supplements to improve health of cattle's. The provision to benefit 50 farmers of each micro watershed/year @ Rs.225 has been kept in the project proposals.	4	200	1000	225	225000
	Animal Husbandry	Supply of mini- kits of high yielding variety green fodder seeds to 30 farmers in each micro watershed/year @ Rs.200/- mini kits.	4	120(farmers)	600 Seeds of mini kit	200 per mini kit of seeds	120000

S. No.	Particulars	Contents	No. of micro watershed	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
2	Agriculture	To introduce Summer Moong or Mash or Daincha as a third crop in Rice-wheat rotation. Supply of mini- kits to 50 farmers of each micro watershed/year @ Rs.200/ kit as assistance is provided.	4	200(farmers)	1000 (mini kits)	200 per mini kits	200000
	Agriculture	Application of farm inputs like Zinc sulphate or sulphur or weedicides or pesticides. 50 farmer of each micro watershed/ year @ Rs.200/ kits as assistance is provided.	4	200(farmers)	1000 (mini kits)	200 per mini kits	200000
	Agriculture	Supplying of Agriculture implements – 20 farmers (average) per micro watershed @ Rs. 1000/ units as assistance is provided.	4	80(farmers)	400	1000	400000
	Agriculture	Agro Forestry: Poplar/ Eucalyptus/ daik on 50% subsidy @ Rs. 10/ plant as assistance are provided.	4	4000(plants)	20000 plants	Rs. 10 per plant	200000
3	Horticulture	Potential for Horticulture plants. Supply of plants at 50 % cost share for cultivation of fruits like Citrus (Lemon, kinnon, galgal), Guava, Amla, Chikoo, Ber/mango), floriculture and vegetables (especially ginger, turmeric, garlic and tomato)	4	400 plants	2000 plants	Rs.40 per plant	80000
	Horticulture	Kitchen gardening Packets distributed to	4	400	2000	Rs. 25 Per	50000

S. No.	Particulars	Contents	No. of micro watershed	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
		100 farmers in each micro watershed/ year @ Rs.25/ packet.				packet	
	Horticulture	Four units of Bee keeping in each micro watershed @ 3000/ unit as assistance are provided.	4	16	80	3000	240000
	Horticulture	Four units of Vermi compost in each micro watershed per year @ Rs. 10000 per unit as assistance is provided.	4	16	80	10000	800000
4	Joint camps with Line Departments	Two training camps to beneficiaries on Proven technology in agriculture are provided (during pre kharif and rabi season).	4	8	40	20000	800000
		Contingency					33600

Total: Rs. 3573600/-

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

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

Under Agro forestry, tree species commonly planted are eucalyptus and Poplar. 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 de compost highly nutritive organic manure.

One of the important occupations of villagers is the animal husbandry. At present, the animal wastes are not being used by the villagers. This waste can be utilized as vermin- compost on the farm where the productivity and physical condition of the soil can be increased manifold. The animal waste can be used for preparation of vermin- compost. The available nutrients in vermin- compost are higher than country type farmyard manure. As per NHM guideline, the installation cost of structure of 1 vermin compost unit (size) 500 Sq. ft., the total cost of the unit would be is Rs. 60000/-. Out of this the 50% subsidy i.e. Rs.30000/- is met from the ongoing programme of horticulture department. The additional amount i.e. Rs. 10000/- will be born 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 side depending upon the provision of filtered for drainage of excess water is prepared of about 75- 90 cm thick. The whole bed should be above the ground, the proper bed width to be not more than 1.5 m to allow easy access to the centre of the bed is constructed.

3. **Land**

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

4. **Seed Stock**

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

5. **Machinery**

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

LIVELIHOOD ACTIVITIES FOR THE ASSET LESS PERSONS-9%

7.4 LIVELIHOOD SUPPORT TO SHG'S

The key issue of inclusion of this chapter is that about 80% 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 Ms Manju, Sociologist of the team held comprehensive discussions on the possibilities of livelihood in the rain fed areas. The main objectives of these discussions were:

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

SHGs would be imparted Skill Training on identified Economic Activities and it is proposed to impart them trainings at Krishi Vigyan Kender (CCSHAU), Yamunanagar and Haryana Institute of rural development, Nilokheri. Agriculture University, Hisar, Central Soil and Water research and training Institute, Chandigarh and HIRD, Nilokheri. 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 (RFP) so that do not get trapped by money lenders. Funds thus given on loan are recoverable from SHGs/individuals in easy installments. It is also proposed to impart skill training to at least 10 unemployed youth from each village and give them trainings of their choice so that they establish some small enterprises. It is further proposed to give them interest free loan of Rs. 12000/- each as Revolving Fund Assistance to meet their urgent needs of funds for establishing micro enterprises. Such funds recovered could either be given back to SHGs/individual or some other SHGs/individuals depending upon assessment of their

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

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

1. Cutting and Tailoring
2. Embroidery
3. Mushroom cultivation
4. Plumbing
5. Carpentry
6. Bee keeping
7. Animal husbandry
8. Vermi compost
9. Cattle rearing and selling milk
10. Beautician
11. Carpet making
12. Household wiring, Motor winding
13. Pickles, sauces, jam, jelly etc.
14. Backyard poultry
15. Babbar grass and Sarcunda rope.
16. 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 watershed	No. of villages	Total SHGs	Amount of RFA per SHG	Total
1	Mirzapur	5	6	25000	150000
2	Taprian	1	1	25000	25000
3	Atari	4	5	25000	125000
4	Fazilpur	3	4	25000	100000
		13	**16**		**400000**

Table 30. Skill Trainings/Skill up gradation for SHGs

S.No.	Name of micro watershed	No. of villages	Total SHGs	Amount of Training per SHG	Total
1	Mirzapur	5	6	35000	210000
2	Taprian	1	1	35000	35000
3	Atari	4	5	35000	175000
4	Fazilpur	3	4	35000	140000
		13	**16**		**560000**

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 watershed	No. of villages	No. of Persons in micro watershed	Amount of Training per trainee for 6 month	Total
1	Mirzapur	5	16	10000	160000
2	Taprian	1	4	10000	40000
3	Atari	4	13	10000	130000
4	Fazilpur	3	12	10000	120000
		13	**45**		**450000**

Note: The beneficiaries will contribute 10% as cost haring of the livelihood support programme Rs. 450000 @ 10% cost sharing.

Total 450000- 45000
= 405000/-

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 watershed	No. of villages	No. of Persons in micro watershed	Amount of Training per Trainee	Total
1	Mirzapur	5	16	20000	320000
2	Taprian	1	4	20000	80000
3	Atari	4	13	20000	260000
4	Fazilpur	3	12	20000	240000
		13	**45**		**900000**

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

Total

Note: The beneficiaries will contribute 10% as cost haring of the livelihood support programme Rs. 900000 @ 10% cost sharing.

= 900000- 90000
= 810000/-

Table 33. Cutting and Tailoring Centre for female beneficiaries

S. No.	Name of micro watershed	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	Mirzapur	5	4	8	2000	6	48000
2	Taprian	1	1	2	2000	6	12000
3	Atari	4	3	6	2000	6	36000
4	Fazilpur	3	3	6	2000	6	36000
		13	**11**	**22**			**132000**

Total cost for 11 centres

Cost of Sewing
1. Machines **Total** 55000/- (lump sum)

2. Payment to trainers 132000

Table 34. Embroidery Centre for female beneficiaries

S. No.	Name of micro watershed	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	Mirzapur	5	4	2000	6	12000	4	48000
2	Taprian	1	1	2000	6	12000	1	12000
3	Atari	4	3	2000	6	12000	3	36000
4	Fazilpur	3	3	2000	6	12000	3	36000
		13	**11**					**132000**

Total Cost:

Payment to trainer: Rs. 132000 /-

Total

Table 35. Livelihood Support

S.No.	Name of micro watershed	No. of villages	Revolving fund assistance to individuals unemployed youth/ landless, women	
			Dairy Unit	**Toy/ candle sweet boxes etc.**
1	Mirzapur	5	7	7
2	Taprian	1	1	1
3	Atari	4	5	5
4	Fazilpur	3	5	5
	Total	**13**	**18**	**18**
	Rate (Rs)		**25000**	**10000**
	Cost (Lakh Rs)		**4.50**	**1.80**

Contingency, printing material and other unseen items: Rs.92240/-

Total funds available under this component are Rs. 3216240/-

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. Y.S. Parmar Agriculture and Horticulture University, Nauni, Solan
v. Mushroom Training Centre, Sonipat and Solan
vi. NIRD, Hyderabad
vii. Krishi Vigyan Kender (CCSHAU), Yamunanagar

There appears to be great potential for these activities and these activities are likely to generate income of Rs. 2000/- to Rs. 2500/- per member per month. However no activities would be forced upon on any SHGs and they would be free to decide the activity they would like to opt for their additional income. The PIA can take up the activities as per the need and approval of the Watershed Committee. Based on their choice, Project report for the specified activity would be prepared and revolving fund of Rs. 20000/ Rs. 25000/- per SHG would be given for running their respective micro enterprise. If need arises for more funds for their Income Generation Activities at later stage, they would be assisted in getting loan from banks. SHGs thus formed would be provided all possible assistance to uplift for their Socio- Economic conditions.

CONVERGENCE

7.5 INTRODUCTION

The National Rural Employment Guarantee Act (NREGA), notified on September 7, 2005, marked a paradigm shift from the previous wage employment programmes with its rights-based approach that makes the Government legally accountable for providing employment to those who demand it. The act aims at enhancing livelihood security households in rural areas of the country by providing at least one hundred days of guaranteed wage employment in a financial year to every household whose audit members volunteer to do unskilled manual work. Such Inter sectoral convergence becomes instrumental towards.

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

7.5.1 Convergence between MGNREGA and Watershed Programmes

Most of the activities under watershed development are covered under MGNREGA and there is a need for convergence to meet gap in requirement under IWMP. The labour component would be met out of funds made available under MGNREGA. The village wise details of the fund requirement are exhibited below (table. 36)

Detail of Convergence of IWMP and other schemes

Table 36. GAPS IN FUNDS REQUIREMENT – MICRO WATERSHED WISE

S. No.	Name of micro watershed	Total cost requirement for works	Total funds available under IWMP for works	Gap in funds requirement for works	Convergence with MGNREGA
1	Mirzapur	92.77	88.1	4.67	4.67
2	Taprian	7.77	7.33	0.44	0.44
3	Atari	60.29	56.31	3.98	3.98
4	Fazilpur	51.07	48.38	2.69	2.69
		211.90	**200.12**	**11.78**	**11.78**

Total

- 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 four 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 32 ha horticulture development programme with the financial assistance of Rs. 12.80 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 masonry structure/ large/ WHS/ Silt detention dam/ Crate wire structures 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 under progress and post project. 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 Watershed	Effective Area	Total Cost	Monitoring 1%
1	Mirzapur	1311	15732000	157320
2	Taprian	109	1308000	13080
3	Atari	838	10056000	100560
4	Fazilpur	720	8640000	86400

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 Project	Effective Area	Total Cost	Evaluation 1%
1	Mirzapur	1311	15732000	157320
2	Taprian	109	1308000	13080
3	Atari	838	10056000	100560
4	Fazilpur	720	8640000	86400

CONSOLIDATION PHASE- 3 %
Consolidation Phase = Rs. 10, 72,080 /-

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: MirjaPur

Table 3. Consolidated Phase

S. No	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.94
2	Preparation of Project completion report and	0.23
3	Documentation of success stories	0.24
4	Management of proper utilization of WDF	0.71
5	Mechanism for quality and sustainability issues under the Project	0.24
6	Watershed activities	2.36

Total: 4.72 lacs

Name of Micro watershed: Taprian

Table 4. Consolidated Phase

S. No	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.08
2	Preparation of Project completion report and	0.02
3	Documentation of success stories	0.02
4	Management of proper utilization of WDF	0.06
5	Mechanism for quality and sustainability issues under the Project	0.01
6	Watershed activities	0.20

Total:0.39 lacs

Name of Micro watershed: Atari

Table 5. Consolidated Phase

S. No	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.60
2	Preparation of Project completion report and	0.16
3	Documentation of success stories	0.15
4	Management of proper utilization of WDF	0.45
5	Mechanism for quality and sustainability issues under the Project	0.15
6	Watershed activities	1.51

Total: 3.02 lacs

Name of Micro watershed: Fazilpur
Table 6. Consolidated Phase

S. No	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.52
2	Preparation of Project completion report and	0.13
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	1.29

Total: 2.59 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 2978 ha and the Project Cost is 357.36 lacs covering 4 no. micro watersheds and in all 13 villages. Benefits will be much more than the project cost as detailed below:

With the several interventions under IWMP III 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 Lower Sukar Rao Nadi Watershed III 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 causal labour either in the villages is in Kala Amb , Saha, Yamunanagar and Jagadhri Industrial Complex**.**

Table 1. Expected Employment Generation in the Project area

S. no.	Name of micro watershed	Wage employment										Self employment				
		No of man days					No. of Beneficiaries					No. of Beneficiaries				
		SC	ST	others	Women	Total	SC	ST	others	Women	Total	SC	ST	others	Women	Total
1	Mirzapur	575	-	12701	63	13339	632	-	1885	150	2667	22	-	22	22	66
2	Taprian	-	-	3200	-	3200	-	-	640	-	640	11	-	-	-	11
3	Atari	322	-	18139	36	18497	354	-	2865	480	3699	22	-	11	22	55
4	Fazilpur	195	-	12769	22	12986	215	-	2072	310	2597	11	-	11	22	44
	Total	**1092**	**-**	**46809**	**121**	**48022**	**1201**	**-**	**7462**	**940**	**9603**	**66**	**-**	**44**	**66**	**176**

50030 man days would be generated with the implementation of the project in Lower Sukar Rao Nadi Watershed (IWMP III), which means 50 person for 200 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 Lower Sukar Rao Nadi watershed (IWMP III)

S. No.	Name of micro watersheds	No. of persons migrating(in %age)		No. of days per year of migration		Comments
		Pre Project	Expected post project	Pre Project	Expected post project	
1	Mirzapur	-	-	-	-	-
2	Taprian	-	-	-	-	-
3	Atari	3-5	1-2	3-5	1-2	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
4	Fazilpur	-	-	-	-	

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 4.50 to 14.00 m. It is expected that water table would be 3.50 to 13.50 m during post project period. The expected rise has been computed from the rainfall pattern using 20% conservation component during post project.

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

Name of Sub watershed	Sources	Existing pre-project ground water table level (m)	Expected increase during post project (m)	Remarks
Lower Sukar Rao Nadi Watershed (IWMP III)	Ground water	4.50 to 14.00	3.50 to 13.50	……..
	Bore Wells	…….	……..	……..
	Other (specify)	…….	……..	……..

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 percolation tanks, sub surface dam 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 Lower Sukar Rao Nadi Watershed (IWMP III)

Name of Micro-Watersheds	Name of Crops	Pre project		Total Production(in Kg)	Total Value Rs (in lacs)	Expected post project		Total Production(in Kg)	Total Value Rs (in lacs)
		Area ha	Average yield Qtl. Per ha			Area ha	Average yield Qtl. Per ha		
Mirzapur	Maize	201	1625	326625	39.19	211.05	1820	384111	46.09
	Paddy	170	3360	571200	61.69	187	3696	691152	74.64
	Wheat	435	4545	1977075	233.29	478.5	4999.5	2392261	282.29
Taprian	Maize	15	1625	24375	2.92	15.75	1820	28665	3.43
	Paddy	14	3360	47040	5.08	15.4	3696	56918.4	6.15
	Wheat	24	4545	109080	12.87	26.4	4999.5	131986.8	15.57
Atari	Maize	141	1625	229125	27.49	148.05	1820	269451	32.33
	Paddy	64	3360	215040	23.22	70.4	3696	260198.4	28.10
	Wheat	210	4545	954450	112.62	231	4999.5	1154885	136.27
Fazilpur	Maize	102	1625	165750	19.89	107.1	1820	194922	23.39
	Paddy	69	3360	231840	25.04	75.9	3696	280526.4	30.29
	Wheat	219	4545	995355	117.45	240.9	4999.5	1204380	142.12
Total		**1664**			**680.75**	**1807.45**			**820.67**

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

9.5 HORTICULTURE

Table 5. Pre and post project area under Horticulture

S.No.	Name of Micro Watershed	Existing area under horticulture (ha)	Additional Area under horticulture proposed to be covered through IWMP	Total area in ha – Post Project
1	Mirzapur	6	5	11
2	Taprian	5	5	10
3	Atari	5	5	10
4	Fazilpur	5	5	10
	Total	**21**	**20**	**41**

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	Mirzapur	10	25	35
2	Taprian	7	10	17
3	Atari	99	50	149
4	Fazilpur	15	50	65
	Total	**131**	**135**	**266**

9.7 EXPECTED REDUCTION IN SOIL LOSS

Table 7 Pre and post project soil losses in Lower Sukar Rao Nadi watershed (IWMP III)

S.No.	Name of micro watersheds	Pre Project Soil loss in tonnes per ha	Post Project Soil loss in tonnes per ha
1	Mirzapur	15-25	10-15
2	Taprian	15-25	10-15
3	Atari	15-25	10-15
4	Fazilpur	15-25	10-15

9.8 LIVESTOCK

Table 8. Details of livestock in the project area

S.No.	Name of micro watershed	Type of Animals	Pre project			Post project			Remarks
			No.	Yield Kg/ day	Income In Rs per day	No.	Yield Kg/ day	Income In Rs per day	
1	Mirzapur	Buffalo	1253	7-8	224-256	1441	9-10	342-380	Increase in milk yield and number of animals by approx. 15%
		Cow	1271	3-4	78-104	1462	5-6	150-180	
2	Taprian	Buffalo	34	7-8	224-256	39	9-10	342-380	Increase in milk yield and number of animals by approx. 15%
		Cow	-	-	-	-	-	-	
3	Atari	Buffalo	507	$7^{1/2}$-$8^{1/2}$	240-272	583	$9^{1/2}$-$10^{1/2}$	361-399	Increase in milk yield and number of animals by approx. 15%
		Cow	777	3-4	78-104	893	5-6	150-180	
4	Fazilpur	Buffalo	635	7-8	224-256	730	9-10	342-380	Increase in milk yield and number of animals by approx. 15%
		Cow	161	$3^{1/2}$-$4^{1/2}$	91-117	185	$5^{1/2}$-$6^{1/2}$	165-195	

9.9 LINKAGES

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

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

Table No. 9: Backward-Forward Linkages

Sr. No.	Project	Type of Marketing Facility	Pre-Project (no.)	During the Project (no.)	Post-project (no.)
1	Lower Sukar Rao Nadi Watershed (IWMP III)	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	Migration reduce

Sr. No.	Project	Type of Marketing Facility	Pre-Project (no.)	During the Project (no.)	Post-project (no.)
				activities	
		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

9.9.1 LOGICAL FRAMEWORK ANALYSIS

Table 10. Logical Framework Analysis

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

Components	Activities	Outputs	Effect	Impact
	Panchayat Institutions • Gender sensitization of UGs and WCs to increase inclusiveness of Samuh (Joint) decision making. • Sensitize Village communities to involve children and youth in development		of GVCs. • Involvement of youth and children in village 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,	• Common and private lands to be brought under new plantations and agro-horti- forestry like Neem, Adussa, prosopis, Banyan and	• Fodder availability from common and private land increased. • Accessibility to common and forest	• Better Ecological order in the area. • Increase in the proportion of households having more security of

Components	Activities	Outputs	Effect	Impact
	treatment and regeneration of forest lands. • Plantation of fruits and forest species. • Input trainings, conduct meetings and organize exposure visits for communities, village volunteers and staff to effectively plan, execute and monitor activities. • Identification and promotion of non-timber forest produce based income generation activities.	Peepul. • Forest lands to be brought under new plantations and protection. • Trainings, exposure visits and meetings to be organized for communities, village volunteers and staff. • Income generation intervention promoted	lands increased with removal of encroachments and resolution of conflicts	fodder. • Reduction in drudgery of fodder and fuel collection, especially women
Rainfed Area Development	• Treatment of land through improved soil and moisture conservation practices on watershed basis. • Promotion of good agricultural practices- horticulture,	• Land to be brought under improved soil moisture conservation practices. • Good agricultural practices to be promoted. • Organic farming to be promoted. Fodder banks to be established.	• Improved productivity of treated land. • Increased availability of water in cells. • Increase in annual agricultural production.	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
	improved crop and vegetable. • Promotion of organic farming practices. • Formation of Fodder banks to increase fodder security and promote dairy development among communities. • Identification and promotion of agri-produce based income generation activities like grading, processing and packaging. • Promotion of better irrigation practices like drip irrigation • Impart trainings, conduct meetings and organize exposure visits of communities.	• 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.	• 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
Women's socio-political and economic empowerment	• Formation and strengthening of women' SHG groups • Capacity building of women folk. • Capacity building of SHG leaders and accountants Linking SHGs with external financial institutions	• Women's SHG groups to be formed. • Federation of Women's SHGs to be formed. • Trainings to be conducted for preparation of woolen products from sheep and goats	• Enhanced capacities of leaders of women's group in taking initiatives to solve problems at different levels. • Improved access to credit for livelihood purposes Increased household income.	• Position of women in household, community, society (politically, socially and economically) as perceived by women and community at large. • Performance enhancement of SHGs in terms of participation, decision-making, leadership and fund management. • Equality and equity in gender relations at home (decision making, expenditure, 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.