CONTENTS (IWMP VII)

CHAPTER- 1

METHODOLOGY

INTRODUCTION

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

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

In order to implement watershed area programme a systematic survey has been conducted to know the potentiality of each village / Micro-Watershed. With this view, a baseline survey in IWMP VII comprising of six micro watersheds Chitlang (6D1E7r4), Jhagroli (6D1E7n8), Bucholi (6D1E7r2), Sigra (6D1E7n9), Dewas (6D1E7r3), Salimabad (6D1E7r1) falling in eleven villages of block Mahendergarh and Kanina of district Mahendergarh. The base line survey conducted shall be considered as bench mark against which the results of project could be compared at the end of the implementation. It would also be helpful in guiding watershed programmes and to plan its goal in identifiable terms and be used as future reference. PRA techniques and transect walk were conducted with the Gram Sabha members and beneficiaries for building confidence in participation during project planning.

1.1 SCIENTIFIC PLANNING

1.1.1 Cluster Approach

This envisages a broader vision of Geo- hydrological unit which involves treating the cluster (IWMP VII) of 6 micro watersheds namely Chitlang (6D1E7r4), Jhagroli (6D1E7n8), Bucholi (6D1E7r2), Sigra (6D1E7n9), Dewas (6D1E7r3), Salimabad (6D1E7r1) falling in eleven villages with their respective codes.

1.1.2 Base Line Survey

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

1.1.3 Collection of Primary Data

Though the project was sanctioned in September, 2011 but the preparatory phase started in 2012.Initially, a meeting was arranged with officials of concerned departments and technical experts located at Chitlang, Jhagroli, Bucholi, Sigra, Dewas, Salimabad micro-watersheds. During this meeting, preliminary details of the proposed project including location of villages and criteria of selection and PPR was thoroughly discussed.

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

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

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

1.1.4 Collection of Secondary data

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

1.2 PARTICIPATORY RURAL APPRAISAL

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

holders as per guidelines , the mechanism of fund flows, cost sharing arrangement in different components and operational mechanism of the projects was thoroughly discussed with the community and Watershed Committees (WC) in detail.

1.2.1 Participatory Net Planning

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

Based on the experience of the experts working in the area and catchment area characteristics each structures like Dug out Pond, Water Conveyance System, Roof Top rain water harvesting / Recharge system, Cement Masonry Structures, Earthen Embankment with pacca outlet, Small Earthen Embankment with vegetative support, Community water storage Tank, Ramp inlet/outlet & protection wall, if necessary at old ponds, UGPL etc. were recommended to conserve and store water used for life saving additional irrigation potential in the rainfed area and to avoid further degradation of the land.

1.2.2 Community Participants in Social Mapping

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

1.2.3 Transect Walk

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

Transect walk

1.2.4 Focus Group Discussions

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

Gram Sabha member's participation in group discussion

1.3 USE OF GIS TECHNOLOGY FOR PLANNING

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

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

1.3.1 Prioritization

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

1.3.2 Planning

Based on the land use and Topographical maps in addition to social maps (PRA) prepared by the participants, analysis was carried out for the planning in micro- watersheds. The action plan was formulated using maps of Drainage pattern, Soil class, Soil erosion, forest, hydrology and present land use. The project proposals were deliberated in the Gram Sabha meetings which were approved with required amendments.

Based on the experience of the experts working in the area and catchment area characteristics each structure like Dug out Pond, Water Conveyance System, Roof Top rain water harvesting / Recharge system, Cement Masonry Structures, Earthen Embankment with pacca outlet, Small Earthen Embankment with vegetative support, Community water storage Tank, Ramp inlet/outlet & protection wall, if necessary at old ponds, UGPL etc. were provided in consultation with the Gram Sabha Members. However finally only those activities are included which were suggested by the Gram Sabha according to their needs.

1.3.3 Hydrological modeling

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

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

S. No.	Scientific Criteria/input used	Whether Scientific Criteria was used
A	**Planning**	
	Cluster approach	Yes
	Hydro-geological survey	Yes
	Contour Mapping	Yes
	Participatory net planning (PNP)	Yes

S. No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	Remote sensing data-especially soil	Yes
	Ridge to valley treatment	Yes
	Online IT connectivity between	Yes
	1. Project and DRDA cell/ZP	Yes
	2. DRDA and SLNA	Yes
	3. SLNA and DoLR	Yes
	Availability of GIS layers	Yes
	1. Survey of India map/imagery /SLUSI map	Yes
	2. Micro- Watershed Boundary	Yes
	3. Drainage pattern	Yes
	4. Soil (soil fertility status)	Yes
	5. Land use	Yes
	6. Ground water status	Yes
B	Inputs	-

S. No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	Bio pesticides	Yes
	Organic manure	Yes
	Vermi- compost	Yes
	Bio Fertilizer	Yes
	Water saving devices	Yes
	Mechanical tools	Yes
	Bio fencing	No
	Nutrient Budgeting	No
	Automatic water level recorder & sedimentation samplers	No

1.4 Preparation of Action Plan and Approval

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

CHAPTER – 2

PROJECT BACKGROUND

2.1 PROJECT BACKGROUND

Integrated Watershed Management Programme (IWMP VII) project is falls in Mahendergarh and Kanina block of Mahendergarh district in Haryana state. The project is a cluster of six micro- watersheds namely Chitlang (6D1E7r4), Jhagroli (6D1E7n8), Bucholi (6D1E7r2), Sigra (6D1E7n9), Dewas (6D1E7r3), Salimabad (6D1E7r1) falling in eleven villages. The total geographical area of the project is **3849 ha** out of which **3372 ha** has been undertaken to be treated under IWMP VII starting from year 2011-12. The project is divided into six micro watersheds. The Base map is shown in Annexure I.

Table 1: Basic Project Information

Sr. No	Name of the project	Name of the micro watersheds	Code No.	Name of the villages	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
1	Chitlang watershed (IWMP VII)	Chitlang	6D1E7r4	Chitlang Bir Chitlang	Mahendergarh	Mahendergarh	725	662	79.44	ASCO Mahendergarh

Sr. No	Name of the project	Name of the micro watersheds	Code No.	Name of the villages	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
2	Chitlang watershed (IWMP VII)	Jhagroli	6D1E7n8	Jhagroli (part)	Kanina	Mahendergarh	810	606	72.72	ASCO Mahendergarh
3	Chitlang watershed (IWMP VII)	Bucholi	6D1E7r2	Bucholi Meghanwas	Mahendergarh	Mahendergarh	590	532	63.84	ASCO Mahendergarh
4	Chitlang watershed (IWMP VII)	Sigra	6D1E7n9	Sigra Sigri Anawas	Kanina	Mahendergarh	656	600	72.00	ASCO Mahendergarh
5	Chitlang watershed (IWMP VII)	Dewas	6D1E7r3	Dewas Dulana	Mahendergarh	Mahendergarh	598	530	63.60	ASCO Mahendergarh
6	Chitlang watershed (IWMP VII)	Salimabad	6D1E7r1	Salimabad	Mahendergarh	Mahendergarh	470	442	53.04	ASCO Mahendergarh
					Grand Total		**3849**	**3372**	**404.64**	

2.2 NEED OF WATERSHED DEVELOPMENT PROGRAMME

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

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

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

Table 2. Criteria and Weightage for Selection of Watershed

S. No.	Criteria	Maximum Score	Ranges and Scores			
i.	Poverty index (% of poor to population)	10	Above 80 % (10)	80 to 50 % (7.5)	50 to 20 % (5)	Below 20% (2.5)

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

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

Based on above criteria and weightage of 103 concerning these thirteen parameters, a composite ranking was given to Chitlang Watershed (IWMP VII) 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 and more than 50 % farmers are small and marginal. So the scoring was done 5. So accordingly, scoring was done like project area comes under Arravalli range and Dohun basin of Haryana, has no assured irrigation facility, erratic rainfall, deep, poor quality and less ground water discharge, hence the ground water status score is 5. The percentage of schedule castes in this watershed is about 30 percent of the total population, hence 3 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 5 is allotted. With all the parameters taken together gives the watershed score to be 103.

Table- 3: Weightage of the Project

1	2	3	4	5	6	7	8	9													
Sr. No.	District	Name of the project	No. of micro-water-sheds proposed to be covered	Geographical area (ha)	Proposed Area for Development	Type of project (Hilly/ Desert/ Others)	Proposed cost (Rs. In Lakh)	Weightage under the criteria													
								i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	Total

1.	Mahendergarh	Chitlang watershed (IWMP VII)	6	3849	3372	others	404.64	5	3	0	5	5	10	10	5	10	15	10	15	10	103

Table 4: Watershed Information

Name of the Project	No. of Micro-Watersheds to be Treated	Watershed codes	Watershed regime/type/order
Chitlang Watershed (IWMP VII)	6	(6D1E7r4), (6D1E7n8), (6D1E7r2), (6D1E7n9), (6D1E7r3), (6D1E7r1)	Others

2.3 OTHER ONGOING DEVELOPMENT PROJECTS / SCHEMES IN THE PROJECT VILLAGES

These villages being backward have been on top priority of number in developmental projects. These programmes are Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS). The micro watershed wise ongoing development programme in the project area is tabulated in Table 5.

Table 5. Ongoing Developmental Programs in the Project Area

S. No.	Name of the Program /Project	Name of Micro watersheds	Sponsoring agency	Objective	Estimated number of beneficiaries

1	MGNREGA	Chitlang	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	139
2	MGNREGA	Jhagroli	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	323
3	MGNREGA	Bucholi	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	335
4	MGNREGA	Sigra	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	431
5	MGNREGA	Dewas	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	371
6	MGNREGA	Salimabad	DRDA, Mahendergarh	To provide assured employment of 100 days in a year to unskilled labour and development of village.	Nil

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.	Name of District	Total micro watersheds in the District		Micro- watersheds covered so far						Net watersheds to be covered	
				Deptt. of Land Resources		Other Ministries/ Deptt.		Total watersheds covered			
				Pre- IWMP projects (DPAP+DDP+IWDP)		Any other watershed project					
		No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)
1	Mahendergarh	374	187000	130	65000	17 (EAS)	5500	169	85639	205	101361
						22 (NWDPRA)	12139				

CHAPTER – 3

BASIC INFORMATION OF THE PROJECT AREA

GEOGRAPHY AND GEOHYDROLOGY

Chitlang Watershed (IWMP VII) falls in Mahendergarh and Kanina Block of District Mahendergarh. The area is occupied by Indo-Gangetic alluvium plains and area is traversed and drained by seasonal streams of Dohun river system. Physiographically, the area is divided Interdunal plains and Dohun River watershed. The area of watershed lies in between 28˚13'15''to 28˚19'20'' N Latitude & 76˚0'20'' to 76˚13'45'' east longitude with general elevation varies between 265-285 m (MSL) above mean sea level (as per Google Earth maps). Area experiences the second lowest rainfall in the state about 80 percent of its annual rainfall is received in the month of July to September. Despite intensity of rainfall is scattered and erratic in this area, water retention capacity is very low, so area receive drought conditions in alternative years. The Drainage and Contour map is presented in Annexure II.

3.1 LAND USE PATTERN

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

Table. 1 Land use pattern of Chitlang Watershed (IWMP VII)

Sr. No.	Name of Micro Watersheds With Code	Name of Villages	Geographical Area in (ha)	Treatable area of the village(ha)	Land under agriculture use (ha)	Rain fed area (ha)	Wasteland	
							Cultivable	Non-Cultivable
1	Chitlang (6D1E7r4)	Chitlang	671	617	563	509	11	97
		Bir Chitlang	54	45	51	42	-	3
2	Jhagroli (6D1E7n8)	Jhagroli (part)	810	606	722	518	-	88
3	Bucholi (6D1E7r2)	Bucholi	390	372	336	318	-	54
		Meghanwas	200	160	160	120	-	40
4	Sigra (6D1E7n9)	Sigra	273	249	234	210	-	39
		Sigri	265	250	260	245	-	5
		Anawas	118	101	99	82	-	19
5	Dewas (6D1E7r3)	Dewas	334	314	276	256	-	58
		Dulana	264	216	224	176	-	40
6	Salimabad (6D1E7r1)	Salimabad	470	442	234	206	-	236
			3849	**3372**	**3159**	**2682**	**11**	**679**

(Source – District Census Handbook, 2001 Mahendergarh)

3.2 SOIL AND TOPOGRAPHY

The soils of Chitlang Watershed are very deep, loamy sand to clay loam, typic ustipsamment,typic torripsamment, typic torriorthent and typic haplustepts in the area.. The topography of the area ranges from level to nearly level. Soils are subject to susceptible to moderate to severe water and wind erosion. The slope ranges from 0.5 to 3 and above most of the area of micro watersheds falls under level to nearly level. In some low lying area small saline patches observed. Slope map is presented in Annexure IV.

Table 2. Soil type and Topography

Sr. No.	Name of Micro Watersheds	Code	Geographical area (ha)	Major Soil types	Topography
1.	Chitlang	6D1E7r4	725	Sand, loamy sand, sandy loam, loam, sandy clay	Level to nearly level

				loam etc.	
2.	Jhagroli	6D1E7n8	810	Sand, loamy sand, sandy loam, loam, sandy clay loam.	Level to nearly level
3.	Bucholi	6D1E7r2	590	Sand, loamy sand, sandy loam, loam, sandy clay loam, clay loam etc.	Level to nearly level
4.	Sigra	6D1E7n9	656	Sand, loamy sand, sandy loam, loam, sandy clay loam etc.	Level to nearly level
5	Dewas	6D1E7r3	598	Sand, loamy sand, sandy loam, loam, sandy clay loam etc.	Level to nearly level
6.	Salimabad	6D1E7r1	470	Sand, loamy sand, sandy loam, loam, sandy clay loam, clay loam etc.	Level to nearly level
			3849		

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 temporary flood on an average once in 5- 8 years and drought every or alternative Year. The absence of assured irrigation and drought resulted in low to very low yields of the crops.

Table 3. Flood and Drought condition

S. No.	Name of Micro- watersheds	Flood Incidence	Drought Incidence
1	Chitlang	1 time in 5-8 Years	Every or Alternative Year
2	Jhagroli	1 time in 5-8 Years	Every or Alternative Year
3	Bucholi	1 time in 5-8 Years	Every or Alternative Year
4	Sigra	1 time in 5-8 Years	Every or Alternative Year
5	Dewas	1 time in 5-8 Years	Every or Alternative Year
6	Salimabad	1 time in 5-8 Years	Every or Alternative Year

3.3 SOILS

3.3.1 Soil Erosion

In the identified six micro watersheds, it is observed that due to thin vegetative cover to increase the loss of surface soil in the watershed area. This results in degradation of agricultural land and low organic matter contents. The organic carbon content in areas comparatively low to restrict average in agriculture production and degradation of soil physical and chemical property. Average annual rainfall of the area is 366 mmIn the watershed area the upper soil crest gets washed away in the form of runoff during rainy season if heavy storm occur, which also carries valuable top soil (sheet). Soil erosion in respect of sheet is quite high. Majority of the watershed Community are dependent on rainfed agriculture due to lack of assured irrigation facility. Agriculture suffers due to area being rain fed and due to erratic rains in the region, resulting in further deterioration of socio economic conditions of community.

3.3.2 Soil Salinity/Alkalinity

There is low to moderate soil salinity in the Project and pH is normal and within the limits of 7.10 to 8.50.

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

Table 4. Soil pH and Salinity

S. No.	Name of Micro Watersheds	Soil pH	Type of salinity
1.	Chitlang	7.15- 8.50	Low to Moderate
2.	Jhagroli	7.16- 8.35	Low to Moderate
3.	Bucholi	7.15- 8.15	Low to Moderate
4.	Sigra	7.17- 8.35	Low to Moderate
5	Dewas	7.15- 8.45	Low to Moderate
6.	Salimabad	7.10- 8.15	Low to Moderate

3.3.3 SOIL CLASSIFICATION

Major soils associations' fall in the watershed are three soil associations unit. The detailed description of all soil associations are given below. The Soil map is presented in **Annexure V.** The fertility status of the project area, available nitrogen and phosphorus are

low. However, the available potash varies from medium to high. The fertility status map of the project area is exhibited in **Annexure-VI**.

Soil Mapping Unit- 9 (Zerpur Soil Association)

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

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

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

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

The Majri soil series is dominated in this soil association and associated soil series is Basal. The dominant soil excessively drained, Sand to Loamy sand to Silt loam, Sandy Mixed hyperthermic Typic Torripsamments, 1st associate soil series is excessively drained,

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

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

3.3.4 Land Capability Classification

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

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

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

Land capability subclass III e3s3

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

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

1. Land leveling should be done at 50% subsidy, because formers are not economically capable to bear the rate of land leveling.
2. Engineering measures like Check Dams, Percolation Embankments with other measures be under taken.
3. Agronomic measures like Dry farming, strip& Mixed cropping with other soil conservation measures like agro forestry and rainfed horticulture are recommended.
4. Masonry structure (outlet) should be constructed with field bandhs and percolation embankments for rills control.
5. Provide community water storage tanks for supplementary irrigation during lean period.
6. Strengthening of defunct water courses for water conservation which is waste during irrigation.

Land capability subclass IV e4s4

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

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

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

3.3.5 Climatic Conditions

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

Table 5. Rainfall during the years 2000-12

S. No.	Year	Rainfall (in mm)
1	2000	228
2	2001	384
3	2002	141
4	2003	339
5	2004	354
6	2005	530
7	2006	267
8	2007	312
9	2008	554
10	2009	321
11	2010	689
12	2011	362
13	2012	287
	Average Rainfall	**366**

(Source: - Deputy Director Agriculture, Mahendergarh)

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

3.3.6 Physiography and Reliefs

Physiographically, the area slope falls South- West to North- East. The general Elevation in the area belongs to old alluvium plains with sand overburden in pockets to make small hummocks in the area. 265-285 m above mean sea level (google earth map). Area experiences second lowest rainfall in state and water is drained through field to field and ultimately create temporary water logging in low lying areas to create haphazard condition during rainy season if heavy rain received. The elevation range and percentage slope distribution has been presented in **Table 6.**

Table 6. Physiography and Relief

Project Name	Elevation (MSL)	Slope Range (%)	Major Streams
Chitlang Watershed (IWMP VII)	265-285 m	0.5 to 3	Dohun River

3.4 LAND AND AGRICULTURE

The land holding pattern of the villages under Chitlang Watershed shows that the majority of the land holding is below 5.0 ha. The lack of irrigation source has forced the majority of the small farmers and landless labours of Watershed to migrate from village to ensure there, employment and livelihood to nearest Industrial towns is Narnaul, Rewari, Delhi, Gurgaon, Dharuhera and Bhiwadi. This affects directly the demographic profile of the villages.

The major crops Bajra, Gawar, green fodder and pulses in Kharif under rainfed conditions. The major crops during Rabi wheat, mustard, gram, green fodder and seasonal vegetables in rainfed and irrigated conditions. The soil and water conservation measures such as Engineering like Dug out Pond, Water Conveyance System, Roof Top rain water harvesting / Recharge system, Cement Masonry Structures, Earthen Embankment with pacca outlet, Small Earthen Embankment with vegetative support, Community water storage Tank, Ramp inlet/outlet & protection wall, if necessary at old ponds, UGPL etc.. The project would help the farmers to take crop production which will enhance the net production value. The following plants are commonly observed in the Project Area. The natural vegetation in the project area is exhibited in **Table 7.**

Table 7. NATURAL VEGETATION

Sr. No.	Trees	Fruits	Shrubs	Grasses
1	Khairi	Amla	Pala	Anjan
2	Jand	Ber	Hins	Dhaman
3	Dhak	Guava	Puthkanda	Dub
4	Babool	Citrus	Bansa	Kana
5	Beri		Panwar	Dabh
6	Pipal		Karir	Pala
7	Lasura		Khip	Chirya
8	Shisham		Ak	
9	Neem		Phog	

Sr. No.	Trees	Fruits	Shrubs	Grasses
10	Siris		Nagphani	
11	Kikar			

3.4.1 Land Ownership Details

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

Table-8:- Land Ownership Details

GENERAL	OBC	SC	ST	Total owners
725	1571	121	-	2417

3.4.2 AGRICULTURE/PATTERN

Table 9. Agriculture/ Pattern

Sr. No.	Name of Micro Watersheds	Village	Land under agriculture use (ha)	Net Sown area (ha)	
				One time	Two times
1	Chitlang	Chitlang	563	457	378
		Bir Chitlang	51	41	35
2	Jhagroli	Jhagroli	722	542	492
3	Bucholi	Bucholi	336	254	225
		Meghanwas	160	127	112

Sr. No.	Name of Micro Watersheds	Village	Land under agriculture use (ha)	Net Sown area (ha)	
				One time	Two times
4	Sigra	Sigra	234	187	148
		Sigri	260	201	178
		Anawas	99	78	68
5	Dewas	Dewas	276	216	193
		Dulana	224	178	155
6	Salimabad	Salimabad	234	187	157
		Total	**3159**	**2468**	**2141**

(Source: Department of Agriculture, Haryana)

3.4.3 IRRIGATION

Lack of Assured Irrigation Facilities

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

Table 10. Irrigation Pattern.

S. No.	Name of Micro Watersheds	Name of Villages	Source 2: Groundwater (Tube wells)	
			Availability months	Net area (ha)
1	Chitlang	Chitlang	July to June	520
		Bir Chitlang	July to June	31
2	Jhagroli	Jhagroli	July to June	820

S. No.	Name of Micro Watersheds	Name of Villages	Source 2: Groundwater (Tube wells)	
			Availability months	Net area (ha)
3	Bucholi	Bucholi	July to June	146
		Meghanwas	July to June	160
4	Sigra	Sigra	July to June	231
		Sigri	July to June	236
		Anawas	July to June	77
5	Dewas	Dewas	July to June	254
		Dulana	July to June	160
6	Salimabad	Salimabad	July to June	164
				2799

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

3.4.4 CROPPING PATTERN (crop details)

Cropping Pattern

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

Table 11 A. Crop Details (Rabi)

S.	Name of	Village	Rabi crops(Wheat)	(Mustard)

No.	Micro Watersheds		Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
1	Chitlang	Chitlang	162	746.334	4607	Yes	102	157.794	1547	Yes
		Bir Chitlang	17	77.520	4560	Yes	8	12.336	1542	Yes
2	Jhagroli	Jhagroli	154	708.400	4600	Yes	281	434.145	1545	Yes
3	Bucholi	Bucholi	81	372.195	4595	Yes	114	171.000	1500	Yes
		Meghanwas	42	191.310	4555	Yes	29	44.863	1547	Yes
4	Sigra	Sigra	54	248.778	4607	Yes	76	116.660	1535	Yes
		Sigri	62	284.642	4591	Yes	91	140.231	1541	Yes
		Anawas	24	110.040	4585	Yes	38	58.064	1528	Yes
5	Dewas	Dewas	91	418.782	4602	Yes	48	74.256	1547	Yes
		Dulana	71	326.600	4600	Yes	38	57.000	1500	Yes
6	Salimabad	Salimabad	72	331.056	4598	Yes	75	116.100	1548	Yes
		Total	**830**				**900**			

Table 11 B. Crop Details (Kharif)

S. No.	Name of Micro Watersheds	Village	(Bajra)				(Gwar)		
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.
1	Chitlang	Chitlang	379	654.533	1727	Yes	28	48.860	1745
		Bir Chitlang	32	54.560	1705	Yes	2	3.458	1729
2	Jhagroli	Jhagroli	421	722.015	1715	Yes	54	93.690	1735
3	Bucholi	Bucholi	210	362.670	1727	Yes	14	24.430	1745
		Meghanwas	81	139.725	1725	Yes	9	15.696	1744
4	Sigra	Sigra	124	210.800	1700	Yes	7	12.180	1740
		Sigri	137	234.270	1710	Yes	36	62.100	1725
		Anawas	43	72.885	1695	Yes	5	8.725	1745
5	Dewas	Dewas	154	260.106	1689	Yes	27	46.818	1734
		Dulana	134	229.274	1711	Yes	17	29.648	1744
6	Salimabad	Salimabad	124	212.660	1715	Yes	12	20.580	1715
		Total	**1839**				**211**		

3.4.5 Livestock

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

Table 12. Village Wise Distribution of Milk Production in Chitlang Watershed (IWMP VII)

S. No.	Name of Micro Watersheds	Villages	Buffalo(*Lit/per day/annum) for 6 months	Cow(*lit/per day/annum) for 6 months	Sheep	Goat	Camel
1	Chitlang	Chitlang	464/6496/116928 (lit/per day/annum)	50/300/54000 (lit/per day/annum)	47	132	10
		Bir Chitlang	9/108/19440 (lit/per day/annum)	1/5/900 (lit/per day/annum)	0	0	0
2	Jhagroli	Jhagroli	903/13545/2438100 (lit/per day/annum)	151/906/163080 (lit/per day/annum)	112	38	25
3	Bucholi	Bucholi	765/10710/1927800 (lit/per day/annum)	120/840/151200 (lit/per day/annum)	0	17	13
		Meghanwas	431/6465/1163700 (lit/per day/annum)	60/300/54000 (lit/per day/annum)	0	79	7
4	Sigra	Sigra	677/10832/1949760 (lit/per day/annum)	16/80/14400 (lit/per day/annum)	0	356	7
		Sigri	215/2365/425700 (lit/per day/annum)	17/119/21420 (lit/per day/annum)	347	197	5
		Anawas	235/2350/423000 (lit/per day/annum)	46/230/41400 (lit/per day/annum)	0	0	10
5	Dewas	Dewas	546/7644/1375920 (lit/per day/annum)	54/270/48600 (lit/per day/annum)	0	181	7

S. No.	Name of Micro Watersheds	Villages	Buffalo(*Lit/per day/annum) for 6 months	Cow(*lit/per day/annum) for 6 months	Sheep	Goat	Camel
		Dulana	354/5310/955800 (lit/per day/annum)	47/329/59220 (lit/per day/annum)	71	196	10
6	Salimabad	Salimabad	420/5460/982800 (lit/per day/annum)	44/308/55440 (lit/per day/annum)	0	50	0

(Source: Animal Husbandry, Mahendergarh)

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

3.4.6 Ground Water Concern

a) Depth to Water

Ground Water Cell of Haryana has fixed hydrograph station mostly open well for monitoring purposes. The water level data is observed during pre and post monsoon. The data generated has been analyzed for the purpose of ground water studies in the watershed area. The ground water behavior in the watershed reveals the variation of depth to water level from 20 to 80 m and above, below ground level (BGL). The water table of Chitlang, Bucholi, part of Dewas, Salimabad and Sigra falls in the depth range of 40-60 m, where as the part of Jagroli and Sigra falls in the depth range of 30-40 m; part of Jagroli falls in the depth range of 30-40 m and small pocket of Dewas and Salimabad has water depth greater than 80 m. The village wise water level data has been tabulated in **Table 13.** Depth to water level map has been prepared and presented in the **Annexure VIII.**

Table 13. Village Wise Depth to Water Level of Chitlang Watershed (IWMP VII)

S. No.	Name of Micro Watersheds	Name of Villages	Source	Pre- Project level (m)
1	Chitlang	Chitlang	Open Well	35
		Bir Chitlang	Open Well	38
2	Jhagroli	Jhagroli	Open Well	33
3	Bucholi	Bucholi	Open Well	41
		Meghanwas	Open Well	53
4	Sigra	Sigra	Open Well	59
		Sigri	Open Well	56
		Anawas	Open Well	58
5	Dewas	Dewas	Open Well	82
		Dulana	Open Well	83
6	Salimabad	Salimabad	Open Well	58

The source of drinking water supply is through the tube wells network in the area. The micro watershed wise quality ranges from fresh to marginal. The water quality distribution in Chitlang, Dewas, Bucholi and Salimabad is fresh where as in Jagroli and Sigra micro watershed, water quality is marginal. The water quality map of the area is presented in **Annexure-IX**. The drinking water supply is available thought the year but shortage in villages during May and June where the supply is augmented by tankers. The department of Public Health Engineering is responsible for the water supply for drinking purpose.

b) Water table fluctuation

Historical ground water table data (1974 to 2010) was analyzed and the water table is falling at the rate of 88 cm/yr. There is need of recharging of aquifer by rain water harvesting.

The seasonal fluctuation i.e. Pre and Post monsoon period is 1- 2.4m. The pattern of ground water depletion is almost uniform in the project area.

c) Rain water harvesting and Recharging

Ground water development potential of Chitlang watershed area is over-exploited and there is need for rain water harvesting and recharging. It has been proposed to make rainwater-harvesting by construction of water harvesting structure. The provision of this has been provided in the project proposal.

3.4.7 DETAILS OF COMMON PROPERTY RESOURCES: The department of panchayat has maintained the record of common property resources of area under various institutions. The data has been taken has been collected DDPO, Mahendergarh. The details of common property resource in Chitlang Watershed (IWMP VII) are tabulated in **Table 14.**

Table 14. Detail of Common Property Resources

Name of the Project	CPR Particulars	Total Area, ha (Area owned / in possession of)				Area available for treatment (ha)			
		Pvt. Person	Govt.	PRI	Any Other	Pvt. Person	Govt.	PRI	Any Other
Chitlang Watershed (IWMP VII)	Waste land	19	-	75	-	19	-	75	-
	Pasture	-	-	130	-	-	-	130	-

	Orchards	8	-	-	-	-	-	-	-
	Village wood lot	-	-	-	-	-	-	-	-
	Forest	-	-	377	-	-	-	107	-
	Village ponds, lake	-	-	17	-	-	-	17	-
	Community Buildings	-	-	52	-	-	-	52	-
	Weekly Mkts	-	-	-	-	-	-	-	-
	Permanent Mkts	-	-	-	-	-	-	-	-
	Temples/place of worship	-	-	-	11	-	-	-	11
	Others								

3.5 SOCIO ECONOMIC AND LITERACY PROFILE

Land holdings: The area under the project is cultivated by small and marginal farmers. Almost 70 percent of the farmers fall under this category.

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

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

3.5.1 Demographic Status

Table 15. Demographic Status/ Population Pattern

S. No.	Name of the Micro watersheds	Name of villages	Total no. of houses	Total Population			SC			
				Male	Female	Total	Male	Female	Total	%age
1	Chitlang	Chitlang	430	1162	1022	2184	290	211	511	23.40
		Bir Chitlang	6	20	12	32	0	0	0	0.00
2	Jhagroli	Jhagroli	615	1754	1635	3389	274	268	542	15.99
3	Bucholi	Bucholi	433	1152	1006	2158	176	164	340	15.76
		Meghanwas	287	750	658	1408	71	58	129	9.16
4	Sigra	Sigra	379	1078	1003	2081	197	192	389	18.69
		Sigri	252	647	579	1226	235	202	437	35.64
		Anawas	158	425	407	832	41	46	87	10.46
5	Dewas	Dewas	481	1241	1086	2327	177	148	325	13.97
		Dulana	239	633	545	1178	161	146	307	26.06
6	Salimabad	Salimabad	170	499	416	915	8	8	16	1.75
		Total	**3450**	**9361**	**8369**	**17730**	**1630**	**1443**	**3083**	**17.39**

(Source- District Census 2011)

Table16. Village wise Literacy Rate in Chitlang Watershed (IWMP VII)

S. No.	Name of the Micro watershed	Name of villages	Total population	Literacy					
				Total Literates	% age	Male	% age	Female	% age

1	Chitlang	Chitlang	2184	1480	67.77	855	57.77	625	42.23
		Bir Chitlang	32	24	75.00	15	62.50	9	37.50
2	Jhagroli	Jhagroli	3389	2367	69.84	1396	58.98	971	41.02
3	Bucholi	Bucholi	2158	1557	72.15	940	60.37	617	39.63
		Meghanwas	1408	1018	72.30	605	59.43	413	40.57
4	Sigra	Sigra	2081	1468	70.54	863	58.79	605	41.21
		Sigri	1226	840	68.52	483	57.50	357	42.50
		Anawas	832	558	67.07	328	58.78	230	41.22
5	Dewas	Dewas	2327	1656	71.16	1008	60.87	648	39.13
		Dulana	1178	854	72.50	520	60.89	334	39.11
6	Salimabad	Salimabad	915	621	67.87	383	61.67	238	38.33
		Total	**17730**	**12443**	**70.18**	**7396**	**59.44**	**5047**	**40.56**

(Source- District Census- 2011)

Table 17. EMPLOYMENT STATUS

S. No.	Name of Micro Watersheds	Name of villages	Schedule caste		Cultivators		Agricultural labourers		Household industry workers		Other workers	
			Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	Chitlang	Chitlang	290	211	88	2	163	2	6	2	159	9

		Bir Chitlang	0	0	2	0	0	0	1	0	4	0
2	Jhagroli	Jhagroli	274	268	129	43	257	54	22	4	281	14
3	Bucholi	Bucholi	176	164	187	123	18	2	6	1	228	25
		Meghanwas	71	58	36	0	18	0	3	0	77	13
4	Sigra	Sigra	197	192	140	274	2	1	3	0	325	36
		Sigri	235	202	63	0	5	0	1	1	179	10
		Anawas	41	46	53	17	3	1	7	0	122	5
5	Dewas	Dewas	177	148	212	39	19	4	2	0	170	15
		Dulana	161	146	102	22	5	0	0	0	138	16
6	Salimabad	Salimabad	8	8	123	38	0	0	0	12	134	14
		Total	**1630**	**1443**	**1135**	**558**	**490**	**64**	**51**	**20**	**1817**	**157**

Source: Census 2011

3.5.2 MIGRATION PATTERN

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

Table 18. Migration Pattern in Chitlang Watershed (IWMP VII)

S. No.	Name of Micro Watersheds	Name of villages	Total Population	No. of persons migrating	No. of days per year of migration	Main reason for migration	Income during migration/ month/person
1	Chitlang	Chitlang	2184	88	60	Lack of employment opportunity	6500- 10000
		Bir Chitlang	32	-	-	-	-
2	Jhagroli	Jhagroli	3389	118	45	Lack of employment opportunity	6500- 10000
3	Bucholi	Bucholi	2158	87	60	Lack of employment opportunity	6500- 10000
		Meghanwas	1408	69	45	Lack of employment opportunity	6500- 10000
4	Sigra	Sigra	2081	64	45	Lack of employment opportunity	6500- 10000
		Sigri	1226	98	90	Lack of employment opportunity	6500- 10000
		Anawas	832	87	60	Lack of employment opportunity	6500- 10000
5	Dewas	Dewas	2327	97	60	Lack of employment opportunity	6500- 10000
		Dulana	1178	78	60	Lack of employment opportunity	6500- 10000
6	Salimabad	Salimabad	915	59	90	Lack of employment opportunity	6500- 10000

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

Table 19. BPL Pattern

S. No.	Name of Micro watersheds	Name of villages	Total houses	Total Household-BPL	% of BPL HH
1	Chitlang	Chitlang	430	125	29.07
		Bir Chitlang	6	-	
2	Jhagroli	Jhagroli	615	182	29.59
3	Bucholi	Bucholi	433	187	43.19
		Meghanwas	287	104	36.24
4	Sigra	Sigra	379	85	22.43
		Sigri	252	124	49.21
		Anawas	158	45	28.48
5	Dewas	Dewas	481	175	36.38
		Dulana	239	61	25.52
6	Salimabad	Salimabad	170	34	20.00
		Total	**3450**	**1122**	**32.52**

(Source: District Administration Mahendergarh, Haryana)

INFRASTRUCTURE DETAILS

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

Table 20. Village Infrastructure

S. No.	Name of Micro watersheds	Name of villages	Bank Y/N	Post office Y/N	School Primary/ High/ Sr.Sec	Milk Collection Centre Y/N	Pucca Road to Village Y/N	Health Facility Govt/Private Y/N	Veterinary facility Y/N
1	Chitlang	Chitlang	N	N	Prim	N	Y	N	N
		Bir Chitlang	-	-	-	-	-	-	-
2	Jhagroli	Jhagroli	N	Y	Middle & Prim	N	Y	Y	N
3	Bucholi	Bucholi	N	Y	Sr. Sec	N	Y	N	N
		Meghanwas	N	N	Prim (2)	N	Y	N	Y
4	Sigra	Sigra	N	N	Prim	Y	Y	Y	N
		Sigri	N	N	Prim (2)	N	Y	N	N
		Anawas	N	N	Prim	N	Y	N	N
5	Dewas	Dewas	N	Y	High	Private	Y	N	N
		Dulana	N	Y	Sr. Sec.	N	Y	N	N
6	Salimabad	Salimabad	N	N	Sr.Sec,B.ed., Engg.	N	Y	N	N

FACILITIES/ HOUSEHOLD ASSETS

Table 21. Facilities/ Household assets in Chitlang Watershed (IWMP VII)

S.	Name of	Name of	Total	HHs	HHs with phones	HHs with vehicles	HHs	HHs with	HHs with	HHs

No.	micro water sheds	villages	no. of Houses	with Safe latrines	Landline	Mobile	2 wheelers	4 wheelers	with TV sets	cooking gas	drinking water	with fridge
1	Chitlang	Chitlang	430	150	10	450	204	4	256	214	430	160
		Bir Chitlang	6	1	3	0	2	0	3	0	6	0
2	Jhagroli	Jhagroli	615	300	25	1700	255	54	545	420	615	415
3	Bucholi	Bucholi	433	151	15	51	35	21	39	14	433	11
		Meghanwas	287	81	12	58	22	11	19	5	287	4
4	Sigra	Sigra	379	119	21	60	27	18	22	11	379	9
		Sigri	252	100	2	354	21	7	55	45	252	22
		Anawas	158	50	5	300	54	6	43	122	158	54
5	Dewas	Dewas	481	312	50	450	214	15	340	215	481	156
		Dulana	239	210	4	245	110	20	200	130	239	120
6	Salimabad	Salimabad	170	124	10	210	97	25	150	130	170	135

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

Table 22. Per capita (Household) income Chitlang Watershed (IWMP VII)

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	Chitlang	Chitlang	15000	20000	18000	11000	64000
		Bir Chitlang	-	-	-	-	-
2	Jhagroli	Jhagroli	18000	12000	17000	14000	61000
3	Bucholi	Bucholi	14000	10000	15000	13000	52000
		Meghanwas	15000	9500	16000	14000	54500
4	Sigra	Sigra	10000	15000	17000	9000	51000
		Sigri	8000	8500	24000	12000	52500
		Anawas	10000	10000	19000	15000	54000
5	Dewas	Dewas	20000	18000	16000	17000	71000
		Dulana	19000	17000	12000	21000	69000
6	Salimabad	Salimabad	10000	8500	22000	19000	59500

3.5.4 Comparative Status of crop Productivity

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

3.6 REASONS FOR LOW PRODUCTIVITY

- Moderate to severe erosion hazard
- Poor physical and chemical properties of the soils are light in texture with boulders in pockets and poor fertility.
- Low water holding/ retention capacity.
- Moderate to rapid permeability.
- Low organic carbon content.
- Poor phosphorous and medium potash nutrients availability.
- Lack of assured irrigation facility.
- Acceptance of hybrid/ high yielding varieties is very low.
- Irregular and erratic rainfall: there is long span between two subsequent rainfalls in the area.
- Sudden change in climate of the area.
- Essential micro- nutrient deficiency in the soil.
- Dependence on monsoon.
- Low use of fertilizer per unit cropped area.
- Lack of economic condition of farmers.
- Lack of good quality of seeds and fertilizer.
- Lack of post harvesting facilities such as storage and marketing.

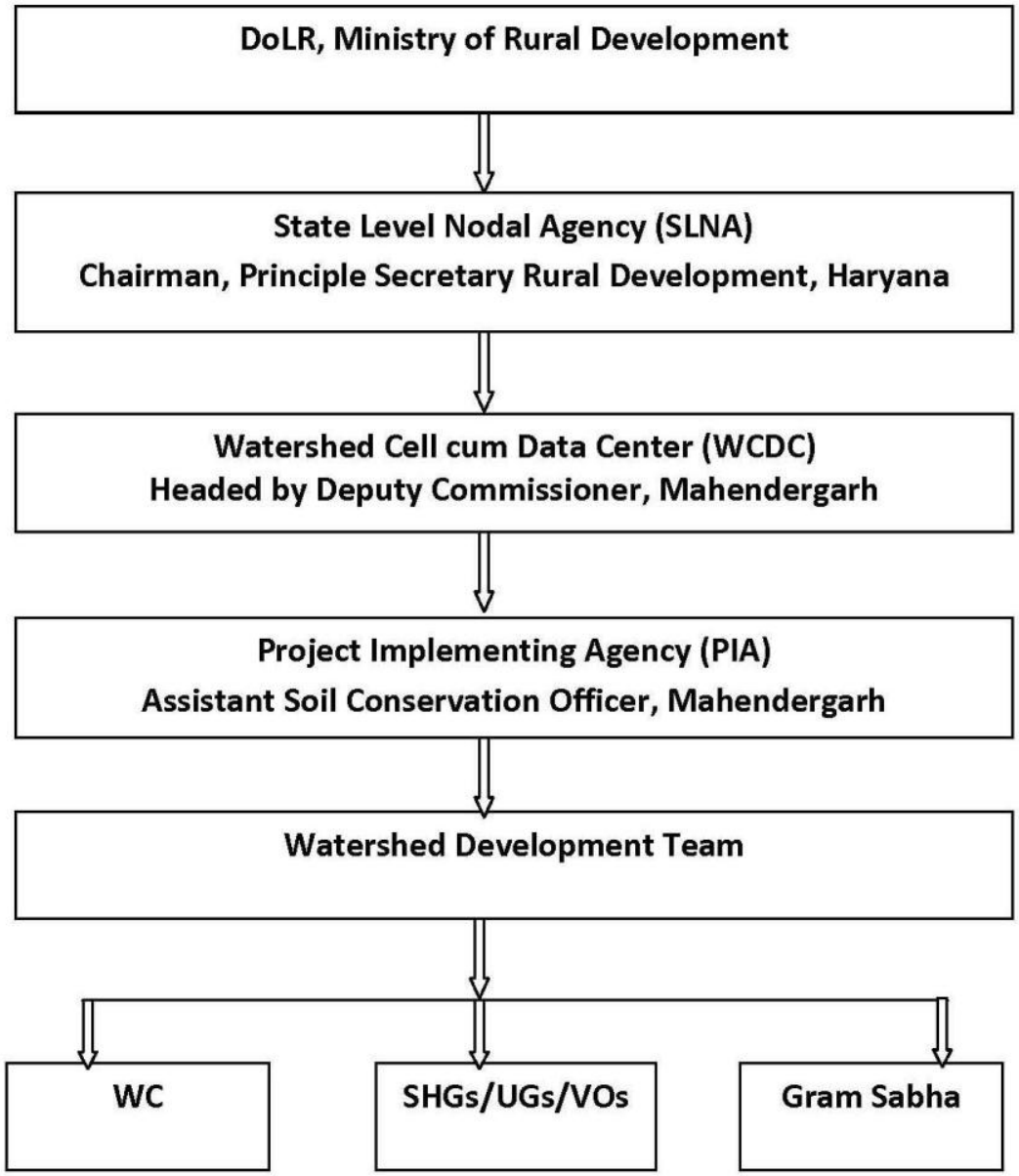
CHAPTER-4

PROJECT MANAGEMENT AGENCIES

4.1 INSTITUTIONAL ARRANGEMENT

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

The institutional set up is given below:


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

4.2 STATE LEVEL NODAL AGENCY, HARYANA

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

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

4.3 WATERSHED CELL CUM DATA CENTRE, MAHENDERGARH

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

Organization of WCDC and its Objective

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

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

4.4 Project Implementation Agency

The project Implementing Agencies (PIA), ASCO Mahendergarh is selected by the State Level Nodal Agency (SLNA) for Integrated Watershed Management Programme (IWMP) in Haryana. In the district Mahendergarh, where the area of development is 27898 ha, a separate dedicated unit, called the Watershed Cell cum Data Centre has been established which will oversee the implementation of watershed programme. The PIA is responsible for implementation of watershed project. Soils and Water Conservation Department, Mahendergarh will guide with its. He has a vast experience in implementing various watershed development Projects.

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

PIA will also undertake:

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

Table 1. PIA/ Project Implementing Agency

S.No.	Name of the Project	Details of PIA	
1	Chitlang Watershed (IWMP VII)	i) Type of organization	Agriculture Department, Govt. of Haryana
		ii) Name of organization	Assistant Soil Conservation Officer

		iii) Designation & Address	Assistant Soil Conservation Officer, Mahendergarh, Mini Secretariat, Room no. 307
		iv) Telephone	01285- 220223
		v) Fax	-
		vi) E-mail	vimalyadav_3218@rediffmail.com

The PIA is well competent to effectively manage this project and has a good rapport with the village community. The watershed committee members are giving them positive response in the preparatory phase. The overall responsibility of the PIA would be to oversee the project progresses well and to provide technical knowhow as when required. PIA has qualified and highly experienced staff to accomplish this task and take this project forward and attain to a logical conclusion. PIA will be assisted by the Watershed Development Team.

4.4.1 Monitoring Level Staff at PIA Head Office

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

4.5 Watershed Development Team

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

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

a) Constitution of Watershed Committee and its functioning,
b) Organizing and strengthening User groups, Self Help Groups,
c) Mobilizing women to ensure that the perspectives and interests of women are adequately reflected in the watershed action plan
d) Conducting Training and Capacity Building,
e) Common property resource management and equitable sharing
f) Preparing detailed resource development plan including Soil & Water Conservation,
g) Undertake engineering surveys,
h) Prepare engineering drawings and cost estimate for structures to be built.
i) Monitoring, checking, assessing, undertaking physical verification and measurements of the work done
j) Facilitating the development of livelihood opportunities for the landless
k) Maintaining project accounts
l) Arranging physical, financial and social audit of the work undertaken

m) Setting up suitable arrangements for post- project operation, maintenance and future development of the assets created during the project period.

4.6 WATERSHED COMMITTEE DETAILS

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

Their representation of various groups is as under:

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

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

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

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

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

4.6.1 Formation of Watershed Committees (WC)

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

Table 2. Watershed Committees (WC) Details

Name of Micro Watersheds	Name of Villages	Name of President/ Chairman	Name of Members
Chitlang	Chitlang/ Bir Chitlang	Smt. Bimla Devi	Sh. Sumanpal, Smt. Shanti Devi, Smt. Krishan Devi, Sh. Mahabir singh, Sh. Gobind singh, Sh. Zile singh, Sh. Jaipal singh, Sh. Roshan Lal, Smt. Sunita Devi, Smt. Saroj Devi, Smt. Laxmi devi, Sh. Anil, Sh. Raju singh, Sh. Satish, Sh. Sujan, Sh. Ravinder, Sh. Devender, Sh. Udai singh, Sh. Satyavir singh
Jhagroli	Jhagroli	Smt. Kamlesh Devi	Smt. Anju Devi, Sh. Naresh Kumar, Smt. Dayawanti, Sh. Pehlad singh, Sh. Randhir

Name of Micro Watersheds	Name of Villages	Name of President/ Chairman	Name of Members
			singh, Sh. Babu Lal, Smt. Prem Devi, Smt. Sumitra, Smt. Guddi Devi, Sh. Ashok Soni, Sh. Omparkash, Sh. Surtaj, Sh. Radheyshyam, Ran singh, Sh. J.P., Sh. Surender, Smt. Savitri Devi, Sh. Krishan singh, Sh. Satyavir singh
Bucholi	Bucholi	Smt. Kamlesh Devi	Sh. Suman Kumar, Smt. Shanti Devi, Sh. Surender Kumar Sharma, Sh. Jagbir singh, Smt. Misri Devi, Sh. Jagmal singh, Sh. Rajbir singh / Lala Ram, Sh. Jai singh, Smt. Munesh Devi, Smt. Subhwanti Devi, Sh. Rajkumar, Sh. Sheotaj, Sh. Suresh Kumar, Sh. Jaiparkash, Sh. Rambilash, Sh. Dalip singh, Sh. Amir singh, Sh. Dharamender, Sh. Satyavir singh
	Meghanwas	Smt. Krishna Devi	Smt. Anju Devi, Dr. Satyavir singh, Sh. Sundar Lal, Sh. Dariyao singh, Sh. Rattan singh, Sh. Ajit singh, Smt. Brahma Devi, Smt. Santosh Devi, Sh. Lal singh, Sh. Omparkash, Smt. Manju Devi, Sh. Sajjan singh, Smt. Promila Devi, Sh. Ashish, Sh. Omparkash, Sh. Birender singh, Sh. Satyavir singh
Sigra	Sigra	Sh. Sube singh	Smt. Anju Devi, Sh. Naresh Kumar, Sh. Harlal, Sh. Rajpal, Sh. Rohtash, Sh. Hari singh, Smt. Maya Devi, Sh. Dharambir, Smt. Sunita Devi, Smt. Santosh Devi, Smt. Rajesh, Sh. Ajay Kumar, Sh. Mukesh kumar, Sh. Juglal, Sh. Dayanand, Sh. Satyavir singh

Name of Micro Watersheds	Name of Villages	Name of President/ Chairman	Name of Members
	Sigri	Smt. Kaushalya Devi	Smt. Anju Devi, Sh. Naresh Kumar, Sh. Saitan singh, Smt. Bimla Devi, Smt. Lichhma Devi, Smt. Kamla Devi, Sh. Pardeep Kumar, Sh. Mukesh, Smt. Anita, Smt. Maya Devi, Sh. Raju, Sh. Lalit, Sh. Madan singh, Sh. Satyavir singh
	Anawas	Sh. Balbir singh	Smt. Anju Devi, Sh. Naresh Kumar, Sh. Nathu Ram, Sh. Rohtash, Smt. Bimla Devi, Smt. Savita, Sh. Omparkash, Sh. Roshan Lal, Sh. Roshan Lal, Sh. Sanwat Ram, Sh. Bhola Ram Chowkidar, Sh. Ramotar, Sh. Rajbir singh, Sh. Sanjay, Sh. Krishan Kumar, Smt. Munni Devi, Smt. Sharmila Devi, Sh. Satyavir singh
Dewas	Dewas	Sh. Deshraj	Sh. Rajkumar Yadav, Sh. Yogesh Kumar, Sh. Udmiram, Sh. Chhaju Ram, Sh. Mahender singh, Sh. Rajesh Kumar, Smt. Bhuri Devi, Sh. Ramesh Kumar, Smt. Barphi Devi, Smt. Santosh Devi, Sh. Rajaram, Smt. Mukesh Devi, Smt. Satto Devi, Sh. Lala Ram, Sh. Ishwar singh, Sh. Hosiar singh, Sh. Ranbir singh, Sh. Chandgi Ram, Smt. Bimla Devi, Sh. Satyavir singh
	Dulana	Sh. Mithu Ram Chopra	Sh. Suman Kumar, Smt. Shanti Devi, Sh. Rati Ram Yadav, Sh. Sumer singh, Sh. Risal singh Yadav, Smt. Brahma Devi, Sh. Jai singh, Smt. Santosh Devi, Smt. Parkash, Sh. Ishwar singh, Sh. Jaisingh Yadav, Sh. Vijay singh, Sh.

Name of Micro Watersheds	Name of Villages	Name of President/ Chairman	Name of Members
			Surender singh, Sh. Shish Ram, Sh. Satyavir singh
Salimabad	Salimabad	Sh. Suresh Saini	Sh. Surender Sharma, Sh. Ramesh, Sh. Sultan singh, Sh. Hemraj Saini, Sh. Lekhram, Smt. Anguri Devi, Smt. Manju Devi, Smt. Maya Devi, Smt. Shakuntla devi, Sh. Mukesh Kumar Yadav, Smt. Lali Devi, Sh. Virender kumar, Sh. Satbir, Sh. Sanjay, Sh. Satyavir singh

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

- Convening the meeting and recording the minutes of WC meeting and will be responsible for follow up the decision taken by the WC Committee.
- The secretary will be responsible for financial transactions of the project and will sign the cheques with WDT nominee on the behalf of WC.
- He will motivate the villagers for voluntary contribution and ensure equitable distribution of resources.

4.7 INSTITUTIONAL SETUP AT WATERSHED LEVEL

4.7.1 Self Help Groups

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

4.7.2 User Groups

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

CHAPTER- 5

BUDGETING

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

IWMP- VII CHITLANG 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 VII

Area in Hectares and

Funds in Rs.

Table 1. Activity wise allocation of funds for Project Village

(BUDGET AT A GLANCE)

Name of the project	Project Area	Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
Chitlang Watershe	3849	3372	40464000	Administrative costs	404640	404640	1213920	1213920	809280	4046400
				Monitoring	0	0	0	404640	0	404640

d (IWMP VII)				Evaluation	0	0	0	0	404640	404640
				Entry point activities	1618560	0	0	0	0	1618560
				Institution and capacity building	0	2023200	0	0	0	2023200
				Detailed project report	404640	0	0	0	0	404640
				Watershed development works	0	3237120	6474240	6878880	6069600	22659840
				Livelihood activities for the asset less persons	0	0	1213920	2023200	404640	3641760
				Production system and micro enterprises	0	0	1213920	1618560	1213920	4046400
				Consolidation phase	0	0	0	0	1213920	1213920
				Total	**2427840**	**5664960**	**10116000**	**12139200**	**10116000**	**40464000**
				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: Chitlang)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
662	7944000	Administrative costs	79440	79440	238320	238320	158880	794400
		Monitoring	0	0	0	79440	0	79440
		Evaluation	0	0	0	0	79440	79440
		Entry point activities	317760	0	0	0	0	317760
		Institution and capacity building	0	397200	0	0	0	397200
		Detailed project report	79440	0	0	0	0	79440
		Watershed development works	0	635520	1271040	1350480	1191600	4448640
		Livelihood activities for the asset less persons	0	0	238320	397200	79440	714960
		Production system and micro enterprises	0	0	238320	317760	238320	794400
		Consolidation phase	0	0	0	0	238320	238320
		Total	**476640**	**1112160**	**1986000**	**2383200**	**1986000**	**7944000**
		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: Jhagroli)

(**BUDGET AT A GLANCE)**

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
606	7272000	Administrative costs	72720	72720	218160	218160	145440	727200
		Monitoring	0	0	0	72720	0	72720
		Evaluation	0	0	0	0	72720	72720
		Entry point activities	290880	0	0	0	0	290880
		Institution and capacity building	0	363600	0	0	0	363600
		Detailed project report	72720	0	0	0	0	72720
		Watershed development works	0	581760	1163520	1236240	1090800	4072320
		Livelihood activities for the asset less persons	0	0	218160	363600	72720	654480

		Production system and micro enterprises	0	0	218160	290880	218160	727200
		Consolidation phase	0	0	0	0	218160	218160
		Total	**436320**	**1018080**	**1818000**	**2181600**	**1818000**	**7272000**
		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: Bucholi)

(BUDGET AT A GLANCE)

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

Area	Available							
532	6384000	Administrative costs	63840	63840	191520	191520	127680	638400
		Monitoring	0	0	0	63840	0	63840
		Evaluation	0	0	0	0	63840	63840
		Entry point activities	255360	0	0	0	0	255360
		Institution and capacity building	0	319200	0	0	0	319200
		Detailed project report	63840	0	0	0	0	63840
		Watershed development works	0	510720	1021440	1085280	957600	3575040
		Livelihood activities for the asset less persons	0	0	191520	319200	63840	574560
		Production system and micro enterprises	0	0	191520	255360	191520	638400
		Consolidation phase	0	0	0	0	191520	191520
		Total	**383040**	**893760**	**1596000**	**1915200**	**1596000**	**6384000**
		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: Sigra)

(**BUDGET AT A GLANCE)**

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
600	7200000	Administrative costs	72000	72000	216000	216000	144000	720000
		Monitoring	0	0	0	72000	0	72000
		Evaluation	0	0	0	0	72000	72000
		Entry point activities	288000	0	0	0	0	288000
		Institution and capacity building	0	360000	0	0	0	360000
		Detailed project report	72000	0	0	0	0	72000
		Watershed development works	0	576000	1152000	1224000	1080000	4032000

		Livelihood activities for the asset less persons	0	0	216000	360000	72000	648000
		Production system and micro enterprises	0	0	216000	288000	216000	720000
		Consolidation phase	0	0	0	0	216000	216000
		Total	**432000**	**1008000**	**1800000**	**2160000**	**1800000**	**7200000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and
Funds in Rs.

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

(**BUDGET AT A GLANCE)**

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
530	6360000	Administrative costs	63600	63600	190800	190800	127200	636000
		Monitoring	0	0	0	63600	0	63600
		Evaluation	0	0	0	0	63600	63600
		Entry point activities	254400	0	0	0	0	254400
		Institution and capacity building	0	318000	0	0	0	318000
		Detailed project report	63600	0	0	0	0	63600
		Watershed development works	0	508800	1017600	1081200	954000	3561600
		Livelihood activities for the asset less persons	0	0	190800	318000	63600	572400
		Production system and micro enterprises	0	0	190800	254400	190800	636000
		Consolidation phase	0	0	0	0	190800	190800
		Total	**381600**	**890400**	**1590000**	**1908000**	**1590000**	**6360000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and
Funds in Rs.

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

(**BUDGET AT A GLANCE)**

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
442	5304000	Administrative costs	53040	53040	159120	159120	106080	530400
		Monitoring	0	0	0	53040	0	53040
		Evaluation	0	0	0	0	53040	53040
		Entry point activities	212160	0	0	0	0	212160
		Institution and capacity building	0	265200	0	0	0	265200
		Detailed project report	53040	0	0	0	0	53040

		Watershed development works	0	424320	848640	901680	795600	2970240
		Livelihood activities for the asset less persons	0	0	159120	265200	53040	477360
		Production system and micro enterprises	0	0	159120	212160	159120	530400
		Consolidation phase	0	0	0	0	159120	159120
		Total	**318240**	**742560**	**1326000**	**1591200**	**1326000**	**5304000**
		Percentage of total cost	**6%**	**14%**	**25%**	**30%**	**25%**	**100%**

CHAPTER – 6

PREPARATORY PHASES

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

6.1 AWARENESS GENERATION AND MOTIVATION FOR PARTICIPATION

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

6.1.1 Collection of Base Line Data and Hydrological Data

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

6.1.2 Formation of Village Level Institutions

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

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

6.1.3 Preparation of DPR

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

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

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

Strengths

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

Weaknesses

- Erratic rainfall
- Lack of good quality fodder.
- Lack of advanced cattle breed.
- Low level of milk production.
- Lack of knowledge base regarding scientific cattle management.
- Prevalence of soil erosion
- No organized micro enterprises activities.
- Lack of technical skills.

Opportunities

- Rain Water harvesting/recharging for production.
- Promotion of organic farming.
- Promotion of horticultural activities (dry land plants).
- Provide training on dairy farming and other income generating activities.
- Promotion of nursery raising and pasture development.

- There would be horizontal integration and convergence of development programmes being organized and run by govt.

Threats

There are few negative issues that may have adverse effect

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

CAPACITY BUILDING- 5%

Rs. 20, 23, 200/-

6.2 Capacity Building

1. Introduction

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

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

2. Vision

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

3. Need

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

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

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

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

4. Rationale

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

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

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

5. Objectives

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

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

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

Sl. No.	Title of Training Programme and Duration	Level of Participants	Total persons	Trainees Per Programme	Number of Programmes
01	District Level Sensitization Workshop for Watershed Committees. **One Day**				
	Mahendergarh	Members of Watershed Committees @ 10 per committee would also include accompanying WDT Members.	700	300-350	2
02	Block Level Functional Programmes for Secretaries of Watershed Committees. **Two Days**				
	Mahendergarh	Secretaries of Village Watershed Committees	70	35-40	2
03	Project Level Sensitization Camps for WC **One Days**				
	Mahendergarh	Members of Watershed Committees @ 10 Persons (Tentative) per WC	700	50	14
04	Village Level Awareness Camps on IWMP at Micro Watershed Level for User Groups **One Day**				
	Mahendergarh	Approximately 50 prospective user groups per micro watershed.	2050	50	41
05	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP **One Day**				
	Mahendergarh	Three persons (Leader, Secretary and Treasurer) per Self Help Group @ around one SHG per village.	210	50	4

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

6. Training Methods

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

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

7. Tools

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

8. Resource Persons

8.1. Internal

Around two persons per WDT identified from the initial training activities by HIRD, Nilokheri would be trained on various aspects for designing and conducting the training programmes. It is expected that each WDT members would be required

to function as a internal resource person for the proposed training programmes. Technical experts from each WCDC and PIA would also function as facilitators in the proposed training activities.

8.2. External

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

9. Fund Requirement

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

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

Sr. No	Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD	Total Funds
1	District Level Sensitization Workshop(s) for Watershed Committees	42884
2	Block Level Functional Programmes for Secretaries of Watershed Committees. Two Days	5584
3	Village Level Sensitization Camps for WC One Days	29867

4	Village Level Awareness Camps on IWMP at Micro Watershed Level for Prospective User Groups One Day	40140
5	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP One Day	11071
	Total	**129546**

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

S. No.	Target Group	Training Topics	No. of days	Budget per camp	No. of Camps	No. of Participants per camp	Cost for all participants per day	Cost per participant/ per day	Cost per person	Total Budget
1	Self Help Groups-2 SHGs- micro watershed level	Orientation on IWMP, SHGs cum Exposure Visit	2	16800	5	12	8400	700	2100	126000
2	User groups from each micro watershed	NRM, Post Project Management etc. –Exposure	2	16800	5	12	8400	700	2100	126000

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
		Visit								
3	Sub watershed Level- WDT Members	Part II-Module I to V-Exposure Visit Outside State- Conceptual, Technical, Social, Management of Finance, Monitoring and Evaluation.	4	36000	5	6	9000	1500	4500	135000
4	Sub watershed Level- PIA Members	Exposure Visit- Within Fundamentals of Watershed, Finance Management, Final Report on WDP etc	2	8400	5	6	4200	700	4500	135000
5	District Level- WDC	Exposure visit to successful watershed/ University.	2	8400	5	6	4200	700	1400	42000

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
6	District Level-Line Deptt., WDC	Exposure visit to successful watersheds within state.	2	8400	5	6	4200	700	1400	42000
7	SLNA and District Level Controlling Officers	Exposure visit to successful watersheds outside state	4	36000	5	6	9000	1500	6000	180000
Total			**18**		**35**	**54**				**786000**

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

S. No.	District	No. Micro watershed	No. of Camps/ Year/ Micro watershed	Total No. of camps per Year	Total No. of camps for 5 Year's	Amount of per Camp	Amount per Micro watershed	Total Budget
1.	Farmer Training Camp in each season	6	2	12	60	12,000	1,44,000	7,20,000

2.	Propaganda & Documentation (Puppet show, documentary movies show, video-graphy, Photography, wall Painting, Display Board, pamphlets, leaf lets. Etc)	6	2	12	60	5000	60,000	3,00,000
3	Contingency charges							87654
	Total							**1107654**

i) **Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD = Rs. 1,29,546/-**

ii) **Micro Watershed Wise Exposure cum training Visit For SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members**
= Rs. 7, 86,000/-

iii) **Farmer's / Beneficiaries training camps with Extension Program's = Rs. 11,07,654/-**

Grand Total = Rs. 20, 23,200/-

6.2.1. EXPECTED OUTCOME OF CAPACITY BUILDING

- All principal stakeholders would be covered under proposed training interventions by March, 2013.
- The knowledge level of different stakeholders on various provisions of Common Guidelines will increase to a significant level.
- The skill level of the principal stakeholders will be improved in managing watershed projects in consonance with the provisions of common guidelines and state government instructions.
- The programmes will help in ensuring that all stakeholders/agencies/institutions work with positive attitudes in order to utilize the benefit of the projects in fulfilling the objectives set forth.

- Programmes will create a sense of responsible partnership amongst various stakeholders.
- The programmes will also help in further identifying areas for future interventions.
- Improved participation of different stakeholders leading to speedy implementation of watershed development work phase.
- Experiences would help in consolidating other gaps for better planning and management of Capacity Building and Training interventions under new projects in future.

6.3 Entry Point Activities 4%

EPA activities are taken up under the watershed to build rapport with village community at the beginning of the project, generally certain important works which are in urgent demand of the local community are taken up. A group discussion was conducted in the Gram Sabha meeting/watershed committee regarding EPA activities. It was conveyed to the Gram Sabha that an amount of **Rs. 16, 18,560/-** 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 Chitlang Watershed (IWMP VII)

(Rs. In Lacs)

Sr. No.	Block	Name of Project	No. of EPAs Identified	No. of EPAs Completed	Name/Nature of EPA	Location	Expenditure
1.	Mahendergarh	Chitlang	12	12	1.Interlocking Tile Road	Jhagroli	2.11

Sr. No.	Block	Name of Project	No. of EPAs Identified	No. of EPAs Completed	Name/Nature of EPA	Location	Expenditure
	& Kanina	Watershed (IWMP VII)			2.Drainage Channel	Dulana	0.83
					3.Drainage Channel	Dewas	1.66
					4.Water cooler with Chamber	Salimabad	1.31
					5.Sitting Platform and Kheli	Salimabad	0.68
					6.RCC pipe for Sewerage	Sigra	1.17
					7.Storage Water Tanki	Bucholi	0.47
					8.Samshaan Shed	Meghanwas	1.08
					9.Earth Work in Temple	Anawas	0.46
					10.Interlocking Tile Road	Chitlang/Bir Chitlang	3.01
					11.UGPL for Drinking Water	Bucholi	0.00
					12.Interlocking Tile Road	Sigri	1.24
					Total		**14.04**

Total project Cost @ 4%= Rs. 16, 18,560/-

CHAPTER- 7

WORK PHASE

7.1 WATERSHED DEVELOPMENT WORKS - 56%

The Works identified after the detailed investigation and survey of the Project Area and identified works were discussed with the team of experts comprising of PIA associated with the field officers working in the area, Hydrologist and supported by Experts from Livelihood, Agriculture, Animal Husbandry and Horticulture. Participatory approach has been adopted to identify the activities under the project. The detailed discussions were held with watershed committees and works identified along with villagers after making visits to identified sites. The works mainly relate to soil and water conservation activities like Dug out Pond, Water Conveyance System, Roof Top rain water harvesting / Recharge system, Cement Masonry Structures, Earthen Embankment with pacca outlet, Small Earthen Embankment with vegetative support, Community water storage Tank, Ramp inlet/outlet & protection wall, if necessary at old ponds, UGPL etc. The proposed project proposals were presented in the Gram Sabha meeting as per the schedule and were approved with certain changes. The works thus identified are given in the attached sheets along with estimates – micro watershed/village wise.

Natural Resource Management/Drainage Line Treatment

Construction of Cement Stone/Brick Masonry structure /Drop Structure/ Outlet/ Protection Wall/Drainage Channel

Existing System: The project area has an undulated and hummocks which are restrict to field operations to stabilized agriculture fields/ habitation located along the banks of ponds and agriculture land. The main objectives of these structures are in situ moisture conservation, soil conservation, field boundary stabilization, land leveling and safe disposal of run off to protect agriculture fields. The land holding is small and loss of land badly affects the economy of the family. The projects executed under DDP/DPAP, stone masonry protection 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 by Afforestation and rain water harvesting/ Earthen embankments for recharge which would also check the soil erosion. As per need, earthen embankment with pucca outlet are proposed at strategic locations on field boundaries of undulated area to protect the farm lands, bank of ponds, habitation and infrastructure.

7.2 Renovation for capacity enhancement and construction of new Ponds

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

Proposed Activity: Renovation for capacity increase and construction of new pond. The provision for construction of Drainage channel, inlet, outlet, ramp and protection walls are the basic need by project stakeholders which has been provided. In some villages, the constructions of new ponds are proposed, subject to availability of land and funds. In summer months, it is widely held

that buffaloes must spend 3 to 4 hours in pond for cooling which save the animal from heat stress. Hence, there was much demand of ponds renovation for increase pond capacity. Ponds as such are the best source of rainwater conservation and ground water recharge.

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

7.3 Earthen Embankment with pucca outlet / Silt Detention Dams / Marginal Bundhs

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

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

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

This phase has been started after the completion of the preparatory phase is by and large complete. It is considered as the heart of the program in which the DPR proposals shall be implemented in participatory mode. In this watershed management program, it was planned to rehabilitate the degraded watersheds by the control of runoff and soil loss by biological and masonry works for conservation measures. In this water stressed project area, rainwater harvesting to reduce soil erosion, recharge ground water, and improve moisture regime and use of harvesting water for human and livestock use. This was coupled with land development, production improvement, and promotion of subsidiary occupations for improved livelihoods. Many village ponds are silted, several are filled with filth and sewage water and giving foul smell. Repair renovation and retaining walls of village ponds has emerged as an important activity. The scope of integrated watershed regeneration/rehabilitation works which emerged from the PRA is now presented.

Sample estimates are as follows:

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

Table-1 Name of Project IWMP- 7 Name of Micro Watershed :- Chitlang Name of village :- Chitlang & Birchitlang

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

No.				Phy.	Unit cost Rs. in Lacs	cost Rs.in Lacs	
1	(1 No.) Dug out Pond (New) and (1 No.) Renovation of old pond	East and South side of the village in common land	No.	2	3	6.00	For ground water recharging & availability of water for village community animals.
2	Water Conveyance System from canal to pond	East and South side of the village in common land	Rmt.	1450	0.007	10.15	To reduce the conveyance and evaporation losses of water.
3	Roof Top rain water harvesting / Recharge system	In Govt. School of village	No.	1	2	2.00	Water harvesting and recharging the ground water reservoir.
4	Cement Masonry Structure (Drainage channel, Ramp, outlets and Inlets)	East, South and middle in village in common land	Cum	152	0.0326	4.96	To insured availability of water during lien period in ponds
5	Rainfed Horticulture	Boundary of Agriculture fields	ha.	5	0.25	1.25	Proper utilization of uncultivated fields and additional income for farmers.
6	Agro forestry	Boundary of Agriculture fields	ha.	7	0.15	1.05	Increase biomass and additional income to the farmers

7	Earthen Embankment with pacca outlet	common Land and undulated Agriculture fields	No.	10	0.77+0.20=0.97	9.70	To check soil erosion and in situ moisture conservation.
8	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	11250	0.029	3.26	Storing surplus canal water for irrigation.
9	Community water storage Tank with pipeline	In agriculture fields near minor/canal	Nos	3	3	9.00	Proper utilization of uncultivated fields and additional income for farmers.
	Total Cost					**47.37**	
	Available Fund					**44.49**	
	Convergence					**2.88**	

Table-2 Name of Project IWMP- 7 Name of Micro Watershed :- Jhagroli Name of village :- Jhagroli

Sr. No.	Nature of works	Location	Unit	No. of works		Estimated cost Rs.in Lacs	Objective
				Phy.	Unit cost Rs. in Lacs		
1	(2 No.) Dug out Pond (New) and (1 No.) Renovation of old pond	North, West, and middle side of village in common land	No.	3	3	9.00	For ground water recharging & availability of water for village community animals.

2	Water Conveyance System from canal to pond	North and West side of village in common land	Rmt.	500	0.007	3.50	To reduce the conveyance and evaporation losses of water.
3	Roof Top rain water harvesting / Recharge system	Middle in the village in Govt. building	No.	2	2	4.00	Water harvesting and recharging the ground water reservoir.
4	Cement Masonry Structure (Drainage channel, Ramp, outlets and Inlets)	Middle and North in village in common land	Cum	178	0.0326	5.80	To insured availability of water during lien period in ponds
5	Rainfed Horticulture	Boundary of Agriculture fields	ha.	2	0.25	0.50	Proper utilization of uncultivated fields and additional income for farmers.
6	Agro forestry	Boundary of Agriculture fields	ha.	5	0.15	0.75	Increase biomass and additional income to the farmers
7	Earthen Embankment with pacca outlet	common Land and undulated Agriculture fields	No.	5	0.77+0.20=0.97	4.85	To check soil erosion and in situ moisture conservation.
8	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	8052	0.029	2.34	Storing surplus canal water for irrigation.

9	Community water storage Tank with pipeline	In agriculture fields near minor/canal	Nos	4	3	12.00	Proper utilization of uncultivated fields and additional income for farmers.
	Total Cost					**42.74**	
	Available Fund					**40.72**	
	Convergence					**2.02**	

Table-3 Name of Project IWMP- 7 Name of Micro Watershed :- Bucholi Name of village :- Bucholi

Sr. No.	Nature of works	Location	Unit	No. of works		Estimated cost Rs. in Lacs	Objective
				Phy.	Unit cost Rs. in Lacs		
1	(1 No.) Dug out Pond (New) and (1 No.) Renovation of old pond	North and East side of village in common land	No.	2	3	6.00	For ground water recharging & availability of water for village community animals.
2	Water Conveyance System from canal to pond	North and East side of village in common land	Rmt.	300	0.007	2.10	To reduce the conveyance and evaporation losses of water.
3	Cement Masonry Structure (Drainage	North and East side of village in common land	Cum	108	0.0326	3.52	To insure availability of water during lean period in ponds

	channel, Ramp, outlets and Inlets)						
4	Rainfed Horticulture	Boundary of Agriculture fields	ha.	6	0.25	1.50	Proper utilization of uncultivated fields and additional income for farmers.
5	Agro forestry	Boundary of Agriculture fields	ha.	8	0.15	1.20	Increase biomass and additional income to the farmers
6	Earthen Embankment with pacca outlet	common Land and undulated Agriculture fields	No.	5	0.77+0.20=0.97	4.85	To check soil erosion and in situ moisture conservation.
7	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	9056	0.029	2.63	Storing surplus canal water for irrigation.
8	Community water storage Tank with pipeline	In agriculture fields near minor/canal	Nos	2	3	6.00	Proper utilization of uncultivated fields and additional income for farmers.
	Total Cost					**27.80**	
	Available Fund					**25.00**	
	Convergence					**2.80**	

Table-4 Name of Project IWMP- 7 Name of Micro Watershed :- Bucholi Name of village :- Meghanwas

Sr. No.	Nature of works	Location	Unit	No. of works		Estimated cost Rs.in Lacs	Objective
				Phy.	Unit cost Rs. in Lacs		
1	Dug out Pond (New)	South, East and West side of village in common land	No.	1	3	3.00	For ground water recharging & availability of water for village community animals.
2	Water Conveyance System from canal to pond	South, East and West side of village in common land	Rmt	477	0.007	3.34	To reduce the conveyance and evaporation losses of water.
3	Cement Masonry Structure (Drainage channel, Ramp, outlets and Inlets)	South, East side of village in common land	Cum	84	0.0326	2.74	To insure availability of water during lean period in ponds
4	Rainfed Horticulture	Boundary of Agriculture fields	ha.	2	0.25	0.50	Proper utilization of uncultivated fields and additional income
5	Agro forestry	Boundary of Agriculture fields	ha.	4	0.15	0.60	Increase biomass and additional income to the farmers
6	Earthen Embankment with pucca outlet	common Land and undulated Agriculture	No.	3	0.77+0.20 =0.97	2.91	To check soil erosion and in situ moisture

		fields					conservation.
	Total Cost					**13.09**	
	Available Fund					**10.75**	
	Convergence					**2.34**	

Table-5 Name of Project IWMP- 7 Name of Micro Watershed :- Sigra Name of village :- Sigri

Sr. No.	**Nature of works**	**Location**	**Unit**	**No. of works**		**Estimated cost Rs. in Lacs**	**Objective**
				Phy.	**Unit cost Rs. in Lacs**		
1	Dug Out Pond	North side of village in common land	No.	1	3	3.00	For ground water recharging & availability of water for village community animals.
2	Water Conveyance System from canal to pond	North and East side of village in common land	Rmt	490	0.007	3.43	To reduce the conveyance and evaporation losses of water.
3	Roof Top rain harvesting / Recharge system	In Govt. School	No.	1	2	2.00	Water harvesting and recharging the ground water reservoir.

4	Cement Masonry Structure (Drainage channel, Ramp, outlets and Inlets)	North side of village in common land	Cum	58	0.0326	1.89	To insure availability of water during lean period in ponds
5	Rainfed Horticulture	Boundary of Agriculture fields	ha.	2	0.25	0.50	Proper utilization of uncultivated fields and additional income
6	Agro forestry	Boundary of Agriculture fields	ha.	4	0.15	0.60	Increase biomass and additional income to the farmers
7	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	5	0.77+0.20=0.97	4.85	To check soil erosion and in situ moisture conservation.
8	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	10500	0.029	3.05	Storing surplus canal water for irrigation.
	Total Cost					**19.32**	
	Available Fund					**16.80**	
	Convergence					**2.52**	

Table-6 Name of Project IWMP- 7 Name of Micro Watershed :- Sigra Name of village :- Sigra

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

No.				Phy.	Unit cost Rs. in Lacs	cost Rs. in Lacs	
1	Dug Out Pond	West side of village in common land	No.	1	3	3.00	For ground water recharging & availability of water for village community animals.
2	Water Conveyance System from canal to pond	West side of village in common land	Rmt	400	0.01	4.00	To reduce the conveyance and evaporation losses of water.
3	Roof Top rain harvesting / Recharge system	In Govt. School in common land	No.	1	2	2.00	Water harvesting and recharging the ground water reservoir.
4	Cement Masonry Structure (Drainage channel, Ramp, outlets and Inlets)	West side and middle in village Matawala Pond in common land	Cum	47	0.0326	1.53	To insure availability of water during lean period in ponds
5	Rainfed Horticulture	Boundary of Agriculture fields	ha.	2	0.25	0.50	Proper utilization of uncultivated fields and additional income
6	Agro forestry	Boundary of Agriculture fields	ha.	3	0.15	0.45	Increase biomass and additional income to the farmers
7	Earthen Embankment with	common Land and undulated Agriculture	No.	5	0.77+0.20=0.97	4.85	To check soil erosion and in situ moisture conservation.

	pacca outlet	fields					
8	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	8548	0.029	2.48	Storing surplus canal water for irrigation.
	Total Cost					**18.81**	
	Available Fund					**16.73**	
	Convergence					**2.08**	

Table-7 Name of Project IWMP- 7 Name of Micro Watershed :- Sigra Name of village :- Anawas

Sr. No.	Nature of works	Location	Unit	No. of works		Estimated cost Rs. in Lacs	Objective
				Phy.	Unit cost Rs. in Lacs		
1	Dug Out Pond	West side of village in common land	No.	1	3	3.00	For ground water recharging & availability of water for village community animals.
2	Water channel, Ramp, inlet, outlet & protection wall, if necessary at old	West side of village in common land	cum	45	0.0326	1.467	To protect banks of pond and safe disposal of excess water.

	ponds						
3	Rainfed Horticulture	Boundary of Agriculture fields	Ha.	1	0.25	0.25	Proper utilization of uncultivated fields and additional income
4	Agro forestry	Boundary of Agriculture fields	Ha.	2	0.15	0.30	Increase biomass and additional income to the farmers
5	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	9060	0.029	2.63	Storing surplus canal water for irrigation.
	Total Cost					**7.64**	
	Available Fund					**6.79**	
	Convergence					**0.85**	

Table-8 Name of Project IWMP- 7 Name of Micro Watershed :- Dewas Name of village :- Dewas

Sr. No.	Nature of works	Location	Unit	No. of works		Estimated cost Rs. in Lacs	Objective
				Phy.	Unit cost Rs. in Lacs		
1	Dug Out Pond	West side of village in common land	No.	1	3	3.00	For ground water recharging & availability of water for village community animals.
2	Water Conveyance System from canal to pond	West side of village in common land	Rmt	500	0.007	3.50	To reduce the conveyance and evaporation losses of water.
3	Roof Top rain harvesting / Recharge system	In Govt. School of village	No.	1	2	2.00	Water harvesting and recharging the ground water reservoir.
4	Cement Masonry Structure (Drainage channel, Ramp, outlets and Inlets)	East –South and West side of village in common land	Cum	90	0.0326	2.94	To insure availability of water during lean period in ponds

5	Rainfed Horticulture	Boundary of Agriculture fields	ha.	2	0.25	0.50	Proper utilization of uncultivated fields and additional income
6	Agro forestry	Boundary of Agriculture fields	ha.	5	0.15	0.75	Increase biomass and additional income to the farmers
7	Earthen Embankment with pacca outlet	common Land and undulated Agriculture fields	No.	7	0.77+0.20= 0.97	6.79	To check soil erosion and in situ moisture conservation.
8	Small Earthen Embankment with vegetative support	common Land and undulated Agriculture fields	100 Cum	12487	0.029	3.62	Storing surplus canal water for irrigation.
	Total Cost					**23.10**	
	Available Fund					**21.10**	
	Convergence					**2.00**	

Table-9 Name of Project IWMP- 7 Name of Micro Watershed :- Dewas Name of village :- Dulana

Sr. No.	**Nature of works**	**Location**	**Unit**	**No. of works**		**Estimated cost Rs. in Lacs**	**Objective**
				Phy.	**Unit cost Rs. in Lacs**		

1	Dug Out Pond	In Panchayat Farm and middle in village in common land	No.	1	3	3.00	For ground water recharging & availability of water for village community animals.
2	Earthen Embankment with pucca outlet	common Land and undulated Agriculture fields	No.	5	0.77+0.20=0.97	4.85	To check soil erosion and in situ moisture conservation.
3	Water Conveyance System from canal to pond	In Panchayat Farm in common land	Rmt	100	0.007	0.70	To reduce the conveyance and evaporation losses of water.
4	Roof Top rain harvesting / Recharge system	In Govt. building on main road	No.	1	2	2.00	Water harvesting and recharging the ground water reservoir.
5	Cement Masonry Structure (Drainage channel, Ramp, outlets and Inlets)	South side near bus stand main road	Cum	107	0.0326	3.49	To insure availability of water during lean period in ponds
6	Rainfed Horticulture	On field boundaries and panchayat land	ha.	2	0.25	0.50	Proper utilization of uncultivated fields and additional income
7	Agro forestry	On field boundaries and panchayat land	ha.	4	0.15	0.60	Increase biomass and additional income to the farmers

8	Small Earthen Embankment with vegetative support	On field boundaries at depressions	100 Cum	8506	0.029	2.47	Storing surplus canal water for irrigation.
	Total Cost					**17.60**	
	Available Fund					**14.52**	
	Convergence					**3.08**	

Table-10 Name of Project IWMP- 7 Name of Micro Watershed :- Dewas Name of village :- Salimabad

Sr. No.	**Nature of works**	**Location**	**Unit**	**No. of works**		**Estimated cost Rs. in Lacs**	**Objective**
				Phy.	**Unit cost Rs. in Lacs**		

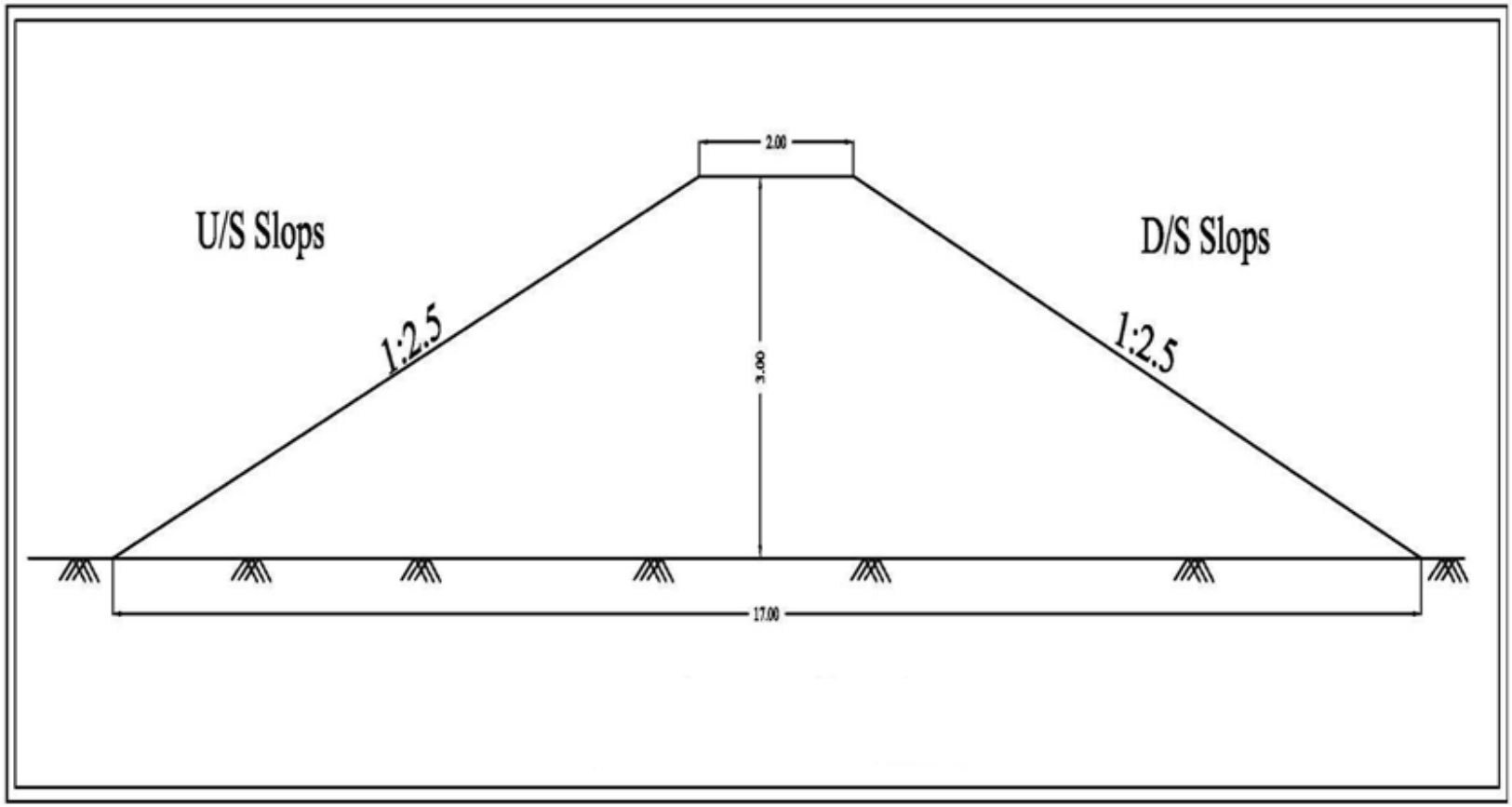
1	(1 No.) Dug Out Pond (New) (1 No.) Renovation of Pond	In common land near Gaushala in South side of village in common land	No.	2	3	6.00	For ground water recharging & availability of water for village community animals.
2	Earthen Embankment with pacca outlet	common Land and undulated Agriculture fields	No.	13	0.77+0.20=0.97	12.61	To check soil erosion and in situ moisture conservation.
3	UGPL (RCC/ HDPE)	Dulana to Salimabad main road to new Pond	Rmt.	500	0.007	3.50	Water harvesting and to save conveyance losses.
4	Roof Top rain harvesting / Recharge system	In govt. building	No.	1	2	2.00	Water harvesting and recharging the ground water reservoir.
5	Cement Masonry Structure (Drainage channel, Ramp, outlets and Inlets)	South side near Gaushala in common land	Cum	87	0.0326	2.84	To insure availability of water during lean period in ponds
6	Rainfed Horticulture	On field boundaries and panchayat land	ha.	3	0.25	0.75	Proper utilization of uncultivated fields and additional income
7	Agro forestry	On field boundaries and panchayat land	ha.	5	0.15	0.75	Increase biomass and additional income to the farmers
8	Small Earthen Embankment with vegetative support	On field boundaries at depressions	100 Cum	13107	0.029	3.80	Storing surplus canal water for irrigation.

	Total Cost	**32.25**	
	Available Fund	**29.70**	
	Convergence	**2.55**	

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 11. DETAILED ESTIMATE OF EARTHEN EMBANKMENT

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



EARTHEN EMBANKMENT

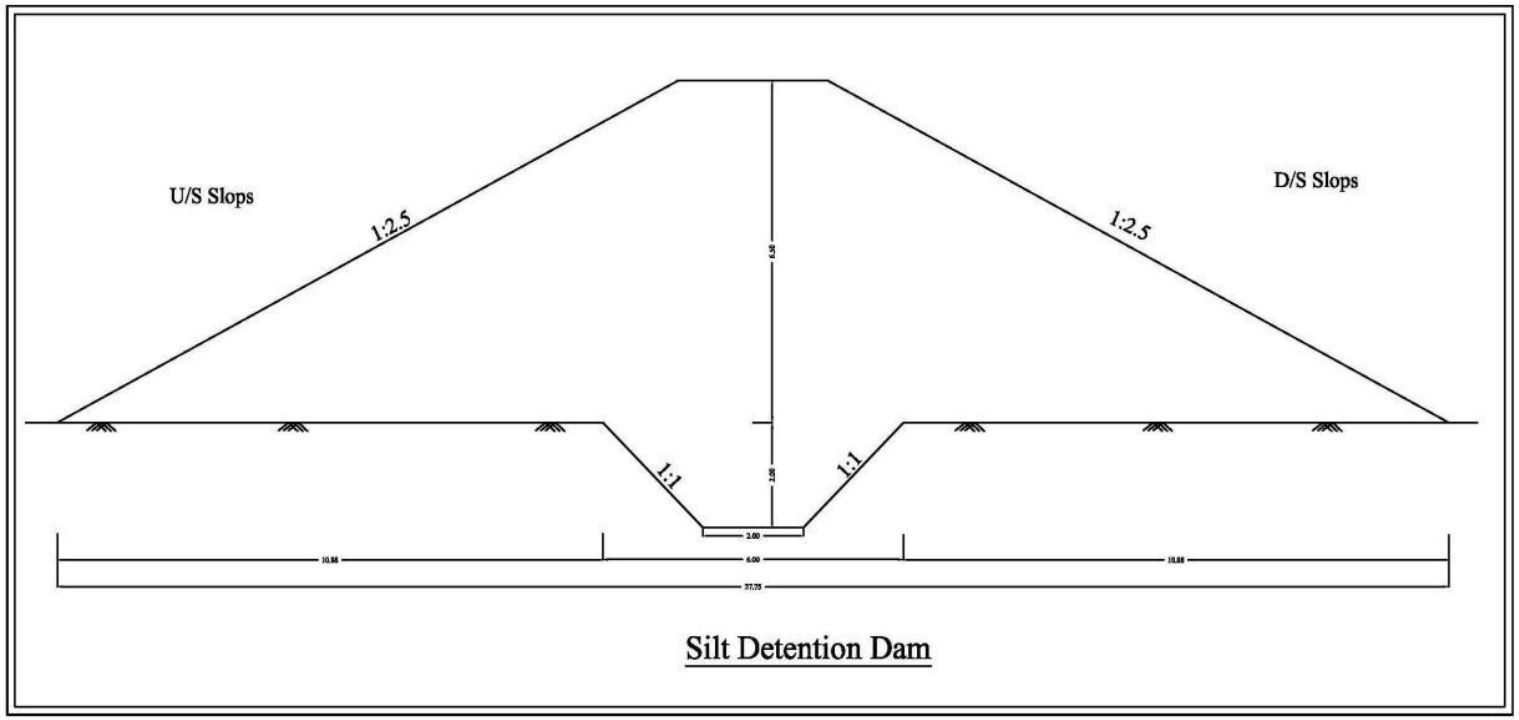
Leads Statement :-					
Cross Section Area = (Base + Top) ÷ 2 x Height i.e {(17.00 +2.00) ÷ 2} x 3.00 = 28.50 Square meters					
Horizontal leads = (Base/2) + (Cross section area/ 2 x 0.6) i.e. (17.00/2) + [{28.50}/(2 x 0.6)] =32.25 meters					
Vertical leads = (Height +0.60) x 0.4 x 10 i.e. (3.00 +0.60)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

Area to be covered by the body of Dam X Depth of loose soil i.e (680.00 x 0.30) =				204.00	cum
Volume of Earthwork in bund filling :-					
(Cross Section Area X Length) + Loose soil to be removed i.e.(28.50 x 40.00)+ 204.00 =				1344.00	cum
ABSTRACT OF COST					
S.No.	**Item of Work**	**Quantity**	**Rate**	**Unit**	**Amount**
1	Jungle clearance including uprooting of rank vegetarian, grass, bush woods etc H.S.R.6.26	2546.00 sq.m	Rs.66.80 + 300% C. Prem. =267.20	100 sq.m	6802.91
2	Removal of loose soil up to 0.3 m below Natural surface level H.S.R. 6.2 (b)	204.00 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	5384.99
3	E/work excavation for making embank-ment undressed including breaking of Clods. H.S.R. 6.2 (b)	1344.00 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	35477.57
4	Extra for admixture for single or kanker Exceeding 30% but up to 40%. H.S.R. 6.2 (h) ii	1344.00 cum	Rs. 318.55 + 350% C. Prem.= 1433.48	100 cum	19265.97
5	Extra for every 7.5 meter additional lead beyond 60mt but up to 255 m by the animal or animal driven cart (5 leads)	1344.00 cum	[(15.00 x 5 No.)+ 350% C. Prem.= 337.50	100 cum	4536.00

	H.S.R. 6.2 (c) (ii)				
6	Dressing of earthwork H.S.R. 6.3 (i)	1344.00 cum	Rs.45.90 + 350 % C. Prem.= 206.55	100 cum	2776.03
Total =					**74243.4712**
Add Contingency at the rate of 3% =					2227.30
Grand Total =					**76470.78**

Table. 12. 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. 13. Leads Statement

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

Horizontal leads = (Base/2) + (Cross section area/ 2 x 0.6) i.e. (27.75/2) + [{69.19}/(2 x 0.6)] =71.54 meters							
Vertical leads = (Height +0.60) x 0.4 x 10 i.e. (4.50 +0.60) x 0.4 x 10 = 20.40 meters							
Total leads = 71.54 meters + 20.40 meters = 91.94 meters							
Number of leads = (91.94 - 15.00) / 7.5 = 10.25 leads Or Say 11 No. of Leads							
Area of Jungle Clearance :-							
Area to be covered by the body of Dam = Length x Average base i.e. 50.00 x 27.75 = 1387.50 Sq. meters							
Area from where E/W is to be excavated = Av. Length x leads i.e. 50.00 x 91.94 = 4597.00 Sq. meters							
Total Area = 1387.50 + 4597.00 =		5984.50	Sq. meters.				
Volume of Key Trench :-							
(Length - 2 x 2.50) x Av. Width x Height i.e (50.00 - 2 x 2.50) x (6.00 +2.00)/2 x 2.00=						360.00	cum
Volume of Loose soil to be removed :-							
Area to be covered by the body of Dam X Depth of loose soil i.e (1387.50 x 0.30) =						416.25	cum
Volume of Earthwork in bund filling :-							
(Cross Section Area X Length) + Loose soil to be removed i.e.(69.19 x 50.00)+ 416.25 =						3875.75	cum
DETAILED ESTIMATE OF CHUTE SPILLWAY							
S.No.	**Description**	**No.**	**Length (mts)**	**Breadth (mts)**	**Height (mts)**	**Content (cums)**	
1	**Excavation of earthwork in foundation And plinth**				**H.S.R 6.6**		
	Crest wall	1	2.00	1.00	1.50	3.00	

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

	Toe with extension	1	4.00	0.70	0.30	0.84	
				Total =		**16.38**	
4	**Square rubble stone masonry course 1: 5 above G.L. H.S.R 12.23 and 12.31**						
	Side walls	2	24.00	0.50	(1.0+0.6)/2=0.80	19.20	
	Wing walls	2	2.00	0.50	1.00	2.00	
	Toe with extension	1	6.00	0.50	0.20	0.60	
		1	1.00	0.50	0.60	0.30	
	Toe wall extensions			**Total =**		**22.10**	
	Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41						
	On top of crest wall	1	2.00	0.50	0.05	0.05	
	On top of side walls	2	24.00	0.50	0.05	1.20	
	On top of wing walls	2	2.00	0.50	0.05	0.10	
	On top of Toe wall	1	4.00	0.50	0.05	0.10	
		1	24.00	2.00	0.10	4.80	
5	Apron			**Total =**		**6.25**	
6	**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	
	Toe wall extensions	2 x 2	1.00	_	0.60	2.40	
				Total =		**56.00**	

Material Statement and cost of Material:-

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

	Total =	**179.8566**	**24.7532**	**19.2384**	**5.5**	**42.328**
	Rates of material	245.00 per bag	950.00 per cum	965.00 per cum	985.00 per cum	945.00 per cum
	Cost of Materials	**44065**	**23516**	**18565**	**5418**	**40000**
Total Cost of Materials =		**Rupees**	**131563**	***/-only***		

ABSTRACT OF COST

S.No.	**Item of Work**	**Quantity**	**Rate**	**Unit**	**Amount**
1	Jungle clearance including uprooting of rank vegetarian, grass, bush woods etc H.S.R.6.26	5984.50 sq.m	Rs.66.80 + 300% C. Prem. =267.20	100 sq.m	15990.58
2	Removal of loose soil up to 0.3 m below Natural surface level H.S.R. 6.2 (b)	416.25 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	10987.75
3	E/Work excavation for digging of the key trench H.S.R. 6.6	360.00 cum	Rs.1108.10 + 350% C. Prem.= 4986.45	100 cum	17951.22
4	Excavation of E/Work for clay filling in Key trench including lead up to 495 mts. H.S.R. 6.2(b)and 6.2 (c)	360.00 cum	586.60+(6x15)+(32x13.25)+ (26x12.00) + 350% C. Prem.= 6356.70	100 cum	22884.12

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

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

Say Rs. 4.95 Lacs

Table. 14. Detail Estimate of Cement Stone Masonry Structure

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
1	**Excavation of earthwork in foundation And plinth H.S.R 6.6**					
	Crest wall with extensions	1	8.00	2.00	1.20	19.20
	Side walls	2	1.50	1.00	1.20	3.60
	Wing walls	2	2.00	1.00	1.20	4.80
	Toe wall with extensions	1	6.00	1.00	1.20	7.20
	Appron	1	4.00	1.50	0.30	1.80
				Total =		**36.60**
2	**Cement concrete work 1 : 4 : 8 in the Foundation and plinth H.S.R 10.39**					
	Crest wall with extensions	1	8.00	1.70	0.20	2.72
	Side walls	2	1.50	0.70	0.20	0.42
	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=	1.20	7.20

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
				0.75		
	Side walls	2	(1.5+2.0)/2= 1.75	0.50	(1.7+0.5)/2= 1.1	1.93
	Wing walls	2	2.00	0.50	1.70	3.40
	Toe wall with extensions	1	6.00	0.50	0.20	0.60
	Toe wall extensions	1	1.00	0.50	0.50	0.25
				Total =		**13.38**
5	**Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41**					
	On the top of crest wall	1	4.00	(1.0+0.5)/2= 0.75	0.05	0.15
	On the top of crest wall extensions	2	2.00	0.50	0.05	0.10
	On the top of side walls	2	1.50	0.50	0.05	0.08
	On the top of wing walls	2	2.00	0.50	0.05	0.10
	Toe wall with extensions	1	6.00	0.50	0.05	0.15
	Apron	1	4.00	1.50	0.10	0.60
				Total =		**1.18**
6	**Cement plastering work 1:4 on the**					
	Crest wall both side	2	4.00	_	1.20	9.60
	Crest wall extensions	2 x 2	2.00	_	0.50	4.00
	Side walls	2	(1.5+2.0)/2= 1.75	_	(1.7+0.5)/2= 1.1	3.85
	Wing walls	2	2.00	_	1.70	6.80
	Toe wall with extensions	1	6.00	_	0.20	1.20
	Toe wall extensions	2 x 2	1.00	_	0.50	2.00
				Total =		**27.45**

Table. 15. MATERIAL STATEMENT AND COST OF MATERIAL

S.No.	Item of work Quantity		Cement	Sand	Stone blast	Bajri 20 mm	Stone boulders
		(cum)	(bags)	(cum)	(cum)	(cum)	(cum)
1	C.C work 1 : 4 : 8	5.74	19.516	2.7552	5.5104	_	_
2	Sq. stone masonry work	16.50	28.38	4.95	_	_	18.15
	1: 5 in foundation.						
3	Sq. stone masonry work	13.38	23.005	4.0125	_	_	14.7125
	1: 4 above ground level.						
4	C.C work 1 : 2 : 4	1.18	7.4025	0.517	_	1.034	_
5	C. plastering work 1 : 4	27.45 sqm	3.02	0.41	_	_	_
	Total =		**81.323**	**12.64645**	**5.5104**	**1.034**	**32.8625**
	Rates of material		245.00 per bag	950.00 per cum	965.00 per cum	985.00 per cum	945.00 per cum
	Cost of Materials		**19924**	**12014**	**5318**	**1018**	**31055**
	Total Cost of Materials =		**Rupees**	**69329**	**/-only**		

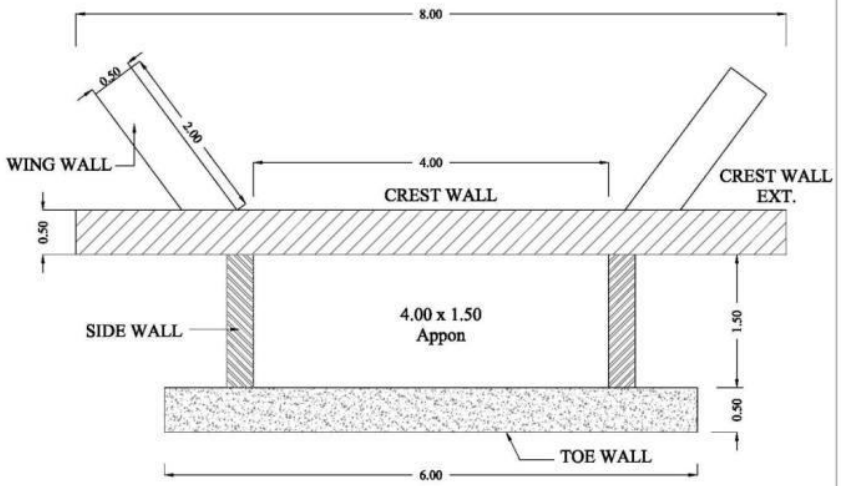
Table. 16. LABOUR COST

S. No.	Item of work Quantity		Rate		Unit	Amount
1	Excavation of earthwork in foundation and plinth H.S.R 6.6	36.60 cum	1108.10 +350% C. Prem. =4986.45		100 cum	**1825.04**
2	Cement concrete work 1 : 8 : 16 in the Foundation and plinth H.S.R 10.39	5.74 cum	64.95 +370% C. Prem. =305.27		cum	**1752.25**
3	Square rubble stone masonry course1: 5 in foundation and plinth H.S.R 12.23	16.50 cum	(160.35+26.00) +250% C. Prem. =652.22		cum	**10761.63**
4	Square rubble stone masonry course1: 5 above G.L. H.S.R 12.23 and 12.31	13.38 cum	(160.35+26.00+27.20) +200% Prem.= 747.42		cum	**9996.74**
5	Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41	1.18 cum	64.95 +370% C. Prem. =305.27		cum	**358.69**
6	Cement plastering work 1:4 on the stone walls H.S.R 15.5	27.45 sqm	5.50 +340 % C. Prem. =24.2		cum	**664.29**
	Total =	29.875 cum				**25358.64525**
					or say Rs.25359/- only	

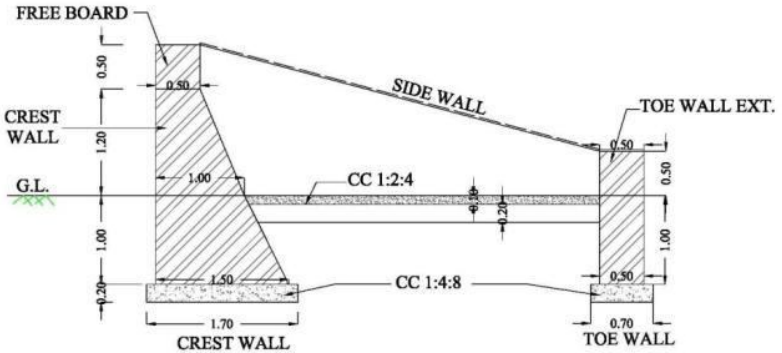
Table. 17. ABSTRACT OF COST

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

WORK PLAN OF CEMENT STONE MASONRY STRUCTURE



PLAN



X-SECTION

* Not to Scale
*All Dimension in m.

X-section of Masonry Structure

Table. 18. Detailed estimate of Pond

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

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

Table. 19. Abstract of cost of estimate for Digging Village Pond

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

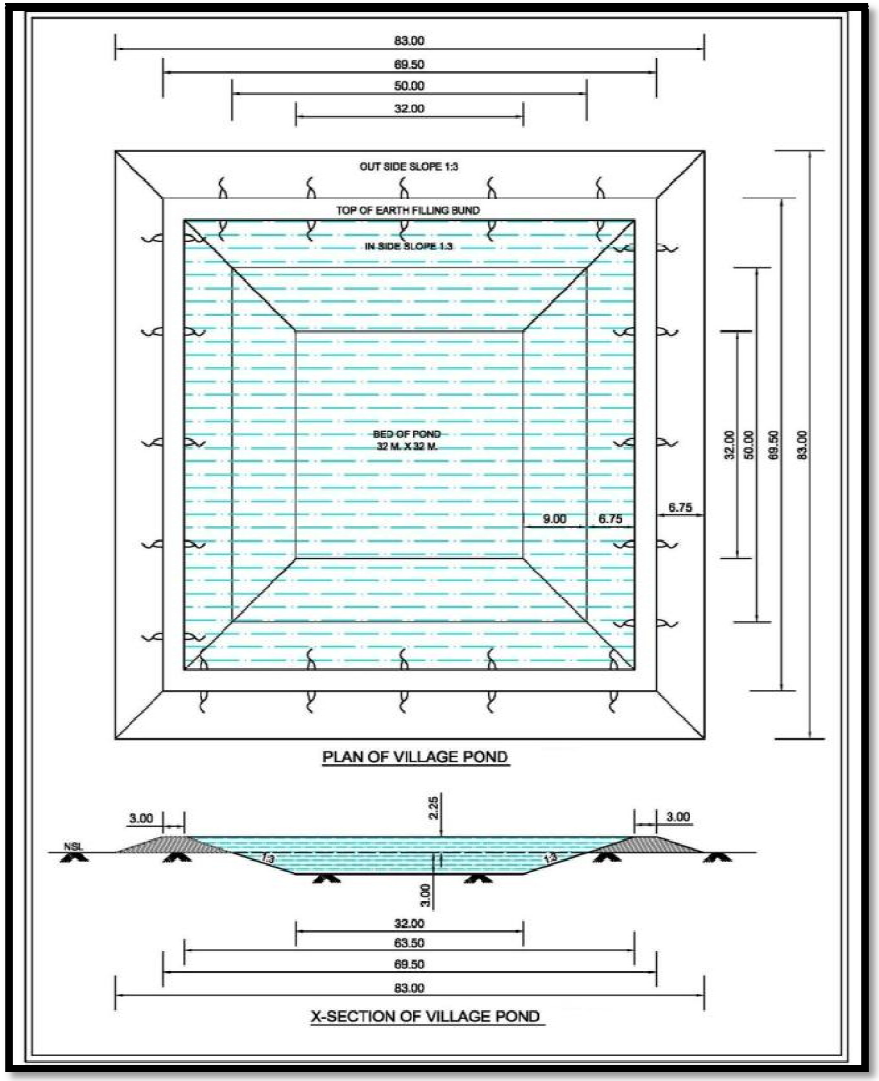

83.00
69.50
50.00
32.00
OUT SIDE SLOPE 1:3
TOP OF EARTH FILLING BUND
IN SIDE SLOPE 1:3
BED OF POND
32 M. X 32 M.
9.00
6.75
6.75
32.00
50.00
69.50
83.00
PLAN OF VILLAGE POND
3.00
2.25
3.00
NSL
1:3
1:3
3.00
32.00
63.50
69.50
83.00
X-SECTION OF VILLAGE POND

Table. 20 Estimate of Orchard Development in the Watersheds Per Hectare (Guava ,Amla & Ber)

A. Horticulture

Sr. No.	Particulars	Quantity	Unit	Rate	Amount
1	Soil working 1m x 1m x 1m size pits (225 Nos.) including cost of refilling(At the distance 20'x20')	225.00	cum	36.66	8248.50
2	Application of Farmyard Manure, including cost			L.S.	450.00
3	Cost of fertiliser/ pesticide @250gm/plant			L.S.	450.00
4	Cost of plants (including 15% etc. for mortality) including transportation and planting	260.00	Nos.	30/Plant	7800.00
5	Casualty replacement @ 10% of item No. 4 & 5				465.00
6	Cost of 2 weedings and hoeing			1.00/Pant	540.00
7	Contingency and unforeseen (3%)				492.00
				Total	**18445.50**
				Say `	**18500.00**
8	Maintenance cost 2nd year			L.S.	**1000.00**
	For next 5 years i.e. , ` 1000 x 5				**5000.00**
				Total	**24500.00**

	Say `	**24500.00**

Table. 21. Estimate of Agro- Forestry/ Afforestation

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

C	**Carriage**					

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

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

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

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

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

PRODUCTION SYSTEM- 10%

7.3 PRODUCTION SYSTEM

7.3.1 Crop Production

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

Scope of Improvement: There appears tremendous scope in improving production systems of the project area. The following practices are suggested enhancing the productivity with proven technology:-

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

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

7.3.2 Horticulture

Existing System: Ber, Amla and Guava are the most preferred fruit crop of the farmers and scattered plants of local citrus fruits are seen in farm lands. Some farmers have started raising Guava and Kinnow where irrigation facilities are available. Citrus fruits also raised but mostly for domestic use. There is no well organized marketing system in fruit plants. **Proposed System:** The average annual rainfall is 366 mm in the project area. The project areas are well connected by roads and the economic condition of the locals can be improved by introducing improved cultural practices of fruit plants coupled with rain water harvesting and efficient use of water. Large number of farmers are interested to increase area under Guava and Kinnow and requested for supply of good quality nursery raised plants. Several families have shown interest in raising Citrus fruits and amla. The following activities are proposed to promote horticulture in the area.

- Supply of quality seedlings arranged from approved nurseries as per choice of farmers.
- Soil testing up to a depth of 180 cm depth to ensure suitability of soil for fruit plants.
- Proper back up of technical support on orchard management by involving HAU Farm Advisory Service and department of horticulture.

- Appropriate safeguards from wildlife damage, frost damage and wind breaks.
- Arrangements for limited irrigation at least for first few years.
- Organizing SHGs around horticulture and joint purchase of inputs and marketing.

7.3.3 Vegetable cultivation

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

7.3.4 Promotion of Farm Forestry and Agro-forestry

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

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

7.3.5 Livestock Improvement Including Fodder Production

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

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

7.3.6 Marketing Arrangements and Proposal for Improvement

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

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

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

7.3.7 Detail of production system to be promoted

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

Table 22.Detail of Production System proposed to be promoted in the project village

S. No.	Particulars	Contents	No. of micro watersheds	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
1	Agriculture	To introduce Summer Moong or Mash, gwar and groundnut as a third crop in bajra-wheat rotation. Supply of mini- kits to 50 farmers of each micro watershed/year @ Rs.200/ kit as assistance is provided.	6	300(farmers)	1500 (mini kits)	200 per mini kits	300000

S. No.	Particulars	Contents	No. of micro watersheds	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
	Agriculture	Application of farm inputs like Zinc Sulphate or Sulphur or weedicides or pesticides. 50 farmer of each micro watershed/ year @ Rs.200/ kits as assistance is provided.	6	300(farmers)	1500 (mini kits)	200 per mini kits	300000
	Agriculture	Supplying of Agriculture implements – 10 farmers (average) per micro watershed @ Rs. 1000/ units as assistance is provided.	6	60(farmers)	300	1000	300000
	Agriculture	Agro Forestry: Eucalyptus/ neem on 50% subsidy @ Rs. 10/ plant as assistance is provided.	6	4800(plants)	24000 plants	Rs. 10 per plant	240000
2	Horticulture	Potential for Grafted Horticulture plants. Supply of plants at 50 % cost share for cultivation of fruits like Citrus fruits, Guava, Amla, ber, floriculture and vegetables (especially, turmeric, garlic, onion and tomato)	6	480 plants	2400 plants	Rs.40 per plant	96000
	Horticulture	Kitchen gardening Packets distributed to 67 farmers in each micro watershed/ year @ Rs.25/ packet.	6	402	2010	Rs. 25 Per packet	50250
	Horticulture	Three units of Bee keeping in each micro watershed @ 3000/ unit as assistance are provided.	6	18	90	3000	270000
	Horticulture	Two units of Vermi compost in each micro watershed per year @ Rs. 10000 per unit as assistance is provided.	6	12	60	10000	600000

S. No.	Particulars	Contents	No. of micro watersheds	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
3	Animal Husbandry	Problems being faced due to some diseases in the animals and low yield of milk. Production of free life saving medicines/ minerals for animals – the provision for 40 farmers of each micro watershed/year @ Rs.225 has been provided.	6	240	1200	225	270000
	Animal Husbandry	Livestock Management supply of feed supplements to improve health of cattle's. The provision to benefit 40 farmers of each micro watershed/year @ Rs.225 has been kept in the project proposals.	6	240	1200	225	270000
	Animal Husbandry	Supply of mini- kits of high yielding variety green fodder seeds to 20 farmers in each micro watershed/year @ Rs.200/- mini kits.	6	120(farmers)	600 Seeds of mini kit	200 per mini kit of seeds	120000
4	Joint camps with Line Departments	Two training camps to beneficiaries on Proven technology in agriculture are provided (during pre kharif and rabi season).	6	12	60	20000	120000
		Contingency					30150

Total: Rs. 4046400/-

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 is Neem. The impacts of such type's plantation have given extra source of income.

7.3.8. Vermin Compost

The vermin compost is one of the very useful organic manure. The vermin compost prepared by induction of various types worms (Earth Worm), to de compost and converted from raw animal dung to well 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 vemin 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 23: Model/ Estimate for a Vermin Compost Unit

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

Components of Vermin Compost Unit

1. **Shed**

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

2. Vermin- beds

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

3. Land

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

4. Seed Stock

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

5. Machinery

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

LIVELIHOOD ACTIVITIES FOR THE ASSET LESS PERSONS-9%

7.4 LIVELIHOOD SUPPORT TO SHG'S

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

1. Assure one livelihood option to poor families.
2. Assured livelihood for at least 100 days in a year including MGNREGA.
3. At least one daily job per family mainly SCs/BPL/very poor families.

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

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

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

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

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

Table 24. Revolving Fund Assistance for SHGs

S. No.	Name of micro watersheds	No. of villages	Total SHGs	Amount of RFA per SHG	Total

1	Chitlang	2	4	25,000	1,00,000
2	Jhagroli	1	2	25,000	50,000
3	Bucholi	2	4	25,000	1,00,000
4	Sigra	3	6	25,000	1,50,000
5	Dewas	2	4	25,000	1,00,000
6	Salimabad	1	2	25,000	50,000
	Total	**11**			**5,50,000**

Table 25. Skill Trainings/Skill up gradation for SHGs

S. No.	Name of micro watersheds	No. of villages	Total SHGs	Amount of Training per SHG	Total
1	Chitlang	2	4	35,000	1,40,000
2	Jhagroli	1	2	35,000	70,000
3	Bucholi	2	4	35,000	1,40,000
4	Sigra	3	6	35,000	2,10,000
5	Dewas	2	4	35,000	1,40,000
6	Salimabad	1	2	35,000	70,000

	Total	**11**			**7,70,000**

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

S. No.	Name of micro watersheds	No. of villages	No. of Persons in micro watershed	Amount of Training per trainee for 6 month	Total
1	Chitlang	2	9	10,000	90,000
2	Jhagroli	1	10	10,000	1,00,000
3	Bucholi	2	9	10,000	90,000
4	Sigra	3	9	10,000	90,000
5	Dewas	2	9	10,000	90,000
6	Salimabad	1	9	10,000	90,000
	Total	**11**			**5,50,000**

Note: The beneficiaries will contribute 10% as cost sharing of the livelihood support programme Rs. 550000 @ 10% cost sharing.

= 55,0,000- 55,000

= 4,95,000/-

Table 27. One time assistance as Revolving Fund to unemployed youth who have successfully completed Computer Training for setting up a computer centre

S. No.	Name of micro watersheds	No. of villages	No. of Persons in micro watershed	Amount of Training per Trainee	Total
1	Chitlang	2	9	20,000	1,80,000
2	Jhagroli	1	10	20,000	2,00,000
3	Bucholi	2	9	20,000	1,80,000
4	Sigra	3	9	20,000	1,80,000
5	Dewas	2	9	20,000	1,80,000
6	Salimabad	1	9	20,000	1,80,000
	Total	**11**			**11,00,000**

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

Note: The beneficiaries will contribute 10% as cost sharing of the livelihood support programme Rs. 1100000 @ 10% cost sharing.

= 11,00,000- 1,10,000

= 9,90,000/-

Table 28. Cutting and Tailoring Centre for female beneficiaries

S. No.	Name of micro watersheds	No. of villages	No. of centre's	Requirement for sewing machines per village (2 No.)	Payment to trainer per months	Period of training for each centre	Total payment to trainer
1	Chitlang	2	1	2	2,000	6	12,000
2	Jhagroli	1	1	2	2,000	6	12,000
3	Bucholi	2	1	2	2,000	6	12,000
4	Sigra	3	2	4	2,000	6	24,000
5	Dewas	2	2	4	2,000	6	24,000
6	Salimabad	1	1	2	2,000	6	12,000

	Total	**11**	**8**	**16**			**96,000**

Total cost for 8 Centres

1. Payment to trainers 96,000/-

2. Sewing Machine Cost 24,000/- (lump sum)

Table 29. Embroidery Centre for female beneficiaries

S. No.	Name of micro watersheds	No. of villages	No. of centers	Payment to Trainer per Month	Period months	Payment to trainer for 6 months @ Rs. 2000 p.m	Total trainers	Grand Total
1	Chitlang	2	1	2,000	6	12,000	1	12,000
2	Jhagroli	1	1	2,000	6	12,000	1	12,000
3	Bucholi	2	1	2,000	6	12,000	1	12,000
4	Sigra	3	2	2,000	6	12,000	2	24,000
5	Dewas	2	2	2,000	6	12,000	2	24,000
6	Salimabad	1	1	2,000	6	12,000	1	12,000
	Total	**11**	**8**					**96,000**

Total Cost:

Payment to trainer: Rs.96,000/-

Table 30. Livelihood Support

S. No.	Name of micro watersheds	No. of villages	Revolving fund assistance to individuals unemployed youth/ landless, women	
			Dairy Unit	Bee Keeping, Mushroom Cultivation, Vermi Compost etc.
1	Chitlang	2	1	1
2	Jhagroli	1	2	2
3	Bucholi	2	3	3
4	Sigra	3	4	4
5	Dewas	2	3	3
6	Salimabad	1	2	2
	Total	**11**	**15**	**15**
	Rate (Rs)		**25000**	**10000**
	Cost (Lakh Rs)		**3.75**	**1.50**

Contingency, printing material and other unseen items: Rs. 95760/-

Total funds available under this component are Rs. 3641760/-

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

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

There appears to be great potential for these activities and these activities are likely to generate income of Rs. 2000/- to Rs. 2500/- per member per month. However no activities would be forced upon on any SHGs and they would be free to decide the activity they would like to opt for their additional income. The PIA can take up the activities as per the need and approval of the Watershed Committee. Based on their choice, Project report for the specified activity would be prepared and revolving fund of Rs. 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. 31)

Detail of Convergence of IWMP and other schemes

Table 31. GAPS IN FUNDS REQUIREMENT – MICRO WATERSHED WISE

S.No	Name of micro watersheds	Total cost requirement for works	Total funds available under IWMP for works	Gap in funds requirement for works	Convergence with MGNREGA
1	Chitlang	47.37	44.49	2.88	2.88
2	Jhagroli	42.74	40.72	2.02	2.02
3	Bucholi	40.89	35.75	5.14	5.14
4	Sigra	43.69	40.32	3.37	3.37
5	Dewas	40.70	35.62	5.08	5.08
6	Salimabad	32.25	29.70	2.55	2.55
	Total	**247.64**	**226.60**	**21.04**	**21.04**

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

7.5.2 Non-Negotiable for works executed under MGNREGA

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

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

7.5.3 Convergence with Forest Department

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

7.5.4 Convergence with Horticulture Department

National Horticulture Mission is implementing the horticulture development programme which includes construction of water harvesting structures, drip and sprinkler irrigation activities which would be undertaken in convergence with the horticulture department. Under this activity 27 ha horticulture development programme with the financial assistance of Rs. 6.75 lakh has been provided in the project proposals. This would also be undertaken by convergence with the horticulture department.

7.5.5 Convergence with Agriculture Department

The activities under NRM Dug Out Pond, UGPL, Cement Stone Masonry structure, Silt Detention Dam/ Earthen Dam, Roof Top rain harvesting / Recharge system, Marginal Band / Earthen Embankment with pacca outlet, Small Earthen Embankment with vegetative support, Community water storage Tank etc. where the machinery and material component is required and the unit cost exceeds for completion exceeds to the project provision, the same will be met in convergence with the similar activities of the agriculture.

7.5.6 Convergence with Animal Husbandry Department

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

CHAPTER – 8

QUALITY AND SUSTAINABILITY

8.1 Monitoring and Evaluation

8.1.1 Plans for Monitoring and Evaluation

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

8.1.2 Monitoring

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

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

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

Table 1. Micro Watershed wise details

S. No.	Name of the Micro Watersheds	Effective Area	Total Cost	Monitoring 1%
1	Chitlang	662	79,44,000	79,440
2	Jhagroli	606	72,72,000	72,720
3	Bucholi	532	63,84,000	63,840

4	Sigra	600	72,00,000	72,000
5	Dewas	530	63,60,000	63,600
6	Salimabad	442	53,04,000	53,040

8.2 EVALUATION

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

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

Table 2. Micro Watershed wise details

S. No.	Name of the Micro Watersheds	Effective Area	Total Cost	Evaluation 1%
1	Chitlang	662	79,44,000	79,440
2	Jhagroli	606	72,72,000	72,720
3	Bucholi	532	63,84,000	63,840

4	Sigra	600	72,00,000	72,000
5	Dewas	530	63,60,000	63,600
6	Salimabad	442	53,04,000	53,040

CONSOLIDATION PHASE- 3 %

Consolidation Phase = Rs. 12, 13,920/-

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: Chitlang

Table 3. Consolidated Phase

S. No.	Type of activity	Amount earmarked (Rs. in lacs)
1	Managing/ upgrading of all activities taken up under the project	0.48
2	Preparation of Project completion report	0.12
3	Documentation of success stories	0.11
4	Management of proper utilization of WDF	0.36
5	Mechanism for quality and sustainability issues under the Project	0.12
6	Watershed activities	1.19

Total: 2.38 lacs

Name of Micro watershed: Jhagroli

Table 4. Consolidated Phase

S. No.	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.44
2	Preparation of Project completion report	0.11
3	Documentation of success stories	0.10
4	Management of proper utilization of WDF	0.33
5	Mechanism for quality and sustainability issues under the Project	0.11
6	Watershed activities	1.09

Total: 2.18 lacs

Name of Micro watershed: Bucholi

Table 5. Consolidated Phase

S. No.	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.38
2	Preparation of Project completion report	0.10
3	Documentation of success stories	0.09

4	Management of proper utilization of WDF	0.29
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.96

Total: 1.91 lacs

Name of Micro watershed: Sigra

Table 6. Consolidated Phase

S. No.	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.43
2	Preparation of Project completion report	0.11
3	Documentation of success stories	0.11
4	Management of proper utilization of WDF	0.32
5	Mechanism for quality and sustainability issues under the Project	0.11
6	Watershed activities	1.08

Total: 2.16 lacs

Name of Micro watershed: Dewas

Table 7. Consolidated Phase

S. No.	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.38
2	Preparation of Project completion report	0.10
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.29
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.96

Total: 1.91 lacs

Name of Micro watershed: Salimabad

Table 8. Consolidated Phase

S. No.	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.32
2	Preparation of Project completion report	0.08
3	Documentation of success stories	0.08
4	Management of proper utilization of WDF	0.24
5	Mechanism for quality and sustainability issues under the Project	0.08
6	Watershed activities	0.79

Total: 1.59 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 3372 ha and the Project Cost is 404.64 lacs covering 6 no. micro watersheds and in all 11 villages. Benefits will be much more than the project cost as detailed below:

With the several interventions under IWMP VII 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 Chitlang Watershed VII will prove to be very beneficial in improving socio – economic status of people residing in Project villages.

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

9.1 EMPLOYMENT

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

Table 1. Expected Employment Generation in the Project area

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

1	Chitlang	5295	11469	16764	39	201	240	11	11	22	44
2	Jhagroli	1598	3574	5172	43	316	359	11	-	11	22
3	Bucholi	1863	4166	6029	31	364	395	22	11	11	44
4	Sigra	1496	3424	4920	68	353	421	22	22	22	66
5	Dewas	2503	5069	7572	54	376	430	11	22	11	44
6	Salimabad	1953	4047	6000	2	98	100	11	11	-	22
	Total	14708	31749	**46457**	237	1708	**1945**	88	77	77	**242**

46457 man days would be generated with the implementation of the project in Chilang Watershed (IWMP VII), about 92 person for 100 days per year would be employed for the period of five years. In addition to this cropped area/ productivity would be increased and will also generate employment.

9.2 MIGRATION PATTERN

Table 2. Pre and Post Migration in Chitlang Watershed (IWMP VII)

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

1	Chitlang	88	41	60	30	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
2	Jhagroli	118	54	45	22	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
3	Bucholi	156	76	60	30	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
4	Sigra	249	121	60	30	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
5	Dewas	175	185	60	30	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
6	Salimabad	59	28	90	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%

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

9.3 GROUND WATER TABLE

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/recharging aquifers. The watershed area is experiencing falling water table at the rate of 88 cm/yr. so provision of rain water harvesting and recharging the aquifers has been provided to check further fall in water table.

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

S. No.	Name of micro watersheds	Source	Pre- Project level (m)	Remarks
1	Chitlang	Open Well	36	The area is experiencing falling water table at the rate of 88 cm/yr. so provision of rain water harvesting and recharging has been provide to recharge the aquifers.
2	Jhagroli	Open Well	33	
3	Bucholi	Open Well	46	
4	Sigra	Open Well	56	
5	Dewas	Open Well	83	
6	Salimabad	Open Well	58	

Source: Ground Water Cell, Haryana

9.4 CROPS

Agriculture primary depends upon water, but this is availability of this is lacking without existence of canal network and deeper ground water conditions. All this can change with the integrated land and water management during the watershed project. The planned Dug out Pond, Water Conveyance System, Roof Top rain water harvesting / Recharge system, Cement Masonry Structures, Earthen Embankment with pacca outlet, Small Earthen Embankment with vegetative support, Community water storage Tank, Ramp inlet/outlet & protection wall, if necessary at old ponds, UGPL 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 Chitlang Watershed (IWMP VII)

Name of Micro-Watersheds	Name of Crops	Pre project		Total Production(in Kg)	Total Value Rs (in lacs)	Expected post project		Total Production (in Kg)	Total Value Rs (in lacs)
		Area ha	Average yield kg. Per ha			Area ha	Average yield kg. Per ha		
Chitlang	Wheat	179	4580	819820	110.68	196	4717	924532	124.81
	Mustard	110	1545	169950	50.99	118	1596	188328	56.50
	Bajra	411	1718	706098	88.26	428	1802	771256	96.41
Jhagroli	Wheat	154	4600	708400	95.63	168	4736	795648	107.41
	Mustard	281	1545	434145	130.24	293	1598	468214	140.46
	Bajra	421	1715	722015	90.25	436	1800	784800	98.10
Bucholi	Wheat	123	4575	562725	75.97	135	4711	635985	85.86
	Mustard	143	1524	217932	65.38	154	1574	242396	72.72
	Bajra	291	1726	502266	62.78	296	1835	543160	67.90
Sigra	Wheat	140	4590	642600	86.75	153	4725	722925	97.59
	Mustard	205	1534	314470	94.34	217	1586	344162	103.25
	Bajra	309	1700	525300	65.66	323	1783	575909	71.99
Dewas	Wheat	162	4600	745200	100.60	174	4728	822672	111.06

	Mustard	86	1524	131064	39.32	92	1575	144900	43.47
	Bajra	288	1698	489024	61.13	315	1749	550935	68.87
Salimabad	Wheat	72	4598	331056	44.69	77	4751	365827	49.39
	Mustard	75	1548	116100	34.83	78	1624	126672	38.00
	Bajra	124	1715	212660	26.58	135	1765	238275	29.78
Total		3574			1324.09	3788			1463.57

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

9.5 HORTICULTURE

Table 5. Pre and post project area under Horticulture

S. No.	Name of Micro Watershed	Existing area under horticulture (ha)	Additional Area under horticulture proposed to be covered through IWMP	Total area in ha – Post Project
1	Chitlang	3	5	8
2	Jhagroli	1	2	3
3	Bucholi	3	8	11
4	Sigra	2	5	7
5	Dewas	2	4	6

6	Salimabad	1	3	4
	Total	**12**	**27**	**39**

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	Chitlang	4	7	11
2	Jhagroli	3	5	8
3	Bucholi	9	12	21
4	Sigra	5	9	14
5	Dewas	4	9	13
6	Salimabad	3	5	8
	Total	**28**	**47**	**75**

9.7 LIVESTOCK

Table 7. Details of livestock in the project area

S.	Name of	Type of	Pre project	Post project	Remarks

No.	micro watershed	Animals	No.	Yield Kg/ day	Income In Rs per day	No.	Yield Kg/ day	Income In Rs per day	
1	Chitlang	Buffalo	473	11-12	440-480	544	13-14	546-588	Increase in milk yield and number of animals by approx. 15%
		Cow	51	5-6	75-90	59	7-8	140-160	Increase in milk yield and number of animals by approx. 15%
2	Jagroli	Buffalo	903	11-12	440-480	1038	13-14	546-588	Increase in milk yield and number of animals by approx. 15%
		Cow	151	6-7	180-210	174	8-9	256-288	Increase in milk yield and number of animals by approx. 15%
3	Bucholi	Buffalo	1196	7-8	140-160	1375	9-10	225-250	Increase in milk yield and number of animals by approx. 15%
		Cow	180	5-6	75-90	207	7-8	140-160	Increase in milk yield and number of animals by approx. 15%
4	Sigra	Buffalo	1127	10-12	400-480	1296	12-14	504-588	Increase in milk yield and number of animals by approx. 15%
		Cow	79	6-7	180-210	91	8-9	256-288	Increase in milk yield and number of animals by approx. 15%
5	Dewas	Buffalo	900	11-12	440-480	1035	13-14	546-588	Increase in milk yield and number of animals by approx. 15%
		Cow	101	5-6	75-90	116	7-8	140-160	Increase in milk yield and number of animals by approx. 15%

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	
6	Salimabad	Buffalo	420	7.5- 8.5	150-170	483	9.5- 10.5	238-263	Increase in milk yield and number of animals by approx. 15%
		Cow	44	5-6	75-90	51	7-8	140-160	Increase in milk yield and number of animals by approx. 15%

9.8 LINKAGES

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

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

Table. 8: Backward-Forward Linkages

Sr. No.	Project	Type of Marketing Facility	Pre-Project (no.)	During the Project (no.)	Post-project (no.)
1	Chitlang Watershed (IWMP VII)	Backward linkages	-	-	-
		Seed certification	Moderate	Extension and Training	Improved
		Seed supply system	Moderate	Extension and Training	Improved
		Fertilizer supply system	Moderate	Extension and Training	Improved
		Pesticide supply system	Moderate	Extension and Training	Improved
		Credit institutions	Banks	Coordinate to lead banks	Bank intensity increased
		Water supply for irrigation	Scarcity	Promote rain water harvesting	Would be promoted
		Extension services	KGK& Agriculture deptt.	Extension & Training in village level	Improved
		Nurseries	Horticulture and forest	To be promoted	Improved
		Tools/ machinery suppliers	Subsides	Educate by Extension & Training	Supplies would be improved
		Price support system	Major crops	-	Needs for all crops
		Labour	-	Employment generate through works activities	Migration reduce
		Any other (please specify)	-	-	-
		Road network	Available	Coordinate with lined department	Would be strengthen
		Transport facilities	Moderate	Coordinate with lined department	Would be promoted
		Markets / Mandies	Exists	Coordinate with lined department	Intensity would be increased
		Agro and other industries	-	Coordinate with lined department to establish Cottage industries (Kutir Udyog) for landless and unemployed youth	Would be strengthen
		Milk and other collection centres	Milk collection centre in long	Coordinate with lined department	For installation on nearest door steps

			distance		
		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/ MineralsDeficit	Coordinate with lined department, to organize camps in watershed area	Animal vitamins feeds Would be promoted

9.8.1 LOGICAL FRAMEWORK ANALYSIS

Table 9. Logical Framework Analysis

Components	Activities	Outputs	Effect	Impact
Village Institution Formation	Formation of Watershed Community, User Groups	• Watershed Committee each village • Number of user groups depending on the coverage of particular intervention	Project can be implemented and managed in a democratic and Participatory way ensuring equity and transparency.	• Unity and prosperity in the village management. • People's Participation and positive perception towards the programme.
Strengthening Village operations	• Organizing training and awareness	• Awareness camps to be organized • Trainings and	• Quality of management of common resources	

Components	Activities	Outputs	Effect	Impact
	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 Panchayat Institutions • Gender sensitization of UGs and WCs to increase inclusiveness of	exposure visits UGs and WCs to be held Capacity building workshops to be organized one. • Federations of UGs and WC to be formed.	improved. • Quality of distribution of benefits between people improved. • Increased awareness amongst women about village resources • Women participation enhanced in decision-making of GVCs. • Involvement of youth and children in village development.	

Components	Activities	Outputs	Effect	Impact
	Samuh (Joint) decision making. • Sensitize Village communities to involve children and youth in development			
Fund Management	• Improve management and utilization of UGs and WCs • Prepare communities to explore other sources of income for UGs and WCs.	UGs and WCs operating bank account and managing resources on their own.	• Purpose, frequency and volume of use of the fund enhanced • Volume of funds generated for UGs and WCs from other sources of income increased	
Ecological restoration	• Protection, Treatment and regeneration of common and private lands. • Protection, treatment and regeneration of	• Common and private lands to be brought under new plantations and agro-horti- forestry like Neem, Adussa, prosopis, Banyan and Peepul.	• Fodder availability from common and private land increased. • Accessibility to common and forest lands increased with removal of	• Better Ecological order in the area. • Increase in the proportion of households having more security of fodder. • Reduction in drudgery

Components	Activities	Outputs	Effect	Impact
	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.	• 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	encroachments and resolution of conflicts	of fodder and fuel collection, especially women
Rainfed Area Development	• Treatment of land through	• Land to be brought under improved soil	• Improved productivity of	Increase in proportion of households having more

Components	Activities	Outputs	Effect	Impact
	improved soil and moisture conservation practices on watershed basis. • Promotion of good agricultural practices- horticulture, improved crop and vegetable. • Promotion of organic farming practices. • Formation of Fodder banks to increase fodder security and promote dairy development among communities. • Identification and promotion of agri-produce	moisture conservation practices. • Good agricultural practices to be promoted. • Organic farming to be promoted. Fodder banks to be established. • Agriculture based livelihood income generation activities to be promoted • Water harvesting structures to be constructed. • Drip irrigation facilities to be distributed among farmers. • Approx 15000 person days of employment to be generated. • Trainings, exposure visits and meetings to be organized for	treated land. • Increased availability of water in cells. • Increase in annual agricultural production. • Farmers adopt organic farming practices. • Fodder security of farmers enhanced. • Increased availability of water for 9 to12 months. • Increased availability of water for livestock • Increase in agricultural productivity of land. • Augmentation of drinking water supply.	security of food Increase in contribution of agricultural income to the household income

Components	Activities	Outputs	Effect	Impact
	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.	communities, village volunteers.		
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	• 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

Components	Activities	Outputs	Effect	Impact
	financial institutions			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.