

## CONTENTS (IWMP VI)

<b>CHAPTER No.</b>	<b>No.</b>	<b>TITLE</b>	<b>Page No.</b>
<b>CHAPTER- 1</b>	<b>METHODOLOGY</b>		<b>1-10</b>
		Introduction	1
	<b>1.1</b>	Scientific Planning	2
	<b>1.1.1</b>	Cluster Approach	2
	<b>1.1.2</b>	Base Line Survey	2
	<b>1.1.3</b>	Collection of Primary Data	2
	<b>1.1.4</b>	Collection of Secondary data	3
	<b>1.2</b>	Participatory Rural Appraisal (PRA)	4
	<b>1.2.1</b>	Participatory Net Planning	4
	<b>1.2.2</b>	Community Participants in Social Mapping	5
	<b>1.2.3</b>	Transect Walk	5
	<b>1.2.4</b>	Focus Group Discussions	6
	<b>1.3</b>	Use of GIS Technology for Planning	7
	<b>1.3.1</b>	Prioritization	8
	<b>1.3.2</b>	Planning	8
	<b>1.3.3</b>	Hydrological modelling	8
		Table. 1: Detail of scientific planning and inputs in IWMP projects	9
<b>1.4</b>	Preparation of Action Plan and Approval	10	
<b>CHAPTER- 2</b>	<b>PROJECT BACKGROUND</b>		<b>11-17</b>
	<b>2.1</b>	Project Background	11

<b>CHAPTER No.</b>	<b>No.</b>	<b>TITLE</b>	<b>Page No.</b>
		Table. 1: Basic Project Information	11
	<b>2.2</b>	Need of Watershed Development Programme	12
		Table. 2: Criteria and Weight Age for Selection of Watershed	13
		Table. 3: Weight-age of the Project	15
		Table. 4: Watershed Information	15
	<b>2.3</b>	Other ongoing Development Projects / Schemes in the project villages	16
		Table. 5: Ongoing Developmental Programs in the Project Area	16
		Table. 6: Previous Watershed Programme in the Project Area (if any)	17
<b>CHAPTER- 3</b>	<b>BASIC INFORMATION OF THE PROJECT AREA</b>		<b>18-40</b>
		Geography And Geo-hydrology	18
	<b>3.1</b>	Land Use Pattern	18
		Table 1. Land use pattern	18
	<b>3.2</b>	Soil and Topography	19
		Table 2. Soil type and Topography	19
	<b>3.2.1</b>	Flood and Drought Condition	20
		Table 3. Flood and Drought condition	20
	<b>3.3</b>	Soils	20
	<b>3.3.1</b>	Soil Erosion	20
	<b>3.3.2</b>	Soil Salinity/Alkalinity (Salinity ingress)	21
		Table 4. Soil pH and Salinity	21
	<b>3.3.3</b>	Soil Classification	21
	<b>3.3.4</b>	Land Capability Classification	24
	<b>3.3.5</b>	Climatic Conditions	25

<b>CHAPTER No.</b>	<b>No.</b>	<b>TITLE</b>	<b>Page No.</b>
		Table-5. Rainfall	26
	<b>3.3.6</b>	Physiography and Reliefs	27
		Table 6. Physiography and Relief	27
	<b>3.4</b>	Land and Agriculture	27
		Table 7. Natural Vegetation	28
	<b>3.4.1</b>	Land Ownership Details	28
		Table-8. Land Ownership Details	28
	<b>3.4.2</b>	Agriculture/Pattern	29
		Table 9. Agriculture/ Pattern	29
	<b>3.4.3</b>	Irrigation	29
		Table 10. Irrigation Pattern	30
	<b>3.4.4</b>	Cropping Pattern (crop details)	30
		Table 11 A. Crop Details (Rabi)	30
		Table 11 B. Crop Details (Kharif)	31
	<b>3.4.5</b>	Livestock	31
		Table 12. Village Wise Distribution of Milk Production	32
	<b>3.4.6</b>	Ground Water Concern	32
		Table 13. Village Wise Depth to Water Level Range	33
	<b>3.4.7</b>	Details of Common Property Resources	34
		Table 14. Detail of Common Property Resources	34
	<b>3.5</b>	Socio Economic And Literacy Profile	35
	<b>3.5.1</b>	Demographic Status	35

<b>CHAPTER No.</b>	<b>No.</b>	<b>TITLE</b>	<b>Page No.</b>
		Table 15. Demographic Status/ Population Pattern	35
		Table 16. Village wise Literacy Rate	36
		Table 17. Employment Status	36
	<b>3.5.2</b>	<b>MIGRATION PATTERN</b>	<b>37</b>
		Table 18. Migration Pattern	37
		Table 19. BPL Pattern	37
		Table 20. Village Infrastructure	38
		Table 21. Facilities/ Household assets	38
	<b>3.5.3</b>	<b>LIVELIHOOD PATTERN</b>	<b>39</b>
		Table 22. Per capita (Household) income	39
	<b>3.5.4</b>	<b>Comparative Status of crop Productivity</b>	<b>39</b>
	<b>3.6</b>	<b>Reason for low productivity</b>	<b>40</b>
<b>CHAPTER- 4</b>		<b>PROJECT MANAGEMENT AGENCIES</b>	<b>41-51</b>
	<b>4.1</b>	<b>Institutional Arrangement</b>	<b>41</b>
	<b>4.2</b>	<b>State Level Nodal Agency, Haryana</b>	<b>43</b>
	<b>4.3</b>	<b>Watershed Cell cum Data Centre, Bhiwani</b>	<b>43</b>
	<b>4.4</b>	<b>Project Implementation Agency</b>	<b>44</b>
		Table 1. PIA/ Project Implementing Agency	45
	<b>4.4.1</b>	<b>Monitoring Level Staff at PIA Head Office</b>	<b>46</b>
	<b>4.5</b>	<b>Watershed Development Team</b>	<b>46</b>
	<b>4.6</b>	<b>Watershed Committee details</b>	<b>47</b>
	<b>4.6.1</b>	<b>Formation of Watershed Committees (WC)</b>	<b>48</b>
		Table No. - 2 Watershed Committees (WC) Details	49

<b>CHAPTER No.</b>	<b>No.</b>	<b>TITLE</b>	<b>Page No.</b>
	<b>4.7</b>	Institutional Setup at Watershed Level	50
	<b>4.7.1</b>	Self Help Groups	50
	<b>4.7.2</b>	User Groups	50
<b>CHAPTER- 5</b>	<b>BUDGETING</b>		<b>52-</b>
	<b>5.1</b>	Micro Watershed Wise / Component Wise Phasing year Wise Budget Phasing Under IWMP-I	52
		Table. 1: Entire Project	53
		Table. 2: Sanwar Micro- Watershed	54
		Table. 3: Jaitshree Micro- Watershed	55
		Table. 4: Jhinjher A Micro- Watershed	56
		Table. 5: Jhinjher B Micro- Watershed	57
		Table. 6: Kolhawas Micro- Watershed	58
<b>CHAPTER- 6</b>	<b>PREPARATORY PHASE</b>		<b>59-74</b>
	<b>6.1</b>	Awareness Generation And Motivation For Participation	59
	<b>6.1.1</b>	Collection of Base Line Data And Hydrological Data	59
	<b>6.1.2</b>	Formation of Village Level Institutions	60
	<b>6.1.3</b>	Preparation of DPR	60
	<b>6.2</b>	Capacity Building	64
		Table 1: Statement of Targets under Proposed Training Action Plan at Micro Watershed Level to be conducted by WDT members of Bhiwani District	67
		Table: 2: Statement showing funds Requirement for training on IWMP in Haryana (Preparatory Phase – District Level)	69

<b>CHAPTER No.</b>	<b>No.</b>	<b>TITLE</b>	<b>Page No.</b>
		Table. 3: Micro Watershed Wise Exposure cum training Visit for SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members of IWMP 1 ( Bhiwani )	70
		Table No. 4. Farmer's/Beneficiaries training camps with Extension Programmes of IWMP 1 (Bhiwani)	71
	<b>6.2.1</b>	Expected Outcome Of Capacity Building	72
	<b>6.3</b>	Entry Point Activities 4%	73
		Table 5. Entry Point Activities	74
<b>CHAPTER- 7</b>	<b>WORK PHASE</b>		<b>75-127</b>
	<b>7.1</b>	Watershed development Works - 56%	75
	<b>7.2</b>	Proposed Activity	76
	<b>7.2.1</b>	Earthen Embankment	77
	<b>7.2.2</b>	Activities under NRM (56%) Micro Watershed Wise (IWMP-VI Bhiwani)	77
		Table-1: Village wise distribution of works: Village– Sanwar	77
		Table-2: Village wise distribution of works: Village– Jaishree	79
		Table-3: Village wise distribution of works: Village– Jhinjher	80
		Table-4: Village wise distribution of works: Village– Kohlawas	81
		Table. 5. Detailed Estimate of Silt Detention Dam	82
		Table.6. Leads Statement	84
		Table 7. Detailed estimate of earthen embankment	89
		Table.8. Detail Estimate of Cement Stone Masonry Structure	92
		Table.9. Material statement and cost of material	94

<b>CHAPTER No.</b>	<b>No.</b>	<b>TITLE</b>	<b>Page No.</b>
		Table.10. Labour cost	95
		Table.11. Abstract of cost	95
		Table.12. Detailed estimate of Pond	97
		Table.13. Abstract of cost of estimate for Digging Village Pond	98
		Table. 14. Estimate of Orchard Development in the Watersheds Per Hectare ( Lemon & Kinnoo)	100
		Table. 15. Estimate of Agro- Forestry/ Afforestation	102
	<b>7.3</b>	<b>PRODUCTION SYSTEM</b>	105
	<b>7.3.1</b>	Crop Production	105
	<b>7.3.2</b>	Horticulture	106
	<b>7.3.3</b>	Vegetable cultivation	107
	<b>7.3.4</b>	Promotion of Farm Forestry and Agro-forestry	107
	<b>7.3.5</b>	Livestock Improvement Including Fodder Production	108
	<b>7.3.6</b>	Marketing Arrangements and Proposal for Improvement	108
	<b>7.3.7</b>	Detail of production system to be promoted	109
		Table 16. Detail of Production System proposed to be promoted in the project village	109
	<b>7.3.8</b>	Vermin Compost	112
		Table 17: Model for a Vermin Compost Unit	112
		<b>LIVELIHOOD ACTIVITIES FOR THE ASSET LESS PERSONS-9%</b>	115
	<b>7.4</b>	Livelihood support to SHG's	116
	<b>7.4.1</b>	Activities those are likely to be taken up by SHGs/individuals	117

<b>CHAPTER No.</b>	<b>No.</b>	<b>TITLE</b>	<b>Page No.</b>
		Table 18. Revolving Fund Assistance for SHGs	118
		Table 19. Skill Trainings/Skill up gradation for SHGs	118
		Table 20. Computer Training (6 months) for unemployed youth above 12th passed male and female both recommended by Watershed Development Committee	119
		Table 21. One time assistance as Revolving Fund to unemployed youth who have successfully completed Computer Training for setting up a computer centre	119
		Table 22. Cutting and Tailoring Centre for female beneficiaries	120
		Table 23. Embroidery Centre for female beneficiaries	121
		Table 24. Livelihood Support	121
		<b>CONVERGENCE</b>	123
	<b>7.5</b>	Introduction	124
	<b>7.5.1</b>	Convergence between MGNREGA and Watershed Programmes	125
		Table 25. Gaps In Funds Requirement – Micro Watershed Wise	125
	<b>7.5.2</b>	Non-Negotiable for works executed under MGNREGA	125
	<b>7.5.3</b>	Convergence with Forest Department	126
	<b>7.5.4</b>	Convergence with Horticulture Department	126
	<b>7.5.5</b>	Convergence with Agriculture Department	127
	<b>7.5.6</b>	Convergence with Animal Husbandry Department	127
<b>CHAPTER- 8</b>		<b>QUALITY AND SUSTAINABILITY</b>	<b>128-135</b>
	<b>8.1</b>	Monitoring and Evaluation	128
	<b>8.1.1</b>	Plans for Monitoring and Evaluation	128
	<b>8.1.2</b>	Monitoring	128



<b>CHAPTER No.</b>	<b>No.</b>	<b>TITLE</b>	<b>Page No.</b>
		Table 1. Micro Watershed wise details	129
	<b>8.2</b>	Evaluation	129
		Table 2. Micro Watershed wise details	130
	<b>8.3</b>	Consolidation Phase	132
		Table 3. Consolidated Phase: Sanwar Micro- Watershed	133
		Table 4. Consolidated Phase: Jaitshree Micro- Watershed	133
		Table 5. Consolidated Phase: Jhinjher A Micro- Watershed	134
		Table 6. Consolidated Phase: Jhinjher B Micro- Watershed	134
		Table 7. Consolidated Phase: Kohlawas Micro- Watershed	135
<b>CHAPTER- 9</b>	<b>EXPECTED OUTCOME</b>		<b>136-152</b>
		<b>EXPECTED OUTCOMES</b>	136
	<b>9.1</b>	Employment	136
		Table 1. Expected Employment Generation in the Project area	137
	<b>9.2</b>	Migration Pattern	137
		Table 2. Pre and Post Migration	138
	<b>9.3</b>	Ground Water Table	138
		Table 3. Detail of average pre- post ground water table depth in the project area (in meters)	139
	<b>9.4</b>	Crops	139
		Table 4. Increase in Expected Yield	140
	<b>9.5</b>	Horticulture	141
		Table 5. Pre and post project area under Horticulture	141
	<b>9.6</b>	Afforestation/ Vegetative Cover	142

<b>CHAPTER No.</b>	<b>No.</b>	<b>TITLE</b>	<b>Page No.</b>
		Table 6. Pre and post project forest and vegetative cover	142
	<b>9.7</b>	Livestock	142
		Table 7. Details of livestock in the project area	143
	<b>9.8</b>	Linkages	143
		Table No. 8: Backward-Forward Linkages	144
	<b>9.8.1</b>	Logical Framework Analysis	146
		Table 9. Logical Framework Analysis	146
<b>ANNEXURES</b>			
Annexure I		Base Map	
Annexure II		Contour and drainage map	
Annexure III		Land use map	
Annexure IV		Slope map	
Annexure V		Soil map	
Annexure VI		Land Capability map	
Annexure VII		Depth to water level map	
Annexure VIII		Existing Location of Works	
Annexure IX		Proposed Action Plan map	

# CHAPTER- 1

## METHODOLOGY

### **INTRODUCTION**

The Government of India (GoI) adopted watershed management as a strategy to address the sustainable agricultural productivity in the rain fed areas since last three decades. Further, (GoI) has adopted watershed management as a national policy since 2003. Several studies have highlighted that appropriate natural resource management shall 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 rain fed / dry land farming by utilization of 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, Haryali & IWDP were brought under one umbrella in the name of Integrated Watershed Management Programme in the year 2008. The scheme is basically for rain fed area. Common Guidelines were framed by National Rain fed Area Authority. Rural Development Department is the Nodal Department for implementation of IWMP through State Level Nodal Agency.

To implement watershed (IWMP VI) area programme a systematic survey has been conducted to know the potentiality of each village / Micro-Watershed. With this view, a baseline survey was conducted in four micro- watersheds Sanwar (6D1F1c2), Jaishree (6D1F1a5), Jhinhher A+B (2C5F9n9 A), Kohlawas (2C5F9n8). The base line survey conducted shall be considered as bench mark against which the results of project could be compared at the end of the implementation. It would also be helpful in guiding watershed programmes and to plan its goal in identifiable terms and be used as future reference. PRA techniques and transect walk were conducted with the Gram Sabha members and beneficiaries for building confidence in participation during project planning.

## **1.1 SCIENTIFIC PLANNING**

### **1.1.1 Cluster Approach**

This envisages a broader vision of Geo- hydrological unit which involves treating the cluster (IWMP VI) of 4 micro watersheds namely Sanwar (6D1F1c2), Jaishree (6D1F1a5), Jhinjher A+B (2C5F9n9 A), Kohlawas (2C5F9n8) with their respective codes. The Micro-watershed is in continuation to other watershed projects in the area.

### **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 the preparatory phase started in 2012. Initially, a meeting was arranged with officials of concerned departments and technical experts located at Sanwar, Jaishree, Jhinjher A+B, Kohlawas micro- watersheds. During this meeting, preliminary details of the proposed project including location of villages and criteria of selection and PPR were discussed.

In order to have first hand information, a joint visit in the project area was made along with PRI members. In this survey, physical location of the watershed, 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 were procured of the project area 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 was also compiled from revenue records, Anganwari workers and statistical officers of the district. Rainfall data was collected from the Ground Water Cell to maintain the record of rainfall from rain gauge station located in the Sub division/district headquarter of the project area.

#### **1.1.4 Collection of Secondary data**

The data with regard to Demographic, socio-economic, infrastructure, land use, primary and secondary occupation, major crops grown and the 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 meetings were organized at common places and problems and possible solutions 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 stakeholders 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 Renovation/new village pond, Ramp/Inlet and outlet, Roof top rainwater harvesting structures, Earthen Embankment with pucca outlet, Small Earthen Embankment with vegetative Support, Community Water Storage Tank, UGPL, Water conveyance system, Drain etc. were recommended to conserve and store water used for life saving additional irrigation potential in the rain fed 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, Soil Classification, Land Capability Classification, Soil Fertility, Ground Water Depth and Quality, Proposed and existing activities or 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 Renovation/new village pond, Ramp/Inlet and outlet, Roof top rainwater harvesting structures, Earthen Embankment with pucca outlet, Small Earthen Embankment with vegetative Support, Community Water Storage Tank, UGPL, Water conveyance system, Drain 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**

Sr. No.	Scientific Criteria/input used	Whether Scientific Criteria was used
<b>A</b>	<b>Planning</b>	
	Cluster approach	Yes
	Hydro-geological survey	Yes
	Contour Mapping	Yes
	Participatory net planning (PNP)	Yes
	Remote sensing data-especially soil	Yes
	Ridge to valley treatment	Yes
	Online IT connectivity between	Yes
	1. Project and DRDA cell/ZP	Yes
	2. DRDA and SLNA	Yes
	3. SLNA and DoLR	Yes
	Availability of GIS layers	Yes

Sr. No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	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>B</b>	Inputs	-
	Bio pesticides	Yes
	Organic manure	Yes
	Vermi- compost	Yes
	Bio Fertilizer	Yes
	Water saving devices	Yes
	Mechanical tools	Yes
	Bio fencing	No

Sr. No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	Nutrient Budgeting	No
	Automatic water level recorder & sedimentation samplers	No

#### 1.4 Preparation of Action Plan and Approval

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

## CHAPTER -2

### PROJECT BACKGROUND

#### 2.1 PROJECT BACKGROUND

Integrated Watershed Management Programme (IWMP-VI) project is falls in Dadri I Block, Bhiwani district of Haryana State. The project is a cluster of five micro- watersheds in four villages namely Sanwar (6D1F1c2), Jaishree (6D1F1a5), Jhinjher A +B (2C5F9n9), Kohlawas (2C5F9n8). The total geographical area of the project is **3727 ha** out of which **3200 ha** has been undertaken to be treated under IWMP- VI starting from year 2011-2012. The project is divided into five 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 watershed	Code No.	Name of the villages	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
1	Sanwar watershed (IWMP VI)	Sanwar	6D1F1c2	Sanwar	Dadri I	Bhiwani	1038	796	95.52	ASCO Dadri

Sr. No	Name of the project	Name of the micro watershed	Code No.	Name of the villages	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
2	Sanwar watershed (IWMP VI)	Jaishree	6D1F1a5	Jaishree	Dadri I	Bhiwani	725	550	66.00	ASCO
				Sanwar (part)						Dadri
3	Sanwar watershed (IWMP VI)	Jhinjher A	2C5F9n9 A	Jhinjher A	Dadri I	Bhiwani	602	580	69.60	ASCO Dadri
4	Sanwar watershed (IWMP VI)	Jhinjher B	2C5F9n9 B	Jhinjher B	Dadri I	Bhiwani	602	584	70.08	ASCO Dadri
5	Sanwar watershed (IWMP VI)	Kohlawas	2C5F9n8	Kohlawas	Dadri I	Bhiwani	760	690	82.80	ASCO Dadri
					<b>Grand Total</b>		<b>3727</b>	<b>3200</b>	<b>384.00</b>	

## 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)
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)		



S. No.	Criteria	Maximum Score	Ranges and Scores			
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 (5)	

S. No.	Criteria	Maximum Score	Ranges and Scores			
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)	
	<b>Total</b>	<b>150</b>	<b>150</b>	<b>93</b>	<b>37</b>	<b>2.5</b>

Based on above criteria and weightage of 92.5 concerning these thirteen parameters, a composite ranking was given to Sanwar watershed (IWMP VI) project as given in **Table- 3**.

The total numbers of families under BPL are less than the total number of households in the village. Hence a score of 5 was allotted. Rain-fed agriculture is more and more than 90 percent and more than 50 % farmers are small and marginal. So the scoring was done 15 & 5. So accordingly, scoring was done like project area comes under semi arid zone of Haryana, has no assured irrigation facility, erratic rainfall, deep, poor quality and less ground water discharge, hence the ground water status score is 5. The percentage of schedule castes in this watershed is about 30 percent of the total population, hence 5 score was allotted. Due to high percentage of the poor population i.e. about 70 percent thus the scope of poverty index is 5. More than 60 percent of the farmers are small and marginal 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 92.5.

**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-watersheds 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.	Bhiwani	Sanwar watershed (IWMP VI)	5	3727	3200	others	384.00	5	5	0	5	5	15	15	7.5	10	10	5	10	0	<b>92.5</b>

**Table 4: Watershed Information**

Name of the Project	No. of Micro-Watersheds to be Treated	Watershed codes	Watershed regime/type/order
Sanwar Watershed (IWMP VI)	5	6D1F1c2, 6D1F1a5, 2C5F9n9 A, 2C5F9n9 B, 2C5F9n8	others

### 2.3 OTHER ONGOING DEVELOPMENT PROJECTS / SCHEMES IN THE PROJECT VILLAGES

These villages being backward have been on top priority of a number of development projects. These programmes are Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and National Rural Livelihood Mission (NRLM). The programmes running are tabulated in **Table 5**.

**Table5. 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	Sanwar	DRDA, Bhiwani	To provide assured employment of 100 days in a year to unskilled labour and development of village.	52
2	MGNREGA	Jaishree	DRDA, Bhiwani	To provide assured employment of 100 days in a year to unskilled labour and development of village.	48
3	MGNREGA	Jhinjher A+B	DRDA, Bhiwani	To provide assured employment of 100 days in a year to unskilled labour and	62

				development of village.	
4	MGNREGA	Kohlawas	DRDA, Bhiwani	To provide assured employment of 100 days in a year to unskilled labour and development of village.	91

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)**

<b>Watershed Area Development Treated/Sanctioned</b>											
1	2	3		4				5			
Sr. No	Names of District	Total micro watersheds in the District		Micro- watersheds covered so far				Total watersheds covered		Net watersheds to be covered	
				Deptt. of Land Resources		Other Ministries/ Deptt.					
		No.	Area (ha)	Pre- IWMP projects (DPAP+DDP+IWDP)		Any other watershed project		No.	Area (ha)	No.	Area (ha)
1	Bhiwani	437	325000	293	150200	34	18700	327	168900	110	156100

## CHAPTER – 3

# BASIC INFORMATION OF THE PROJECT AREA

### GEOGRAPHY AND GEOHYDROLOGY

The Sanwar Watershed (IWMP-VI) falls in Dadri-I Block of District Bhiwani. The area is occupied by Indo- Gangetic alluvium plains. Physiographically, the area is divided Interdunal plains and old alluvial depressions. The area of watershed lies in between 28°38'20" to 28°43'46" N Latitude & 76°15'25" to 76°21'10" east longitude with general elevation varies between 214-217 m (MSL) above mean sea level. Average annual rainfall of the district is 537mm. About 80 percent of its annual rainfall is received in the months of July to September. Due to absence of proper drainage system, the low lying areas suffer from temporary water logging conditions along with Loharu feeder. Despite low intensity of rainfall is scattered and erratic in this area, water retention capacity of soils is very low, so area receives drought conditions in periodically. The Contour and Drainage map is presented in **Annexure II**.

### 3.1 LAND USE PATTERN

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

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

Sr. No.	Name of Micro Watersheds/ villages With Code	Geographical Area in (ha)	Treatable area of the village(ha)	Land under agriculture use (ha)	Rain fed area (ha)	Wasteland	
						Cultivable	Non-Cultivable
1	Sanwar (part) (6D1F1c2)	1038	796	842	600	16	180

Sr. No.	Name of Micro Watersheds/ villages With Code	Geographical Area in (ha)	Treatable area of the village(ha)	Land under agriculture use (ha)	Rain fed area (ha)	Wasteland	
						Cultivable	Non-Cultivable
2	Jaishree (part) (6D1F1a5)	725	550	642	467	5	78
3	Jhinjher A+ B (2C5F9n9)	1204	1164	1106	1066	1	97
4	Kohlawas (2C5F9n8)	760	690	677	607	0	83
	<b>Total</b>	<b>3727</b>	<b>3200</b>	<b>3267</b>	<b>2740</b>	<b>22</b>	<b>438</b>

(Source – District Census Handbook, 2001 Bhiwani)

### 3.2 SOIL AND TOPOGRAPHY

The soils of Sanwar Watershed are very deep, loamy sand to sandy clay loam/ clay loam found in level to nearly level land comes under coarse loamy to fine loamy Typic ustipssamment, typic and udic haplustepts and typic haplocambids in the area. The topography of the area ranges from level to nearly level with depression in pockets. Soils are subject to susceptible to moderate water erosion and wind erosion. The slope ranges from 0.5 to 3%. In some low lying areas suffer from temporary water logging due to absence of natural drainage system. Slope map is presented in Annexure IV.

**Table 2. Soil type and Topography**

Sr. No.	Name of Micro Watersheds/ Villages	Code	Geographical area (ha)	Major Soil types	Topography
1.	Sanwar (part)	6D1F1c2	1038	Loamy sand to sandy clay loam	Level to nearly level

Sr. No.	Name of Micro Watersheds/ Villages	Code	Geographical area (ha)	Major Soil types	Topography
2.	Jaishree (part)	6D1F1a5	725	Sandy loam to clay loam	Level to nearly level
3.	Jhinjher A+ B	2C5F9n9	1204	Loamy sand to clay loam	Level to nearly level
4.	Kohlawas	2C5F9n8	760	Sandy loam to sandy clay loam	Level to nearly level
	<b>Total</b>		<b>3727</b>		

Source: - Department of Agriculture, Haryana

### 3.2.1 Flood and Drought Condition

Very few incidences of flood have been noticed in the area. The most of area of watershed has faced drought conditions due to insufficient rainfall, inadequate canal irrigation facility and poor groundwater availability.

**Table 3. Flood and Drought condition**

Sr. No.	Name of Micro- watersheds	Flood Incidence	Drought Incidence
1.	Sanwar	Nil	Periodically 1983, 1987, 2001, 2002, 2003, 2009
2.	Jaishree	Nil	
3.	Jhinjher A+ B	Nil	
4.	Kohlawas	Nil	



### 3.3 SOILS

#### 3.3.1 Soil Erosion

In the identified five micro watersheds in four villages, it is observed that due to thin vegetative cover to increase the loss of surface soil in the watershed area. This results in degradation of agricultural land and low organic matter contents. The organic carbon content in areas comparatively low to restrict average in agriculture production. Some times in rainy season the intensity of rainfall is quite high to increase runoff, which also carries valuable top soil (sheet). Soil erosion in respect of sheet is quite high. Majority of the watershed Community are dependent on rainfed agriculture. Agriculture suffers due to area being rain fed and due to erratic rains and absence of assured irrigation facility in the region, resulting in further deterioration of socio economic conditions of community. It is observed that along Loharu feeder create water logging conditions due to absence of natural drainage system.

#### 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 7.15 to 8.35.

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

**Table 5. Soil pH and Salinity**

<b>Sr. No.</b>	<b>Name of Micro Watersheds</b>	<b>Soil pH</b>	<b>Type of salinity</b>
1.	Sanwar	7.16- 8.35	Low to Moderate
2.	Jaishree	7.15- 8.15	Low to Moderate
3.	Jhinjher A+ B	7.17- 8.35	Low to Moderate

4.	Kohlawas	7.15- 8.05	Low to Moderate
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### 3.3.3 SOIL CLASSIFICATION

Major soils associations' fall in the watershed are five soil associations unit. The detail description of all soil associations are given below. The Soil map is presented in **Annexure V**. 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- 4 (Mandhana- Nimriwal- Sandwa Soil Association)**

The Mandhana soil series is dominated in this soil association and associated soil series are Nimriwal and Sandwa soil series. The dominant soil is Well drained, Sandy loam, Fine Loamy Mixed hyperthermic Typic Haplustepts, 1<sup>st</sup> associate soil series is well drained, Loamy sand to Sandy loam, Coarse loamy Mixed hyperthermic Typic Haplocambids and 2<sup>nd</sup> associate soil series is well drained, Loamy sand to Sandy loam, Coarse loamy Mixed hyperthermic Typic Haplocambids, Mandhana soil series is non calcareous, very deep, pH 6.90-7.11, very dark brown to dark brown in colour (7.5YR 2.5/3-7.5YR 4/4) developed on Moderate Steep slopings/Very gently sloping hill sides and terraced slopes with Cobbles and Stones in C- horizon, Nimriwal soil series is Moderate to Violent calcareous, very deep, pH 7.95-8.33, light gray to yellowish brown in colour (10YR 7/2-10YR 5/4) developed on Interdunal depressions/Aeolian plains with White micelleal lime, Cca-Hard calcium carbonate concretions in B- horizon and Sandwa soil series is Moderate to Violent in calcareous, very deep, pH 8.40-8.60, light gray to dark yellowish brown and brown in colour (10YR 7/2-10YR 4/4, 7.5YR 4/4) developed on Interdunal depressions/Valleys with Hard layer of lime concretions in B- horizon.

#### **Soil Mapping Unit- 9 (Mitathal Soil Association)**

The Mitathal soil series is only series in this soil association. The soil series is well drained, Sandy loam to Sand; Fine loamy mixed hyperthermic Udic Haplustepts. The soil series is non calcareous, very deep, pH 7.30-8.30, light brownish gray to yellowish brown in colour (10YR 6/2.5-10YR 5/4) developed on Exhumed/Excavated lands/Paleo lakes and depressions with 10-35% of soft and hard lime concretions.

#### **Soil Mapping Unit- 10 (Majahadpur- Fatehpur Soil Association)**

The Majahadpur soil series is dominated series in this soil association and Fatehpur is associated series. The dominant soil series is well drained, Loamy sand to Sandy loam, Coarse loamy Mixed hyperthermic Typic Haplustepts and associate soil series Fatehpur is Moderate to well drained, Loamy sand, Sandy Mixed hyperthermic Typic Ustipsamments. The dominant soil series is violent to moderately calcareous, very deep, pH 8.18-8.54, dark brown to yellowish brown and brown in colour (10YR 4/3-10YR 5/4, 7.5YR 5/4) developed on Transitional and alluvial plains/interdunal valleys with Few common fine medium hard calcium carbonate kankars in B & C horizon and associate soil series is non calcareous, very deep, pH 8.18-8.48, brown to yellowish brown in color (10YR 5/3-10YR 5/4) developed on Partially Stabilized dunes in Transitional And alluvial plains with 5-10% lime concretions in lower part of C horizon.

#### **Soil Mapping Unit- 11 (Bapaura Soil Association)**

The Bapaura soil series is only series in this soil association. The soil series is moderately well drained, Sandy loam to Loam to Clay loam to Sandy Clay loam; Fine loamy mixed hyperthermic Typic Haplustepts. The soil series is Weak to Strong calcareous, very deep, pH 7.60-8.21, dark yellowish brown to yellowish brown in colour (10YR 4/4- 10YR 5/4) developed on Transitional plain and alluvial plains/low lying basinal area.

### **Soil Mapping Unit- 13 (Nimriwal- Sandwa Soil Association)**

The Nimriwal soil series is dominated in this soil association and associated soil series is Sandwa soil series. The dominant soil is well drained, Loamy sand to Sandy loam, Coarse loamy Mixed hyperthermic Typic Haplocambids, 1<sup>st</sup> associate soil series is well drained, Loamy sand to Sandy loam, Coarse loamy Mixed hyperthermic Typic Haplocambids, Nimriwal soil series is Moderate to Violent calcareous, very deep, pH 7.95-8.33, light gray to yellowish brown in colour (10YR 7/2-10YR 5/4) developed on Interdunal depressions/Aeolian plains with White micelleal lime, Cca-Hard calcium carbonate concretions in B- horizon and Sandwa soil series is Moderate to Violent in calcareous, very deep, pH 8.40-8.60, light gray to dark yellowish brown and brown in colour (10YR 7/2-10YR 4/4, 7.5YR 4/4) developed on Interdunal depressions/Valleys with Hard layer of lime concretions in B- horizon.

**(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 e2s2**

These soils are moderately very deep, light to coarse loamy texture located on level to nearly level land and intra dunal plains. These soils are well drained, moderately permeable, and have low water holding capacity with slight to moderate erosion hazard.

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

1. Land leveling should be done at 50% subsidy, because farmers are not economically capable to bear the cost of land leveling.
2. Engineering measures like field bunds, drop structure for safe disposal of excess rainwater should be under taken.
3. Agronomic measures; mainly strip cropping, dry land farming, leguminous cultivation as mix cropping should be recommended.
4. Provide proper drainage system in low lying depression in the area.

#### **Land capability subclass IV e3s3**

These soils are greatly light textured soils developed on nearly level to gently sloping lands. The water holding capacity is very poor and the water and wind erosion hazard is moderate to severe.

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

1. Suitable soil conservation measures should be adopted to check water and wind erosion. Soils should be provided permanent vegetation (Agro forestry) cover to check further deterioration of soils.

2. Soils would be occasionally cultivated in suitable crop rotation with indigenous grasses.
3. Land leveling should be done at 50% subsidy, because farmers are not economically capable to bear the rate of land leveling.
4. Earthen Embankment and field bunding with agro- forestry should be provided to check water erosion and dune stabilization.

### **3.3.5 Climatic Conditions**

The climate of the area is classified as tropical steppe, semi- arid to arid and hot which is mainly dry. It is very hot in summer except during the monsoon when moist air of oceanic origin penetrates into the area and has cold winter. The hot weather season starts from middle of March to last week of June followed by the South- West monsoon which lasts up to September. The transition period from September to October forms the Post monsoon season. The winter season starts in late November and remains up to the last week of March.

The Normal annual rainfall of the district is 537 mm (from the past 10 years' data) which is unevenly distributed over the area in 22 days. The south- west monsoon sets in the last week of June and withdraws at end of September and contributes about 85% of annual rainfall. July and August are wettest months. Rest 15% rainfall is received during non- monsoon period due to western disturbances. The rainfall varies from 187mm (2002) - 969 mm (2010). The erratic rainfall distribution restricts the selection of crops of choice. Unpredictable drought conditions causing increase of wind erosion reduce crop production. The year wise rainfall from 2002 to 2011 is presented in **Table.5**

**Table-5. Rainfall during the years 2002-11**

Sr. No.	Year	Rainfall (in mm)
1	2002	187
2	2003	431
3	2004	567
4	2005	573
5	2006	341
6	2007	413
7	2008	946
8	2009	389
9	2010	969
10	2011	551
<b>Average</b>		<b>537</b>

(Source: - Deputy Director Agriculture, Bhiwani)

The mean maximum temperature is 41.0° C (May and June) and normal rainy days are 22 in the year in the district.

### 3.3.6 Physiography and Reliefs

Physiographically, the area slope falls West to East. The general Elevation in the area belongs to old alluvium plains with sand overburden in pockets to make small hummocks in the area. 214-217 m above mean sea level. The water is drained through field to field and ultimately create temporary water logging in low lying areas to create haphazard condition during rainy season if heavy rain received. The elevation range and percentage slope distribution has been presented in **Table 7**.

**Table 7. Physiography and Relief**

<b>Project Name</b>	<b>Elevation ( MSL)</b>	<b>Slope Range (%)</b>
Sanwar Watershed (IWMP VI)	214-217	0.5- 3

### **3.4 LAND AND AGRICULTURE**

Lacks of assured irrigation facility, saline ground water conditions have limited the base for irrigation. The average land holding is about 2.4 ha ranging from 0.5 to 4 ha. Lack of assured irrigation sources results in the small farmers, landless households and unemployed youths went to outside for employment to migrate to nearby towns to ensure their livelihood and employment. The labourers come back to their homes after working in nearby industrial/ towns like Gurgaon, Dharuhera and Delhi etc. This migration is temporary and people are shifting to dairy development to avoid this type of migration.

The major crops are Bajra, Gawar, Arhar and pulses in Kharif under rain fed conditions and seasonal vegetables in the small area where irrigation potential exists. The major crops during Rabi are wheat, mustard, gram etc. The soil & water conservation measures such as Renovation/new village pond, Ramp/Inlet and outlet, Roof top rainwater harvesting structures, Earthen Embankment with pucca outlet, Small Earthen Embankment with vegetative Support, Community Water Storage Tank, UGPL, Water conveyance system, Drain etc. in the area will help the farmers to increase crop production which will enhance the net production value of farmers. The following plants are commonly observed in the Project Area.

**Table 7. NATURAL VEGETATION**

<b>Sr. No.</b>	<b>Trees</b>	<b>Fruits</b>	<b>Grasses and Shurbs</b>
1	Shisham	Pomegranate	Munj (Sarkanda)



2	Jati	Ber	Bhurut
3	Kikar	Lemon	Aak
4	Australian Babool	guava	Jharber
5	Safeda	Jamun	Keri (Tit)
6	Neem	Amla	
7	Jaal		

### 3.4.1 Land Ownership Details

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

**Table-8:- Land Ownership Details**

Sr. No.	Name of Micro Watersheds/ Villages	GENERAL	OBC	SC	Total owners
1	Sanwar	729	95	583	1406
2	Jaishree	52	11	35	98
3	Jhinjher A+ B	468	74	330	872
4	Kohlawas	126	24	85	235

### 3.4.2 AGRICULTURE/PATTERN

**Table 9. Agriculture/ Pattern**

Sr. No.	Name of Micro Watersheds/ Villages	Land under agriculture use (ha)	Net Sown area (ha)	
			One time	Two times
1	Sanwar	842	650	575
2	Jaishree	642	525	425
3	Jhinjher A+ B	1106	828	754
4	Kohlawas	677	525	475
	Total	<b>3267</b>	<b>2528</b>	<b>2229</b>

(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 marginal to brackish water quality. The remaining cultivable area is under rain fed agriculture. The present source of irrigation in the watershed has been tabulated in **Table 10**.

**Table 10. Irrigation Pattern**

Sr. No.	Name of Micro Watersheds/ Villages	Source 1: Canal		Source 2: Groundwater (Tube wells)	
		Availability months	Net area (ha)	Availability months	Net area (ha)
1	Sanwar	-	-	July to June	1515

Sr. No.	Name of Micro Watersheds/ Villages	Source 1: Canal		Source 2: Groundwater (Tube wells)	
		Availability months	Net area (ha)	Availability months	Net area (ha)
2	Jaishree	-	-	July to June	129
3	Jhinjher A+ B	-	-	July to June	478
4	Kohlawas	-	-	July to June	257
	<b>Total</b>	-	-		<b>2379</b>

(Source – District Census Handbook Bhiwani)

### 3.4.4 CROPPING PATTERN (crop details)

#### Cropping Pattern

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

**Table 11 A. Crop Details (Rabi)**

S. No.	Name of Micro Watersheds/ Village	Rabi crops(Wheat)				(Mustard)				(Gram)		
		Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.
1	Sanwar	174	742284	4266	Yes	265	476205	1797	Yes	58	72442	1249
2	Jaishree	142	577372	4066	Yes	201	359187	1787	Yes	11	13651	1241
3	Jhinjher	216	898128	4158	Yes	358	643326	1797	Yes	48	59904	1248

S. No.	Name of Micro Watersheds/ Village	Rabi crops(Wheat)				(Mustard)				(Gram)		
		Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.
	A+ B											
4	Kohlawas	167	695722	4166	Yes	231	413952	1792	Yes	8	9992	1249
	<b>Total</b>	<b>699</b>				<b>1055</b>				<b>125</b>		

**Table 11 B. Crop Details (Kharif)**

S. No.	Name of Micro Watersheds/ Villages	(Bajra)				(Gwar)				(Cotton)		
		Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.
1	Sanwar	284	379708	1337	Yes	161	195293	1213	Yes	124	58280	470
2	Jaishree	201	268938	1338	Yes	66	80850	1225	Yes	57	27075	475
3	Jhinjher A+ B	256	336128	1313	Yes	225	274500	1220	Yes	67	31356	468
4	Kohlawas	205	274085	1337	Yes	158	192286	1217	Yes	32	15040	470
	<b>Total</b>	<b>946</b>				<b>610</b>				<b>280</b>		

### 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 murrh 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 Sanwar Watershed (IWMP VI)**

<b>Sr. No</b>	<b>Name of Micro Watersheds/ Villages</b>	<b>Buffalo(*Lit/per day/annum ) for 6 months</b>	<b>Cow(*lit/per day/annum) for 6 months</b>	<b>Goat</b>
1	Sanwar	1794/17940/3229200	377/2639/475020	140
2	Jaishree	187/2057/370260	16/112/20160	1
3	Jhinjher A+ B	1632/22848/4112640	244/1952/351360	76
4	Kohlawas	323/2907/523260	35/245/44100	22

(Source: Animal Husbandry, Bhiwani)

### 3.4.6 Ground Water Concern

#### a) Depth to Water

Ground Water Cell of Haryana has fixed hydrograph station scattered over the district whose monitoring is undertaken during pre and post monsoon season. The water level data has been analyzed for the purpose of ground water studies in the watershed area. The ground water level in micro watersheds located in villages namely Sanwar, Jaitshree and Jhinjher less than 3m depth; whereas in micro watershed falling in village Kohlawas 70 percent of the area falls in 3-10m below ground level (bgl). The village wise water level data has been tabulated in **Table 13**. Depth to water level map has been prepared and presented in the **Annexure VIII**.

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

<b>Sr. No.</b>	<b>Name of Micro Watershed/ Villages</b>	<b>Source</b>	<b>Pre- Project level (m)</b>
1	Sanwar	Open Well	2.80
2	Jaishree	Open Well	2.60
3	Jhinjher A+ B	Open Well	3.40
4	Kohlawas	Open Well	4.10

The majority of the area of watershed is underlain by marginal quality of ground water whereas a small pockets of micro watershed Kohlawas and Jhinjher falls in the brackish ground water quality. The farmers are exploiting ground water for their conjunctive use. The water quality map of the area is presented in **Annexure-IX**. There is adequate availability of drinking water in the villages. Availability of potable water is almost throughout the year except scarcity during May and June. The source of drinking water supply is through the tube wells as well as canal network in the area.

**b) Water table fluctuation**

Long term data of June 1974 to June 2012 reveals the annual rise of water table at the rate of 7cm per year. The seasonal fluctuation i.e. Pre and Post monsoon period is 0.55-1m.

**c) Rain water harvesting**



### 3.5 SOCIO ECONOMIC AND LITERACY PROFILE

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

**Poor economic conditions of farmers:** The general socio economic condition of the farmers in this area 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/ villages	Total no. of houses	Total Population			SC			
			Male	Female	Total	Male	Female	Total	%age
1	Sanwar	1457	4115	3559	7674	868	706	1574	20
2	Jaishree	104	244	239	483	61	56	117	24
3	Jhinjher A+ B	935	2732	2388	5120	344	269	613	12



S. No.	Name of the Micro watersheds/ villages	Total no. of houses	Total Population			SC			
			Male	Female	Total	Male	Female	Total	%age
4	Kohlawas	251	724	605	1329	412	342	754	57
	<b>Total</b>	<b>2747</b>	<b>7815</b>	<b>6791</b>	<b>14606</b>	<b>1685</b>	<b>1373</b>	<b>3058</b>	<b>21</b>

(Source- District Census 2011)

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

Sr. No.	Name of the Micro watersheds/ villages	Total population	Literacy					
			Total Literates	% age	Male	% age	Female	% age
1	Sanwar	7674	5186	67	3109	60	2077	40
2	Jaishree	483	346	71	202	58	144	42
3	Jhinjher A+ B	5120	3441	67	2069	60	1372	40
4	Kohlawas	1329	846	63	532	63	314	37
	<b>Total</b>	<b>14606</b>	<b>9819</b>	<b>67</b>	<b>5912</b>	<b>60</b>	<b>3907</b>	<b>40</b>

(Source- District Census- 2011)

Table 17. EMPLOYMENT STATUS

S. No.	Name of Micro Watersheds/ villages	Schedule caste	Cultivators	Agricultural labourers	Household industry workers	Other workers
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		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	Sanwar	868	706	552	135	32	37	21	40	597	97
2	Jaishree	61	56	43	3	0	0	3	0	32	2
3	Jhinjher A+ B	344	269	597	21	245	10	48	2	331	15
4	Kohlawas	412	342	93	46	73	16	4	0	118	11
	<b>Total</b>	<b>1685</b>	<b>1373</b>	<b>1285</b>	<b>205</b>	<b>350</b>	<b>63</b>	<b>76</b>	<b>42</b>	<b>1078</b>	<b>125</b>

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 Sanwar Watershed (IWMP VI)**

Sr. No.	Name of Micro Watersheds/ villages	Total Population	No. of persons migrating	No. of days per year of migration	Main reason for migration	Income during migration/ month/person
1	Sanwar	7674	-	-	-	-
2	Jaishree	483	-	-	-	-

Sr. No.	Name of Micro Watersheds/ villages	Total Population	No. of persons migrating	No. of days per year of migration	Main reason for migration	Income during migration/ month/person
3	Jhinjher A+ B	5120	-	-	-	-
4	Kohlawas	1329	-	-	-	-

**POVERTY:** The distribution of the BPL and their percentage is presented in table 20.

**Table 19. BPL Pattern**

Sr. No.	Name of Micro watersheds/ villages	Total houses	Total Household- BPL	% of BPL HH
1	Sanwar	1457	386	26
2	Jaishree	104	44	42
3	Jhinjher A+ B	935	297	32
4	Kohlawas	251	149	59
	<b>Total</b>	<b>2747</b>	<b>876</b>	<b>32</b>

(Source: District Administration Bhiwani, Haryana)

### INFRASTRUCTURE DETAILS

All the villages are well connected by pacca 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/ 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	Sanwar	Y	Y	Sr.sec. School	Y	Y	Y	Y
2	Jaishree	N	N	Primary School	N	Y	N	N
3	Jhinjher A+ B	N	N	Sr.sec. School	Y	Y	Y	Y
4	Kohlawas	N	N	Primary School	N	Y	N	N

#### FACILITIES/ HOUSEHOLD ASSETS

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

S. No.	Name of micro water sheds/ villages	Total no. of Houses	HHs with Safe latrines	HHs with phones		HHs with vehicles		HHs with TV sets	HHs with cooking gas	HHs with drinking water	HHs with fridge
				Landline	Mobile	2 wheelers	4 wheelers				
1	Sanwar	1457	655	43	947	539	160	262	116	1457	87
2	Jaishree	104	46	3	67	38	11	18	8	104	6
3	Jhinjher A+ B	935	421	28	607	345	102	168	74	935	56
4	Kohlawas	251	112	7	163	92	27	45	20	251	15

**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 Sanwar Watershed (IWMP VI)**

S. No.	Name of micro watersheds/ 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	Sanwar	22500	18600	5800	4400	51300
2	Jaishree	20500	17400	4900	5200	48000
3	Jhinjher A+ B	18400	14400	4200	4900	41900
4	Kohlawas	21600	18400	5400	4300	49700

#### **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 the area are Wheat, Mustard and Bajra. Compared to rest of the district and the state, the average yield of these crops is low in the project area.

#### **3.6 REASONS FOR LOW PRODUCTIVITY**

- Soil erosion

- Poor physical and chemical properties of the soils.
- Low water holding/ retention capacity.
- Medium to Moderate permeability.
- Low organic carbon content.
- Low available phosphorous.
- Lack of assured irrigation facility.
- Poor ground water quality
- Acceptance of hybrid/ high yielding varieties is low.
- Irregular and erratic rainfall: there is long span between two subsequent rainfalls in the area.
- Sudden change in climate of the area.
- Deficiency of micro- nutrient in the soil.
- Full and partial dependence of monsoon.
- Low use of fertilizer per unit cropped area.
- Poor socio-economic condition of farmers.
- Lack of good quality agricultural inputs.
- Lack of post harvesting facilities such as storage and marketing.

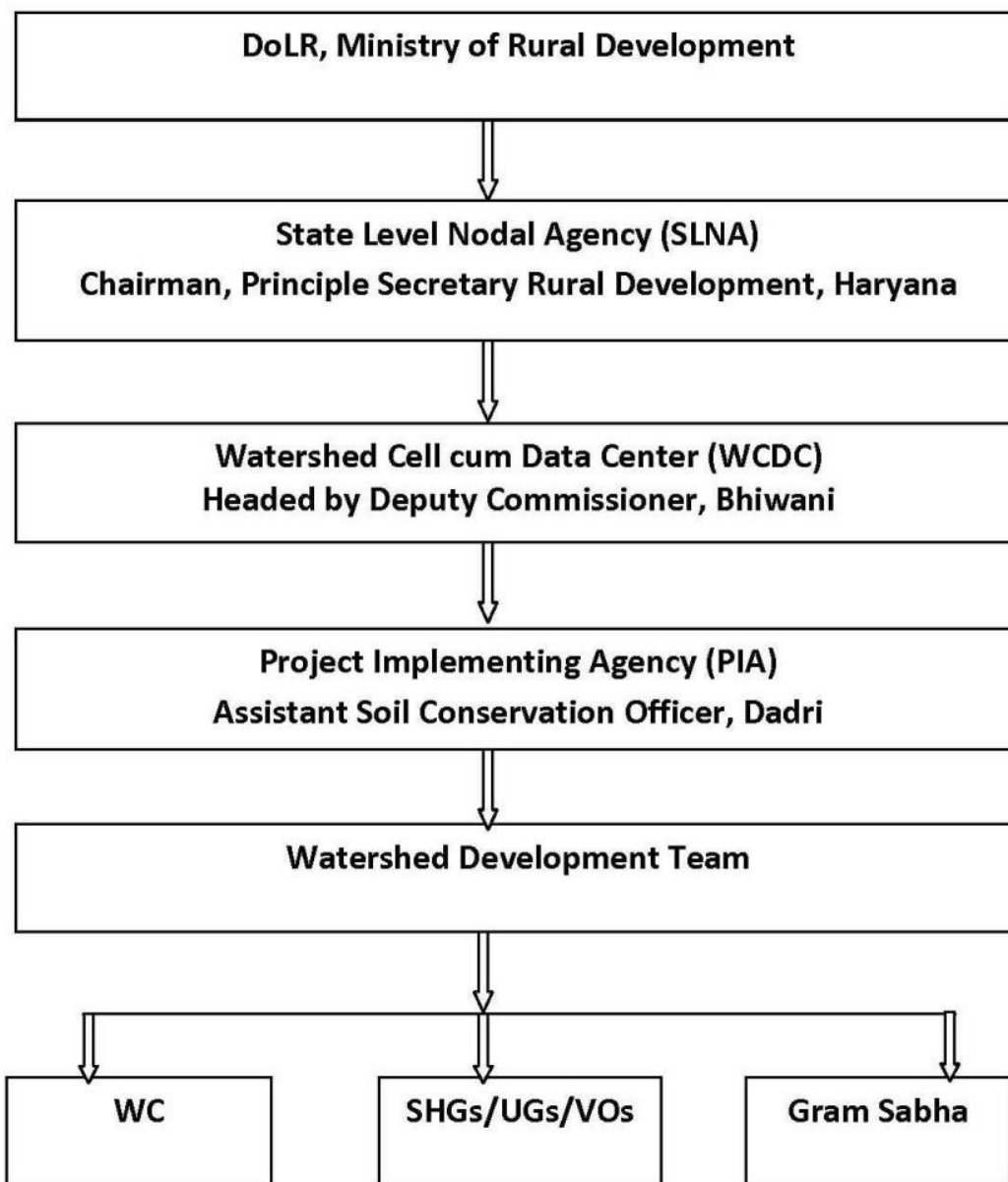
# CHAPTER-4

## PROJECT MANAGEMENT AGENCIES

### 4.1 INSTITUTIONAL ARRANGEMENT

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

The institutional set up is given below:





## 4.2 STATE LEVEL NODAL AGENCY, HARYANA

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

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

### **4.3 WATERSHED CELL CUM DATA CENTRE, BHIWANI**

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 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 Charkhi Dadri is selected by the State Level Nodal Agency (SLNA) for Integrated Watershed Management Programme (IWMP) in Haryana. In the district Bhiwani, where the area of development is 23766 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, Charkhi Dadri. 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	Sanwar Watershed (IWMP- VI)	i) Type of organization	Govt. Organisation
		ii) Name of organization	Department of Agriculture, Haryana
		iii) Designation & Address	Asstt. Soil Conservation Officer Ch. Dadri
		iv) Telephone	01664-255254
		v) Fax	-----

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

#### **4.4.1 Monitoring Level Staff at PIA Head Office**

The highly experienced staff is engaged in the monitoring the project. The technical guidance to field staff from time to time is being provided. Meetings are being periodically held by head office with officials from the Bhiwani 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**

<b>Name of Micro Watersheds</b>	<b>Name of President</b>	<b>Name of Secretary</b>	<b>Name of Cashier</b>	<b>Name of Members</b>
<b>Sanwar</b>	Rameshwar	Narender	Under Process	Banarsi Das, Tara Chand, Bhim Singh, Subhash Chand, Ragbir Singh, Dharambir, Ram kumar, Sewyi devi, Bimla devi, Suresh Kumar, Narender, Satyapati, Kiranpal
<b>Jaishree</b>	Satbir Singh	Sundev	Under Process	Shri chand, Karan Singh, Jitender, Omparkash, Sumer Singh, Siringa Devi, Rohtash, Savitri Devi, Manju, Roshanlal, Ramphal Sharma, Rajkumar
<b>Jhinjher</b>	Rampat	Sukrampal	Kali Ram	Randhir Singh, Rajender Singh, Rajesh, Ramesh, Bharti devi, Sunita devi, Kuldeep Singh, Hari Kishan, Ramdhari, Ramphal, Phul Kumar
<b>Kohlawas</b>	Krishan Kumar	Ruksar	Sunil devi	Mange ram, Atter Singh, Sunil, Kamlesh, Kanta, Raj kumar, Ishwar Singh, Roshanlal, Inder, Mohinder, Jai Bhagwan

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 VI SANWAR WATERSHED**

##### **5.1 BUDGETING**

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

**MICRO WATERSHED WISE / COMPONENT WISE PHASING**

**YEAR WISE BUDGET PHASING UNDER IWMP VI**

Area in Hectares and

Funds in Rs.

**Table 1. Activity wise allocation of funds for Project Village**

**(BUDGET AT A GLANCE)**

Name of the project	Project Area	Effective Area	Funds Available	Name of activity	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	5 <sup>th</sup> Year	Total
Sanwar Watershed (IWMP VI)	3727	3200	38400000	Administrative costs	384000	384000	1152000	1152000	768000	3840000
				Monitoring	0	0	0	384000	0	384000
				Evaluation	0	0	0	0	384000	384000
				Entry point activities	1536000	0	0	0	0	1536000
				Institution and capacity building	0	1920000	0	0	0	1920000
				Detailed project report	384000	0	0	0	0	384000
				Watershed development works	0	3072000	6144000	6528000	5760000	21504000
				Livelihood activities for the asset less persons	0	0	1152000	1920000	384000	3456000

				Production system and micro enterprises	0	0	1152000	1536000	1152000	3840000
				Consolidation phase	0	0	0	0	1152000	1152000
				<b>Total</b>	<b>2304000</b>	<b>5376000</b>	<b>9600000</b>	<b>11520000</b>	<b>9600000</b>	<b>38400000</b>
				<b>Percentage of total cost</b>	<b>6%</b>	<b>14%</b>	<b>25%</b>	<b>30%</b>	<b>25%</b>	<b>100%</b>

**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: Sanwar)**

**(BUDGET AT A GLANCE)**

<b>Effective Area</b>	<b>Funds Available</b>	<b>Name of activity</b>	<b>1<sup>st</sup> Year</b>	<b>2<sup>nd</sup> Year</b>	<b>3<sup>rd</sup> Year</b>	<b>4<sup>th</sup> Year</b>	<b>5<sup>th</sup> Year</b>	<b>Total</b>
796	9552000	Administrative costs	95520	95520	286560	286560	191040	955200
		Monitoring	0	0	0	95520	0	95520
		Evaluation	0	0	0	0	95520	95520
		Entry point activities	382080	0	0	0	0	382080

	Institution and capacity building	0	477600	0	0	0	477600
	Detailed project report	95520	0	0	0	0	95520
	Watershed development works	0	764160	1528320	1623840	1432800	5349120
	Livelihood activities for the asset less persons	0	0	286560	477600	95520	859680
	Production system and micro enterprises	0	0	286560	382080	286560	955200
	Consolidation phase	0	0	0	0	286560	286560
	<b>Total</b>	<b>573120</b>	<b>1337280</b>	<b>2388000</b>	<b>2865600</b>	<b>2388000</b>	<b>9552000</b>
	<b>Percentage of total cost</b>	<b>6%</b>	<b>14%</b>	<b>25%</b>	<b>30%</b>	<b>25%</b>	<b>100%</b>

**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: Jaitshree)**

**(BUDGET AT A GLANCE)**

Effective Area	Funds Available	Name of activity	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	5 <sup>th</sup> Year	Total	
550	6600000	Administrative costs	66000	66000	198000	198000	132000	660000	
		Monitoring	0	0	0	66000	0	66000	
		Evaluation	0	0	0	0	66000	66000	
		Entry point activities	264000	0	0	0	0	264000	
		Institution and capacity building	0	330000	0	0	0	330000	
		Detailed project report	66000	0	0	0	0	66000	
		Watershed development works	0	528000	1056000	1122000	990000	3696000	
		Livelihood activities for the asset less persons	0	0	198000	330000	66000	594000	
		Production system and micro enterprises	0	0	198000	264000	198000	660000	
		Consolidation phase	0	0	0	0	198000	198000	
		<b>Total</b>		<b>396000</b>	<b>924000</b>	<b>1650000</b>	<b>1980000</b>	<b>1650000</b>	<b>6600000</b>
		<b>Percentage of total cost</b>		<b>6%</b>	<b>14%</b>	<b>25%</b>	<b>30%</b>	<b>25%</b>	<b>100%</b>

**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: Jhinjher A)**

**(BUDGET AT A GLANCE)**

<b>Effective Area</b>	<b>Funds Available</b>	<b>Name of activity</b>	<b>1<sup>st</sup> Year</b>	<b>2<sup>nd</sup> Year</b>	<b>3<sup>rd</sup> Year</b>	<b>4<sup>th</sup> Year</b>	<b>5<sup>th</sup> Year</b>	<b>Total</b>
580	6960000	Administrative costs	69600	69600	208800	208800	139200	696000
		Monitoring	0	0	0	69600	0	69600
		Evaluation	0	0	0	0	69600	69600
		Entry point activities	278400	0	0	0	0	278400
		Institution and capacity	0	348000	0	0	0	348000

	building						
	Detailed project report	69600	0	0	0	0	69600
	Watershed development works	0	556800	1113600	1183200	1044000	3897600
	Livelihood activities for the asset less persons	0	0	208800	348000	69600	626400
	Production system and micro enterprises	0	0	208800	278400	208800	696000
	Consolidation phase	0	0	0	0	208800	208800
	<b>Total</b>	<b>417600</b>	<b>974400</b>	<b>1740000</b>	<b>2088000</b>	<b>1740000</b>	<b>6960000</b>
	<b>Percentage of total cost</b>	<b>6%</b>	<b>14%</b>	<b>25%</b>	<b>30%</b>	<b>25%</b>	<b>100%</b>

**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: Jhinjher B)**

**(BUDGET AT A GLANCE)**

<b>Effective Area</b>	<b>Funds Available</b>	<b>Name of activity</b>	<b>1<sup>st</sup> Year</b>	<b>2<sup>nd</sup> Year</b>	<b>3<sup>rd</sup> Year</b>	<b>4<sup>th</sup> Year</b>	<b>5<sup>th</sup> Year</b>	<b>Total</b>
584	7008000	Administrative costs	70080	70080	210240	210240	140160	700800
		Monitoring	0	0	0	70080	0	70080
		Evaluation	0	0	0	0	70080	70080
		Entry point activities	280320	0	0	0	0	280320
		Institution and capacity building	0	350400	0	0	0	350400
		Detailed project report	70080	0	0	0	0	70080
		Watershed development works	0	560640	1121280	1191360	1051200	3924480
		Livelihood activities for the asset less persons	0	0	210240	350400	70080	630720
		Production system and micro enterprises	0	0	210240	280320	210240	700800

		Consolidation phase	0	0	0	0	210240	210240
		<b>Total</b>	<b>420480</b>	<b>981120</b>	<b>1752000</b>	<b>2102400</b>	<b>1752000</b>	<b>7008000</b>
		<b>Percentage of total cost</b>	<b>6%</b>	<b>14%</b>	<b>25%</b>	<b>30%</b>	<b>25%</b>	<b>100%</b>

**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: Kolhawas)**

**(BUDGET AT A GLANCE)**

<b>Effective Area</b>	<b>Funds Available</b>	<b>Name of activity</b>	<b>1<sup>st</sup> Year</b>	<b>2<sup>nd</sup> Year</b>	<b>3<sup>rd</sup> Year</b>	<b>4<sup>th</sup> Year</b>	<b>5<sup>th</sup> Year</b>	<b>Total</b>
690	8280000	Administrative costs	82800	82800	248400	248400	165600	828000
		Monitoring	0	0	0	82800	0	82800
		Evaluation	0	0	0	0	82800	82800

	Entry point activities	331200	0	0	0	0	331200
	Institution and capacity building	0	414000	0	0	0	414000
	Detailed project report	82800	0	0	0	0	82800
	Watershed development works	0	662400	1324800	1407600	1242000	4636800
	Livelihood activities for the asset less persons	0	0	248400	414000	82800	745200
	Production system and micro enterprises	0	0	248400	331200	248400	828000
	Consolidation phase	0	0	0	0	248400	248400
	<b>Total</b>	<b>496800</b>	<b>1159200</b>	<b>2070000</b>	<b>2484000</b>	<b>2070000</b>	<b>8280000</b>
	<b>Percentage of total cost</b>	<b>6%</b>	<b>14%</b>	<b>25%</b>	<b>30%</b>	<b>25%</b>	<b>100%</b>

# CHAPTER – 6

## PREPARATORY PHASES

During the first year, all activities involved by adopting participatory approach and empowerment of local institution (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. Those groups will be revived and new ones were formed depending upon willingness of the interest groups. The type of activities these groups want pursue and their capacity building requirements were noted.

### **6.1.3 Preparation of DPR**

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

Capability Classification, Ground Water (depth & quality), Proposed and existing Activities or 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 five watersheds in four villages of Bhiwani District.

#### **Strengths**

- ❖ 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
- ❖ Poor ground water quality for irrigation
- ❖ 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**

- ❖ Available Rain Water harvesting for life saving irrigation.
- ❖ Promotion of organic farming.
- ❖ Dry land horticulture activities.
- ❖ Provide training on dairy farming and other income generating activities.
- ❖ Promotion of nursery raising and pasture development.
- ❖ Consumptive use of ground water.

### **Threats**

#### **There are few negative issues that may have adverse effect**

- ❖ Unreliable rainfall.
- ❖ Absence of assured irrigation and poor ground water quality.
- ❖ Lack of cooperation and contribution from local residents.
- ❖ Low literacy rate in the project area.
- ❖ Rapid climate change affecting crops.
- ❖ Lack of awareness of Dairy farming as a commercial activity.
- ❖ Frequent droughts.
- ❖ Poor avenues for employment.
- ❖ Wild life menace.

CAPACITY BUILDING- 5%

Rs. 19, 20, 000/-



## **6.2 Capacity Building**

### **1. Introduction**

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

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

### **2. Vision**

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

### **3. Need**

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

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

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

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

### **4. Rationale**

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

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

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

## 5. Objectives

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

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

**Table 1. Statement of Targets under Proposed Training Action Plan at Micro Watershed Level to be conducted by WDT members of Bhiwani 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. <b><u>One Day</u></b>				
	Bhiwani	Members of Watershed Committees @ 10 per committee would also include accompanying WDT Members.	270	300-350	1
02	Block Level Functional Programmes for Secretaries of Watershed Committees. <b><u>Two Days</u></b>				
	Bhiwani	Secretaries of Village Watershed Committees	27	35-40	1
03	Project Level Sensitization Camps for WC <b><u>One Days</u></b>				
	Bhiwani	Members of Watershed Committees @ 10 Persons (Tentative) per WC	270	50	5

04	Village Level Awareness Camps on IWMP at Micro Watershed Level for User Groups <b><u>One Day</u></b>				
	Bhiwani	Approximately 50 <u>prospective</u> user groups per micro watershed.	1350	50	27
05	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP <b><u>One Day</u></b>				
	Bhiwani	Three persons (Leader, Secretary and Treasurer) per Self Help Group @ around one SHG per village.	81	50	2

**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, Gol 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
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1	District Level Sensitization Workshop(s) for Watershed Committees	19483
2	Block Level Functional Programmes for Secretaries of Watershed Committees. <u>Two Days</u>	2787
3	Village Level Sensitization Camps for WC <u>One Days</u>	12690
4	Village Level Awareness Camps on IWMP at Micro Watershed Level for Prospective User Groups <u>One Day</u>	29447
5	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP <u>One Day</u>	5224
	<b>Total</b>	<b>69631</b>

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

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	7000	5	5	3500	700	2100	52500

S. No.	Target Group	Training Topics	No. of days	Budget per camp	No. of Camps	No. of Participants per camp	Cost for all participants per day	Cost per participant/ per day	Cost per person	Total Budget
2	User groups from each micro watershed	NRM, Post Project Management etc. –Exposure Visit	2	14000	5	10	7000	700	2100	105000
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	30000	5	5	7500	1500	4500	112500
4	Sub watershed Level- PIA Members	Exposure Visit- Within Fundamentals of Watershed, Finance Management, Final Report on WDP etc	2	14000	5	10	7000	700	4500	225000
5	District Level-	Exposure visit to successful	2	14000	5	10	7000	700	1400	70000



S. No.	Target Group	Training Topics	No. of days	Budget per camp	No. of Camps	No. of Participants per camp	Cost for all participants per day	Cost per participant/ per day	Cost per person	Total Budget
	WDC	watershed/ University.								
6	District Level-Line Deptt., WDC	Exposure visit to successful watersheds within state.	2	14000	5	10	7000	700	1400	70000
7	SLNA and District Level Controlling Officers	Exposure visit to successful watersheds outside state	4	60000	5	10	15000	1500	6000	300000
<b>Total</b>			<b>18</b>		<b>35</b>	<b>60</b>				<b>935000</b>

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

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	5	2	10	50	12,000	1,20,000	6,00,000

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
2.	Propaganda & Documentation (Puppet show, documentary movies show, video-graphy, Photography, wall Painting, Display Board, pamphlets, leaf lets. Etc)	5	2	10	50	5000	50,000	2,50,000
3	Contingency charges							65369
	<b>Total</b>							<b>915369</b>

- i) Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD = Rs. 69,631/-
- ii) Micro Watershed Wise Exposure cum training Visit For SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members = Rs. 9, 35,000/-
- iii) Farmer's / Beneficiaries training camps with Extension Program's = Rs. 9,15,369/-

**Grand Total = 19, 20,000/-**

#### **6.2.1. EXPECTED OUTCOME OF CAPACITY BUILDING**

- All principal stakeholders would be covered under proposed training interventions by March, 2013.
- The knowledge level of different stakeholders on various provisions of Common Guidelines will increase to a significant level.

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

### **6.3 Entry Point Activities 4%**

EPA activities are taken up under the watershed to build rapport with village community at the beginning of the project, generally certain important works which are in urgent demand of the local community are taken up. A group discussion was conducted in the Gram Sabha meeting/watershed committee regarding EPA activities. It was conveyed to the Gram Sabha that an amount of **Rs. 15, 36,000/-** was provided for EPA. The provision of IEC material for community will be met under EPA. The stake holders discussed the various activities which they felt is important but after the discussion the following activities were finalized. The convergence with the other project can also be undertaken.

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

**(Rs. In Lacs)**

<b>Sr. No.</b>	<b>Block</b>	<b>Name of Project</b>	<b>No. of EPAs Identified</b>	<b>No. of EPAs Completed</b>	<b>No. of EPAs in progress</b>	<b>Name/Nature of EPA</b>	<b>Location</b>	<b>Expenditure</b>
1.	Dadri I	Sanwar Watershed (IWMP VI)	6	0	0	Retaining Wall	Jhinjher	5.75
						Inlet cum Pumps (2 No.)	Sanwar	5.25
						Drainage Pacca Nala for rain water	Jaishree	1.20
						Percolation pond and UGPL	Kohlawas	3.10
						<b>Total</b>		<b>15.30</b>

**Total project Cost @ 4%= Rs. 15, 36,000/-**

# CHAPTER- 7

## WORK PHASE

### **7.1 WATERSHED DEVELOPMENT WORKS - 56%**

The Works under the project have been identified after the detailed survey of the Project Area and discussions held with watershed development team members along with officers from other field like Agriculture, Horticulture and Animal Husbandry. Participatory approach has been adopted to identify the activities under the project. The detailed discussions were held with watershed committees and works identified along with villagers after making visits to identified sites. The works mainly relate to soil and water conservation activities like Renovation/new village pond, Ramp/Inlet and outlet, Roof top rainwater harvesting structures, Earthen Embankment with pucca outlet, Small Earthen Embankment with vegetative Support, Community Water Storage Tank, UGPL, Water conveyance system, Drain etc. The proposed project proposals were presented in the Gram Sabha meeting as per the schedule and were approved with certain changes. The works thus identified are given in the attached sheets along with estimates – micro watershed wise.

#### **Natural Resource Management**

There are no large/ deep gullies in the area because most of the area is level to nearly level, however at few places near stabilized sand dunes where slopes are under nearly level, small gullies with complex slope have been formed which need specific treatment and earthen embankment with pucca outlet and small earthen embankment with vegetative support to stabilize sandy over burden deposits in upper area of watershed.

The project area having small or large old ponds which have been silted up and needs strengthening. The land holding is small and any loss of land nearby area would be loss to the farmer. Under the IWDP/ Haryali some works like construction/renovation of farm ponds, field bunding has been undertaken but still at few places inlet of the ponds and outlet needs to be constructed. So their repair and renovation is proposed during the discussion it was felt to be genuine demand for repair, renovation and capacity enhancement in the area. This will increase the rain water harvesting.

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

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 repair, renovation and capacity enhancement construction of new ponds in the area.

## **7.2 Proposed Activity**

The provision for construction/ renovation of pond, inlet, outlet, ramp and retaining walls are the main requirement by project stakeholders which has been provided. In some villages, the constructions of new ponds are proposed, subject to availability of funds. Ponds as such are the best source of rainwater harvesting.

Gram Panchayats spend meager money on repair and renovation under different schemes but due to paucity of funds, works are taken up in piece meal and main work of retaining wall is ignored. The stakeholders gave high priority for the construction of retaining walls as lot of water is being wasted from the side and cutting of banks.

### 7.2.1 Earthen Embankment

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

**Suggested Interventions:** In a number of villages, sites have been proposed for in-situ moisture conservation and construction of embankments where village paths have got converted in to nalas due to severe erosion.

The DPR proposals shall be implemented in participatory mode. In this watershed management program, it was planned to rehabilitate the degraded watersheds. The scope of integrated watershed regeneration/rehabilitation works which emerged from the PRA are as under:-

Sample estimates are as follows:

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

**Table-1: Village wise distribution of works: Village– Sanwar**

Name of micro-watersheds	Activity/work with location/identification mark	Unit	Unit cost (Rs. in lacs)	Phy.	Estimated amount (Rs in lacs)	Objectives
Sanwar	Renovation/new village pond	No.	3	5	15.00	For ground water recharging & availability of water for village community animals.
	Ramp, inlet, outlet & protection wall, if necessary at old ponds	cum	0.0326	168	5.48	To provide inlet and outlet to check water losses and protection of pond in case of over flow

Name of micro-watersheds	Activity/work with location/identification mark	Unit	Unit cost (Rs. in lacs)	Phy.	Estimated amount (Rs in lacs)	Objectives
	Roof top rainwater harvesting kund in Govt. Primary School	No.	2	2	4.00	For the conservation of water and ground water recharging.
	Earthen Embankment with pucca outlet	No.	0.77+0.20=0.97	6	5.82	For the control of soil erosion, in situ moisture conservation.
	Small Earthen Embankment with vegetative Support	100cu m	0.029	28875	8.37	For the control of soil erosion, in situ moisture conservation.
	Community Water Storage Tank with Pipe line	No.	3	8	24.00	For store surplus canal water for use during lean period
	Water conveyance system from Dadri minor to Mirjani pond	Mtr.	0.007	1000	7	To ensure availability of water in pond during lean period
	Rainfed Horticulture	ha	0.25	8	2.00	Proper utilization of uncultivated fields and additional income for farmers.
	Agro- Forestry	ha	0.15	20	3.00	Increase biomass and additional income to the farmers
<b>Total Funds</b>					<b>74.67</b>	
<b>Available Funds</b>					<b>73.65</b>	



Name of micro-watersheds	Activity/work with location/identification mark	Unit	Unit cost (Rs. in lacs)	Phy.	Estimated amount (Rs in lacs)	Objectives
<b>Convergence</b>					<b>1.02</b>	

**Table-2: Village wise distribution of works: Village– Jaishree**

Name of micro-watersheds	Activity/work with location/identification mark	Unit	Unit cost (Rs. in lacs)	Phy.	Estimated amount (Rs. In Lacs)	Objectives
Jaishree	Renovation/new village pond	No.	3	1	3	For ground water recharging & availability of water for village community animals.
	Ramp, inlet, outlet & protection wall, if necessary at old ponds	cum	0.0326	115	3.75	To provide inlet and outlet to check water losses and protection of pond in case of over flow
	Small Earthen Embankment with vegetative Support	100cum	0.029	12074	3.50	For the control of soil erosion, in situ moisture conservation.
	Drain from village to old pond	No.	5	1	5	Drain out stagnate water to avoid water logging
	Rainfed Horticulture	ha	0.25	4	1	Proper utilization of uncultivated fields and additional income for farmers.

	Agro- Forestry	ha	0.15	20	3	Increase biomass and additional income to the farmers
<b>Total Funds</b>					<b>19.25</b>	
<b>Available Funds</b>					<b>16.80</b>	
<b>Convergence</b>					<b>2.45</b>	

**Table-3: Village wise distribution of works: Village– Jhinjher**

Name of micro-watersheds	Activity/work with location/identification mark	Unit	Unit cost (Rs. in lacs)	Phy.	Estimated amount (Rs. In Lacs)	Objectives
<b>Jhinjher</b>	Renovation/new village pond	No.	3	4	12	For ground water recharging & availability of water for village community animals.
	Ramp, inlet, outlet & protection wall and Partition wall, if necessary at old ponds	cum	0.0326	275	8.965	To provide inlet and outlet to check water losses and protection of pond in case of over flow
	Roof top rainwater harvesting kund in Govt. Primary School	No.	2	2	4	For the conservation of water and ground water recharging.
	Earthen Embankment with pucca outlet	No.	0.77+0.20 =0.97	5	4.85	For the control of soil erosion, in situ moisture conservation.

Name of micro-watersheds	Activity/work with location/identification mark	Unit	Unit cost (Rs. in lacs)	Phy.	Estimated amount (Rs. In Lacs)	Objectives
	Small Earthen Embankment with vegetative Support	100cum	0.029	25147	7.29263	For the control of soil erosion, in situ moisture conservation.
	Community Water Storage Tank with Pipe line	No.	3	6	18	For store surplus canal water for use during lean period
	Water conveyance system from Dadri minor to Mirjani pond	Mtr.	0.007	1500	10.5	To ensure availability of water in pond during lean period
	Drain from village to old pond (1000 mtr.)	No.	10	1	10	Drain out stagnate water to avoid water logging
	Rainfed Horticulture	ha	0.25	5	1.25	Proper utilization of uncultivated fields and additional income for farmers.
	Agro- Forestry	ha	0.15	25	3.75	Increase biomass and additional income to the farmers
<b>Total Funds</b>					<b>80.61</b>	
<b>Available Funds</b>					<b>78.22</b>	
<b>Convergence</b>					<b>2.39</b>	

**Table-4: Village wise distribution of works: Village– Kohlawas**

<b>Name of micro-watersheds</b>	<b>Activity/work with location/identification mark</b>	<b>Unit</b>	<b>Unit cost (Rs. in lacs)</b>	<b>Phy.</b>	<b>Estimated amount (Rs. In Lacs)</b>	<b>Objectives</b>
<b>Kohlawas</b>	Renovation/new village pond	No.	3	3	9	For ground water recharging & availability of water for village community animals.
	Ramp, inlet, outlet & protection wall, if necessary at old ponds	cum	0.0326	122	3.9772	To provide inlet and outlet to check water losses and protection of pond in case of over flow
	Roof top rainwater harvesting kund in Govt. Primary School	No.	2	2	4	For the conservation of water and ground water recharging.
	Earthen Embankment with pucca outlet	No.	0.77+0.20 =0.97	5	4.85	For the control of soil erosion, in situ moisture conservation.
	Small Earthen Embankment with vegetative Support	100 cum	0.029	21154	6.13	For the control of soil erosion, in situ moisture conservation.
	Community Water Storage Tank with Pipe line	No.	3	6	18	For store surplus canal water for use during lean period

Name of micro-watersheds	Activity/work with location/identification mark	Unit	Unit cost (Rs. in lacs)	Phy.	Estimated amount (Rs. In Lacs)	Objectives
	Rainfed Horticulture	ha	0.25	5	1.25	Proper utilization of uncultivated fields and additional income for farmers.
	Agro- Forestry	ha	0.15	15	2.25	Increase biomass and additional income to the farmers
<b>Total Funds</b>					<b>49.46</b>	
<b>Available Funds</b>					<b>46.37</b>	
<b>Convergence</b>					<b>3.09</b>	

**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. 5. 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



## Table. 6. Leads Statement

### Leads Statement :-

Cross Section Area =  $(\text{Base} + \text{Top}) \div 2 \times \text{Height}$  i.e.  $\{(27.75 + 3.00) \div 2\} \times 4.50 = 69.19$  Square meters

Horizontal leads =  $(\text{Base}/2) + (\text{Cross section area}/ 2 \times 0.6)$  i.e.  $(27.75/2) + [(69.19)/(2 \times 0.6)] = 71.54$  meters

Vertical leads =  $(\text{Height} + 0.60) \times 0.4 \times 10$  i.e.  $(4.50 + 0.60) \times 0.4 \times 10 = 20.40$  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 =  $\text{Length} \times \text{Average base}$  i.e.  $50.00 \times 27.75 = 1387.50$  Sq. meters

Area from where E/W is to be excavated =  $\text{Av. Length} \times \text{leads}$  i.e.  $50.00 \times 91.94 = 4597.00$  Sq. meters

Total Area =  $1387.50 + 4597.00 = 5984.50$  Sq. meters.

### Volume of Key Trench :-

$(\text{Length} - 2 \times 2.50) \times \text{Av. Width} \times \text{Height}$  i.e.  $(50.00 - 2 \times 2.50) \times (6.00 + 2.00) / 2 \times 2.00 = 360.00$  cum

### Volume of Loose soil to be removed :-

Area to be covered by the body of Dam X Depth of loose soil i.e.  $(1387.50 \times 0.30) = 416.25$  cum

### Volume of Earthwork in bund filling :-

$(\text{Cross Section Area} \times \text{Length}) + \text{Loose soil to be removed}$  i.e.  $(69.19 \times 50.00) + 416.25 = 3875.75$  cum

## DETAILED ESTIMATE OF CHUTE OUTLET

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S.No.	Description	No.	Length ( mts )	Breadth ( mts )	Height ( mts )	Content ( cums )	
1	<b>Excavation of earthwork in foundation And plinth</b>			<b>H.S.R 6.6</b>			
	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	
				<b>Total =</b>		<b>159.00</b>	
2	<b>Cement concrete work 1 : 4 : 8 in the Foundation and plinth</b>			<b>H.S.R 10.39</b>			
	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	
				<b>Total =</b>		<b>20.04</b>	
3	<b>Square rubble stone masonry course 1: 5 in foundation and plinth H.S.R 12.23</b>						



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

	On top of Toe wall	1	4.00	0.50	0.05	0.10	
	Apron	1	24.00	2.00	0.10	4.80	
				<b>Total =</b>			<b>6.25</b>
<b>6</b>	<b>Cement plastering work 1:4 on the</b>						
	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	
			<b>Total =</b>			<b>56.00</b>	

**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	22.10	38.012	6.63	–	–	24.31

	above ground level.						
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	–	–	–
	<b>Total =</b>		<b>179.8566</b>	<b>24.7532</b>	<b>19.2384</b>	<b>5.5</b>	<b>42.328</b>
	Rates of material		245.00 per bag	950.00 per cum	965.00 per cum	985.00 per cum	945.00 per cum
	<b>Cost of Materials</b>		<b>44065</b>	<b>23516</b>	<b>18565</b>	<b>5418</b>	<b>40000</b>
	<b>Total Cost of Materials =</b>		<b>Rupees</b>	<b>131563</b>	<b>/-only</b>		
<b><u>ABSTRACT OF COST</u></b>							
<b><u>S.No.</u></b>	<b><u>Item of Work</u></b>		<b><u>Quantity</u></b>	<b><u>Rate</u></b>		<b><u>Unit</u></b>	<b><u>Amount</u></b>
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

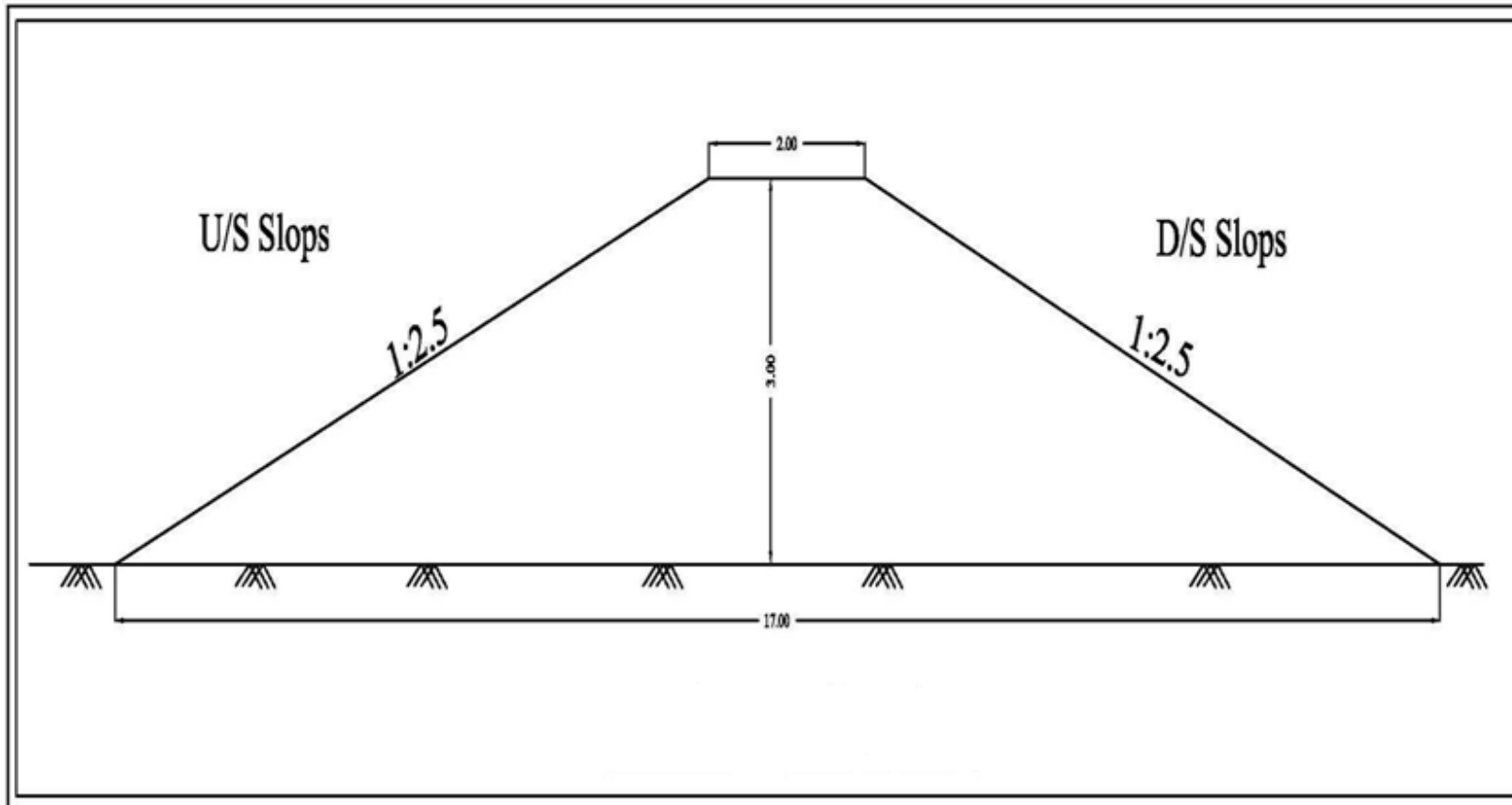
3	E/Work excavation for digging of the key trench H.S.R. 6.6	360.00 cum	Rs.1108.10 + 350% C. Prem.= 4986.45	100 cum	17951.22
4	Excavation of E/Work for clay filling in Key trench including lead up to 495 mts. H.S.R. 6.2(b)and 6.2 (c )	360.00 cum	586.60+(6x15)+(32x13.25)+ (26x12.00) + 350% C. Prem.= 6356.70	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	3875.75 cum	Rs.(75.00+ 68.10)+350% C.	100 cum	24957.89

	earth laying in 25cm layers source of water leads up to 1 km. H.S.R. 6.2 (g) (ii),( i )		Prem.= 643.95		
10	Extra for rolling with road roller / tractor H.S.R. 6.2 (g) (v)	3875.75 cum	Rs.225.00 + 110 % C. Prem.= 472.50	100 cum	18312.92
11	Excavation of earthwork in foundation and plinth H.S.R 6.6	159.00 cum	Rs.1108.10 + 350 % C. Prem. =4986.45	100 cum	<b>7928.46</b>
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	<b>6117.61</b>
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	<b>10683.36</b>
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	<b>16517.98</b>
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	<b>1907.94</b>

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	<b>1355.20</b>
17	Total Cost of Materials =				<b>131562.923</b>
<b>Total =</b>					<b>480352.726</b>
Add Contingency at the rate of 3% =					14410.5818
<b>Grand Total =</b>					<b>494763.31</b>
					<b>Say Rs. 4.95 Lacs</b>

**Table 7. 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.  $\{(17.00 + 2.00) \div 2\} \times 3.00 = 28.50$  Square meters

Horizontal leads = (Base/2) + (Cross section area/ 2 x 0.6) i.e.  $(17.00/2) + \{28.50/(2 \times 0.6)\} = 32.25$  meters

Vertical leads = (Height +0.60) x 0.4 x 10 i.e.  $(3.00 + 0.60) \times 0.4 \times 10 = 14.40$  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.  $40.00 \times 17.00 = 680.00$  Sq. meters

Area from where E/W is to be excavated = Av. Length x leads i.e.  $40.00 \times 46.65 = 1866.00$  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.  $(680.00 \times 0.30) = 204.00$  cum

**Volume of Earthwork in bund filling :-**

(Cross Section Area X Length) + Loose soil to be removed i.e.  $(28.50 \times 40.00) + 204.00 = 1344.00$  cum



**ABSTRACT OF COST**

<b>S.No.</b>	<b>Item of Work</b>	<b>Quantity</b>	<b>Rate</b>	<b>Unit</b>	<b>Amount</b>
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 embankment undressed including breaking of Clods. H.S.R. 6.2 (b)	1344.00 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	35477.57
4	Extra for admixture for single or kanker Exceeding 30% but up to 40%. H.S.R. 6.2 (h) ii	1344.00 cum	Rs. 318.55 + 350% C. Prem.= 1433.48	100 cum	19265.97
5	Extra for every 7.5 meter additional lead beyond 60mt but up to 255 m by the animal or animal driven cart (5 leads) H.S.R. 6.2 (c) ( ii )	1344.00 cum	[(15.00 x 5 No.)+ 350% C. Prem.= 337.50	100 cum	4536.00
6	Dressing of earthwork H.S.R. 6.3 (i)	1344.00 cum	Rs.45.90 + 350 % C. Prem.= 206.55	100 cum	2776.03
<b>Total =</b>					<b>74243.4712</b>

Add Contingency at the rate of 3% =	2227.30
<b>Grand Total =</b>	<b>76470.78</b>

**Table. 8. Detail Estimate of Cement Stone Masonry Structure**

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts )	Content (cums)
<b>1</b>	<b>Excavation of earthwork in foundation And plinth</b>			<b>H.S.R 6.6</b>		
	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
	Apron	1	4.00	1.50	0.30	1.80
				<b>Total =</b>		
<b>2</b>	<b>Cement concrete work 1 : 4 : 8 in the Foundation and plinth</b>			<b>H.S.R 10.39</b>		
	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
	Apron	1	4.00	1.50	0.20	1.20
				<b>Total =</b>		
<b>3</b>	<b>Square rubble stone masonry course1: 5 in foundation and plinth</b>			<b>H.S.R 12.23</b>		
	Crest wall with extensions	1	8.00	(1.5+1.0)/2= 1.25	1.00	<b>10.00</b>
	Side walls	2	1.50	0.50	1.00	<b>1.50</b>

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts )	Content (cums)
	Wing walls	2	2.00	0.50	1.00	2.00
	Toe wall with extensions	1	6.00	0.50	1.00	3.00
				<b>Total =</b>		<b>16.50</b>
<b>4</b>	<b>Square rubble stone masonry course1: 5 above G.L. H.S.R 12.23 and 12.31</b>					
	Crest wall with extensions	1	8.00	$(1.0+0.5)/2=0.75$	1.20	7.20
	Side walls	2	$(1.5+2.0)/2=1.75$	0.50	$(1.7+0.5)/2=1.1$	1.93
	Wing walls	2	2.00	0.50	1.70	3.40
	Toe wall with extensions	1	6.00	0.50	0.20	0.60
	Toe wall extensions	1	1.00	0.50	0.50	0.25
				<b>Total =</b>		<b>13.38</b>
<b>5</b>	<b>Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41</b>					
	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
				<b>Total =</b>		<b>1.18</b>
<b>6</b>	<b>Cement plastering work 1:4 on the</b>					
	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	$(1.5+2.0)/2=$	—	$(1.7+0.5)/2=$	3.85

S.No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts )	Content (cums)
			1.75		1.1	
	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
				<b>Total =</b>		<b>27.45</b>

**Table. 9. MATERIAL STATEMENT AND COST OF MATERIAL**

<u>S.No.</u>	<u>Item of work</u>	<u>Quantity</u>	<u>Cement</u>	<u>Sand</u>	<u>Stone blast</u>	<u>Bairi 20 mm</u>	<u>Stone boulders</u>
		( 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	–	–	–
	<b>Total =</b>		<b>81.323</b>	<b>12.64645</b>	<b>5.5104</b>	<b>1.034</b>	<b>32.8625</b>

	<b>Rates of material</b>	245.00 per bag	950.00 per cum	965.00 per cum	985.00 per cum	945.00 per cum
	<b>Cost of Materials</b>	<b>19924</b>	<b>12014</b>	<b>5318</b>	<b>1018</b>	<b>31055</b>
	<b>Total Cost of Materials =</b>	<b>Rupees</b>	<b>69329</b>	<b>/-only</b>		

**Table. 10. LABOUR COST**

<b>S. No.</b>	<b>Item of work Quantity</b>	<b>Rate</b>	<b>Unit</b>	<b>Amount</b>
1	Excavation of earthwork in foundation and plinth H.S.R 36.60 6.6 cum	1108.10 +350% C. Prem. =4986.45	100 cum	<b>1825.04</b>
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	<b>1752.25</b>
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	<b>10761.63</b>
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	<b>9996.74</b>
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	<b>358.69</b>

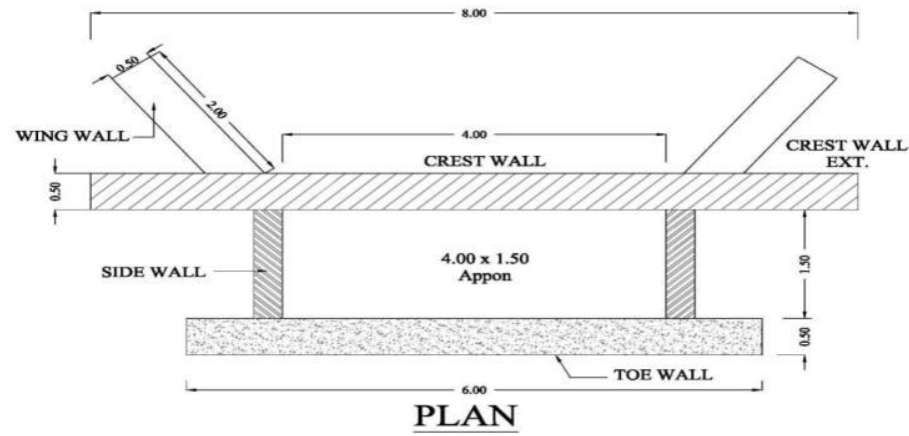
S. No.	Item of work Quantity	Rate	Unit	Amount
6	Cement plastering work 1:4 on the stone walls H.S.R 15.5	27.45 sqm	5.50 +340 % C. Prem. =24.2	cum <b>664.29</b>
	<b>Total =</b>	29.875 cum		<b>25358.64525</b>
				<b>or say Rs.25359/- only</b>

**Table. 11. ABSTRACT OF COST**

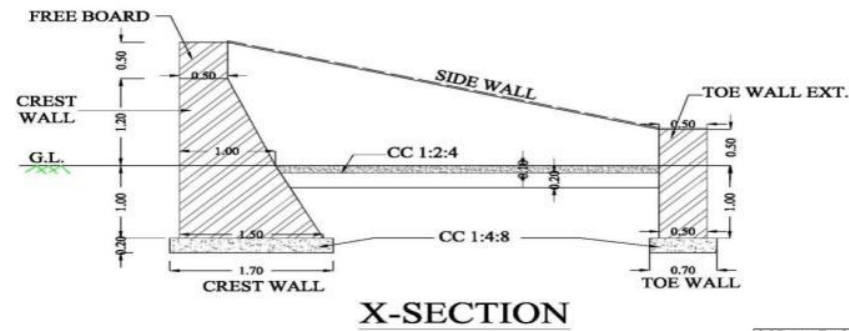
Labour cost	25359.00
Cost of Materials as per detail attached	69329.00
	<b>Total = 94688.00</b>
Add contingency at the rate of 3%	2841.00
	<b>Grand Total = 97529.00</b>

**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. 12. Detailed estimate of Pond**

**Detail Estimate of village Pond**

$$\begin{aligned} \text{Volume of Pond} &= \frac{A+AB+C \times D}{6} \\ &= \frac{(50 \times 50) + 4(41 \times 41) + (32 \times 32)}{6} \quad \times 3.00 \\ &= 5124 \text{ cum} \end{aligned}$$

$$\begin{aligned} \text{Volume of Stone Pitching} &= \text{Area} \times \text{Depth/ Height} \\ &= 3824 \times 0.15 \\ &= 423.60 \text{ cum} \\ &\text{or say - 1461.55 cft.} \end{aligned}$$

**Leads Statement**

$$\begin{aligned} \text{Horizontal Leads} &= (\text{length}/2) + (\text{cross section area}/2 \times 0.60) \\ &= 80/2 + \{(16.50 + 3)/2 \times 2.25\}/2 \times 0.60 \\ &= 61.94 \text{ mtr.} \\ \text{Vertical Leads} &= (\text{Depth} + \text{Height}) \times 0.4 \times 10 \\ &= 21.00 \text{ mtr.} \end{aligned}$$

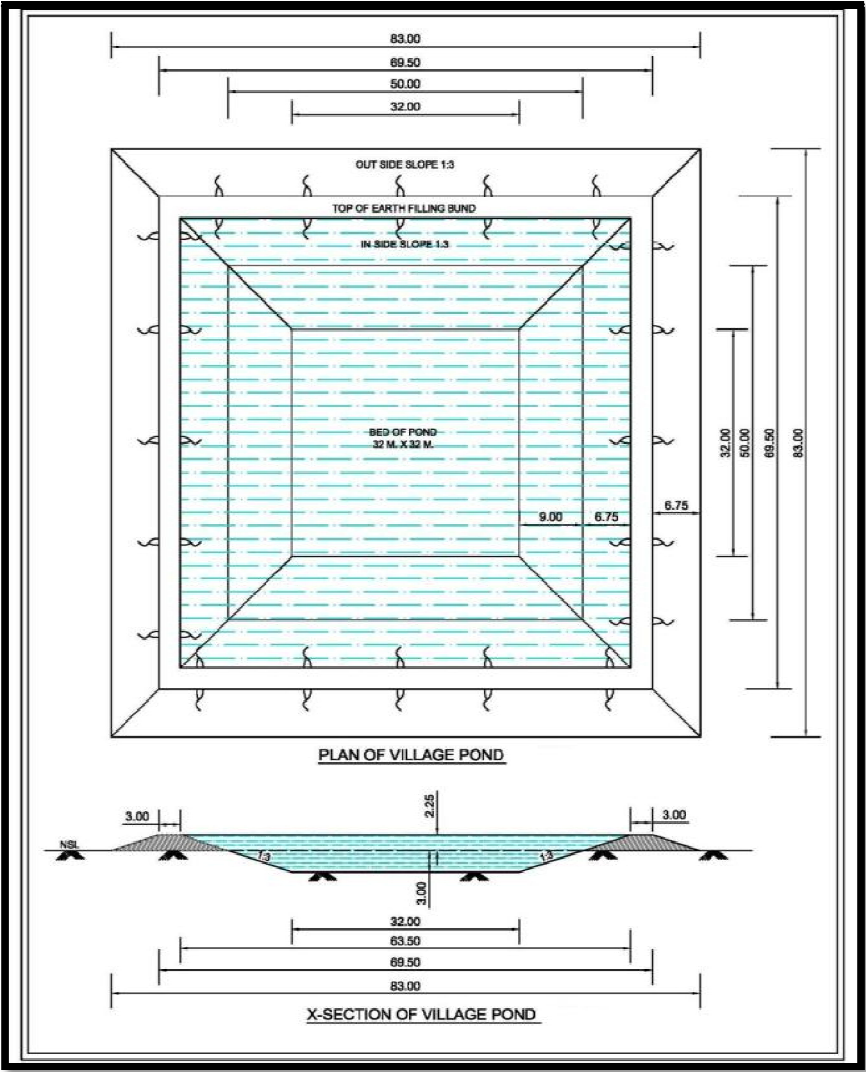


$$\begin{aligned} \text{Total Leads} &= \{(61.94 + 21.00) - 15.00\}/7.5 \\ &= 9 \text{ Leads} \end{aligned}$$

**Table. 13. 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
<b>Total</b>						<b>251458.76</b>

	<b>Add. Contingency @2%</b>	<b>5029.1753</b>
	<b>Grand Total</b>	<b>256487.94</b>
	<b>Or say `</b>	<b>2.60 Lac</b>



**Table. 14. Estimate of Orchard Development in the Watersheds Per Hectare ( Lemon & Kinnoo)**

**A. Horticulture**

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

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

**A. Horticulture**

<b>Sr. No.</b>	<b>Particulars</b>	<b>Quantity</b>	<b>Unit</b>	<b>Rate</b>	<b>Amount</b>
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 Farmacyard 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
<b>Total</b>					<b>18445.50</b>
<b>Say</b>					<b>18500.00</b>

8	Maintenance cost 2 <sup>nd</sup> year			L.S.	1000.00
	For next 5 years i.e. , ` 1000 x 5				5000.00
<b>Total</b>					<b>24500.00</b>
<b>Say `</b>					<b>24500.00</b>

**Table. 15. Estimate of Agro- Forestry/ Afforestation**

<b>Plantation Model</b>						
<b>Cost statement of 1 Ha. Of activities of Plantation for 1st year (wage rate Rs. 94.13/-)</b>						
<b>Sr. No.</b>	<b>Item of work</b>	<b>Unit</b>	<b>Qty.</b>	<b>SOR</b>	<b>Man days</b>	<b>Cost</b>
<b>B</b>	<b>Nursery</b>					
i	Raising of Plants in nursery	Nos.	660	18	5601.00	<b>11880.00</b>
<b>C</b>	<b>Carriage</b>					
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
					<b>Total</b>	<b>1523.63</b>

<b>D</b>	<b>Planting</b>					
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
					<b>Total</b>	<b>2947.31</b>

<b>E</b>	<b>Cultural operations &amp; chemical treatment</b>					
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
					<b>Total</b>	<b>1741.40</b>

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

<b>G. Total =</b>		<b>18767.34</b>
<b>or Say =</b>		<b>18767.00</b>



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 grain storage, food processing and value addition techniques are not prevalent.

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

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

- The application of fertilizers on soil test basis and minimum use of chemicals for weed and disease control shall be promoted.
- Farmers would be linked to farm advisory services and Krishi Vigyan Kendras.
- The concept of precision farming and non-monetary inputs shall be introduced.
- Agro-forestry with integration of trees like Eucalyptus, 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 537 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.
- Proper planning for raising filler plants like Papaya, pomegranate and shade loving crop like turmeric.
- 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 and parthenium, the most obnoxious weeds have invaded such area.

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

- Planting of improved cultivars of Eucalyptus and Neem in the project both as single rows on field bunds and also as blocks.

### **7.3.5 Livestock Improvement Including Fodder Production**

Livestock rearing is the most important subsidiary occupation of the project villagers. In addition to selling milk for regular daily income, farm yard manure is most needed to maintain fertility and moisture retention of soils. Even landless families also maintain few numbers of animals. The animal breed improvement work was initiated in these villages under 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.
- Raising of protein rich fodder plants by promoting Napier Bajra Hybrid and Leucaena hedge rows on field bunds.

### **7.3.6 Marketing Arrangements and Proposal for Improvement**

There is no organized system of marketing although market surplus is limited. The marketing of Wheat, 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, fruits and milk though there are source of income with many families.

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

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

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

### 7.3.7 Detail of production system to be promoted

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

**Table 16. 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 55 farmers of each micro watershed/year @ Rs.200/ kit as assistance is provided.	5	275(farmers)	1375 (mini kits)	200 per mini kits	275000
	Agriculture	Application of farm inputs like Zinc Sulphate or Sulphur or weedicides or pesticides. 55 farmer of each micro watershed/ year @ Rs.200/ kits as assistance is provided.	5	275(farmers)	1375 (mini kits)	200 per mini kits	275000
	Agriculture	Supplying of Agriculture implements – 20 farmers (average) per micro watershed @ Rs. 1000/ units as	5	100(farmers)	500	1000	500000

S. No.	Particulars	Contents	No. of micro watersheds	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
		assistance is provided.					
	Agriculture	Agro Forestry: Eucalyptus/ neem on 50% subsidy @ Rs. 10/ plant as assistance is provided.	5	4000(plants)	20000 plants	Rs. 10 per plant	200000
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)	5	400 plants	2000 plants	Rs.40 per plant	80000
	Horticulture	Kitchen gardening Packets distributed to 100 farmers in each micro watershed/ year @ Rs.25/ packet.	5	500	2500	Rs. 25 Per packet	62500
	Horticulture	Three units of Bee keeping in each micro watershed @ 3000/ unit as assistance are provided.	5	15	75	3000	225000
	Horticulture	Two units of Vermi compost in each micro watershed per year @ Rs. 10000 per unit as assistance is provided.	5	10	50	10000	500000
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 55 farmers of each micro watershed/year @ Rs.225 has been provided.	5	275	1375	225	309375
	Animal	Livestock Management supply of feed	5	275	1375	225	309375

S. No.	Particulars	Contents	No. of micro watersheds	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
	Husbandry	supplements to improve health of cattle's. The provision to benefit 55 farmers of each micro watershed/year @ Rs.225 has been kept in the project proposals.					
	Animal Husbandry	Supply of mini- kits of high yielding variety green fodder seeds to 15 farmers in each micro watershed/year @ Rs.200/- mini kits.	5	75(farmers)	375 Seeds of mini kit	200 per mini kit of seeds	75000
4	Joint camps with Line Departments	Two training camps to beneficiaries on Proven technology in agriculture are provided (during pre kharif and rabi season).	5	10	50	20000	100000 0
		Contingency					28750

**Total: Rs. 3840000/-**

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



Under Agro forestry, tree species commonly planted are eucalyptus and 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 17: Model/ Estimate for a Vermin Compost Unit**

<b>Sr. No</b>	<b>Component</b>	<b>Expenditure to be incurred</b>
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/-
	<b>Total</b>	<b>60000/-</b>

## **Components of Vermin Compost Unit**

### **1. Shed**

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

### **2. Vermin- beds**

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

### **3. Land**

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

### **4. Seed Stock**

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

### **5. Machinery**

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

LIVELIHOOD ACTIVITIES FOR THE ASSET LESS PERSONS-9%

#### **7.4 LIVELIHOOD SUPPORT TO SHG'S**

The key issue of inclusion of this chapter is that about 80% of the population in the proposed villages depends on agriculture and allied activities, but it rarely provides sufficient means of survival to small and marginal farmers. During the base line survey, this aspect was discussed with the existing Self Help Group/ Gram Sabha members. The representative of WAPCOS, Sociologist of the team held comprehensive discussions on the possibilities of livelihood in the rainfed areas. The main objectives of these discussions were:

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

SHGs would be imparted Skill Training on identified Economic Activities and it is proposed to impart them trainings at Krishi Vigyan Kender (CCSHAU) Bhiwani and Haryana Institute of Rural Development, Nilokheri. Agriculture University, Hisar, Central Soil and Water Research and Training Institute, Chandigarh and HIRD, Nilokheri. It is proposed to lend revolving fund of Rs. 25000/- to each SHG/individual formed in the watershed villages. Since the members from SHGs/landless are very poor, they do not have resources to start micro enterprises, it is envisaged that they should be assisted and given loan of this amount in the shape of Revolving Fund Assistance (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. Carpet making
11. Household wiring, Motor winding
12. Backyard poultry
13. Floriculture

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

**Table 18. Revolving Fund Assistance for SHGs**

<b>S. No.</b>	<b>Name of micro watersheds</b>	<b>Total SHGs</b>	<b>Amount of Training per SHG</b>	<b>Total</b>
1	Sanwar	1	25000	25000
2	Jaitshree	1	25000	25000
3	Jhinjher A	1	25000	25000
4	Jhinjher B	1	25000	25000
5	Kohlawas	1	25000	25000
	<b>Total</b>	<b>5</b>		<b>125000</b>

**Table 19. Skill Trainings/Skill up gradation for SHGs**

<b>S. No.</b>	<b>Name of micro watersheds</b>	<b>Total SHGs</b>	<b>Amount of Training per SHG</b>	<b>Total</b>
1	Sanwar	1	35000	35000
2	Jaitshree	1	35000	35000
3	Jhinjher A	1	35000	35000

4	Jhinjher B	1	35000	35000
5	Kohlawas	1	35000	35000
	<b>Total</b>	<b>5</b>		<b>175000</b>

**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 20. Computer Training (6 months) for unemployed youth above 12<sup>th</sup> passed male and female both recommended by Watershed Development Committee**

S. No.	Name of micro watersheds	No. of Persons in micro watershed	Amount of Training per trainee for 6 month	Total
1	Sanwar	25	10000	250000
2	Jaitshree	15	10000	150000
3	Jhinjher A	15	10000	150000
4	Jhinjher B	15	10000	150000
5	Kohlawas	20	10000	200000
	<b>Total</b>	<b>90</b>		<b>900000</b>

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

= 900000- 90000

= 810000/-

**Table 21. One time assistance as Revolving Fund to unemployed youth who have successfully completed Computer Training for setting up a computer centre**

<b>S. No.</b>	<b>Name of micro watersheds</b>	<b>No. of Persons in micro watershed</b>	<b>Amount of Training per Trainee</b>	<b>Total</b>
1	Sanwar	25	20000	500000
2	Jaitshree	15	20000	300000
3	Jhinjher A	15	20000	300000
4	Jhinjher B	15	20000	300000
5	Kohlawas	20	20000	400000
	<b>Total</b>	<b>90</b>		<b>1800000</b>

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. 1800000 @ 10% cost sharing.

= 1800000- 180000

= 1620000/-

**Table 22. Cutting and Tailoring Centre for female beneficiaries**



S. No.	Name of micro watersheds	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	Sanwar	1	2	2000	6	12000
2	Jaitshree	1	2	2000	6	12000
3	Jhinjher A	1	2	2000	6	12000
4	Jhinjher B	1	2	2000	6	12000
5	Kohlawas	1	2	2000	6	12000
	<b>Total</b>	<b>5</b>	<b>10</b>			<b>60000</b>

Total cost for 5 Centres

1. Payment to trainers 60000/-

2. Sewing Machine Cost 25000/- (lump sum)

**Table 23. Embroidery Centre for female beneficiaries**

S. No.	Name of micro watersheds	No. of centers	Payment to Trainer per Month	Period months	Payment to trainer for 6 months @ Rs. 2000	Total trainers	Grand Total
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					p.m		
1	Sanwar	1	2000	6	12000	1	12000
2	Jaitshree	1	2000	6	12000	1	12000
3	Jhinjher A	1	2000	6	12000	1	12000
4	Jhinjher B	1	2000	6	12000	1	12000
5	Kohlawas	1	2000	6	12000	1	12000
	<b>Total</b>	<b>5</b>					<b>60000</b>

Total Cost:

Payment to trainer: Rs.60000/-

**Table 24. Livelihood Support**

S. No.	Name of micro watersheds	No. of villages	Revolving fund assistance to individuals unemployed youth/ landless, women	
			Dairy Unit	Vermi Compost, Bee Keeping, Mushroom Cultivation etc.
1	Sanwar	1	3	3
2	Jaitshree	1	3	3
3	Jhinjher A+B	1	6	6
4	Kohlawas	1	3	3

	<b>Total</b>	<b>4</b>	<b>15</b>	<b>15</b>
	<b>Rate (Rs)</b>		<b>25000</b>	<b>10000</b>
	<b>Cost (Lakh Rs)</b>		<b>3.75</b>	<b>1.50</b>

Contingency, printing material and other unseen items: Rs. 56000/-

**Total funds available under this component are Rs. 3456000/-**

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), Bhiwani

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. 25)

#### Detail of Convergence of IWMP and other schemes

Table 25. 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	Sanwar	74.67	73.65	1.02	1.02
2	Jaishree	19.25	16.80	2.45	2.45
3	Jhinjher A+B	80.61	78.22	2.39	2.39
4	Kohlawas	49.46	46.37	3.09	3.09
	<b>Total</b>	<b>223.99</b>	<b>215.04</b>	<b>8.95</b>	<b>8.95</b>

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

### 7.5.2 Non-Negotiable for works executed under MGNREGA

- Only Job Card holders to be employed for MGNREGA component.

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

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

#### **7.5.3 Convergence with Forest Department**

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

#### **7.5.4 Convergence with Horticulture Department**

National Horticulture Mission is implementing the horticulture development programme which includes construction of water harvesting structures, drip and sprinkler irrigation activities which would be undertaken in convergence with the horticulture department. Under this activity 22 ha horticulture development programme with the financial assistance of Rs. 5.5 lakh has been provided in the project proposals. This would also be undertaken by convergence with the horticulture department.

#### **7.5.5 Convergence with Agriculture Department**

The activities under NRM like Renovation/new village pond, Ramp/Inlet and outlet, Roof top rainwater harvesting structures, Earthen Embankment with pucca outlet, Small Earthen Embankment with vegetative Support, Community Water Storage Tank, UGPL, Water conveyance system, Drain 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 under progress and post project. The satellite imageries are also helpful in monitoring all activities of the watershed area (Pre project, during project and post project). All the details relating to Watershed Activities would be available on website. The system is very useful to know the progress of the project at the click of the button. The higher officials would be able to monitor the progress and could generate the desired reports. The system would also help beneficiaries to know the area of importance, already treated area/ area to be treated. The system would serve an aiding tool to the planners and evaluators for judging the efficacy of the project.

#### **8.1.2 Monitoring**

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

1. Internal Monitoring by PIA/ WCDC
2. Progress and Process monitoring
3. GIS/ On line Monitoring

4. Sustainability monitoring
5. Self Monitoring by communities
6. Social Audits
7. Independent and external monitoring

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

**Table 1. Micro Watershed wise details**

<b>S.no.</b>	<b>Name of the Micro Watersheds</b>	<b>Effective Area</b>	<b>Total Cost</b>	<b>Monitoring 1%</b>
1	Sanwar	796	9552000	95520
2	Jaitshree	550	6600000	66000
3	Jhinjher A	580	6960000	69600
4	Jhinjher B	584	7008000	70080
5	Kohlawas	690	8280000	82800

## **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**

<b>S. no.</b>	<b>Name of the Micro Watersheds</b>	<b>Effective Area</b>	<b>Total Cost</b>	<b>Evaluation 1%</b>
1	Sanwar	796	9552000	95520
2	Jaitshree	550	6600000	66000
3	Jhinjher A	580	6960000	69600
4	Jhinjher B	584	7008000	70080
5	Kohlawas	690	8280000	82800

CONSOLIDATION PHASE- 3 %

Consolidation Phase = Rs. 11, 52,000 /-

### **8.3 CONSOLIDATION PHASE**

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

- I. Managing/upgrading of all activities taken up under the Project.
- II. Preparation of Project completion report and
- III. Documentation of success stories
- IV. Management of proper utilization of WDF
- V. Mechanism for Quality and sustainability issues under the Project.
- VI. Mechanism for fixation and collection of User Charges.
- VII. Consolidation of works
- VIII. Building the capacity of community based organizations to carry out the new agenda – post project period.
- IX. Intensification of farm production systems/off farm livelihoods
- X. Project Management related aspects

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

**Name of Micro watershed: Sanwar**

**Table 3. Consolidated Phase**

<b>S. No.</b>	<b>Type of activity</b>	<b>Amount earmarked</b>
1	Managing/ upgrading of all activities taken up under the project	0.57
2	Preparation of Project completion report	0.15
3	Documentation of success stories	0.14
4	Management of proper utilization of WDF	0.43
5	Mechanism for quality and sustainability issues under the Project	0.14
6	Watershed activities	1.44

**Total: 2.87 lacs**

**Name of Micro watershed: Jaitshree**

**Table 4. Consolidated Phase**

<b>S. No.</b>	<b>Type of activity</b>	<b>Amount earmarked</b>
1	Managing/ upgrading of all activities taken up under the project	0.40
2	Preparation of Project completion report	0.10
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.30
5	Mechanism for quality and sustainability issues under the Project	0.10
6	Watershed activities	0.99

**Total: 1.98 lacs**

**Name of Micro watershed: Jhinjher A**

**Table 5. Consolidated Phase**

<b>S. No.</b>	<b>Type of activity</b>	<b>Amount earmarked</b>
1	Managing/ upgrading of all activities taken up under the project	0.42
2	Preparation of Project completion report	0.10
3	Documentation of success stories	0.10

4	Management of proper utilization of WDF	0.32
5	Mechanism for quality and sustainability issues under the Project	0.10
6	Watershed activities	1.05

**Total: 2.09 lacs**

**Name of Micro watershed: Jhinjher B**

**Table 6. Consolidated Phase**

<b>S. No.</b>	<b>Type of activity</b>	<b>Amount earmarked</b>
1	Managing/ upgrading of all activities taken up under the project	0.42
2	Preparation of Project completion report	0.11
3	Documentation of success stories	0.10
4	Management of proper utilization of WDF	0.32
5	Mechanism for quality and sustainability issues under the Project	0.10
6	Watershed activities	1.05

**Total: 2.10 lacs**

**Name of Micro watershed: Kohlawas**

**Table 7. Consolidated Phase**



<b>S. No</b>	<b>Type of activity</b>	<b>Amount earmarked</b>
1	Managing/ upgrading of all activities taken up under the project	0.50
2	Preparation of Project completion report	0.13
3	Documentation of success stories	0.12
4	Management of proper utilization of WDF	0.37
5	Mechanism for quality and sustainability issues under the Project	0.12
6	Watershed activities	1.24

**Total: 2.48 lacs**

**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 3200 ha and the Project Cost is 384.00 lacs covering 5 no. micro watersheds and in all 4 villages. Benefits will be much more than the project cost as detailed below:

With the several interventions under IWMP VI project such as Livelihood support, Farm production system, various types of activities relating to soil conservation measures for diversification of crops, Protection to field by constructing the structures etc, it is expected that these Watershed villages 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 Sanwar Watershed-VI will prove to be very beneficial in improving socio – economic status of people residing in Project villages.

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

### 9.1 EMPLOYMENT

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

**Table 1. Expected Employment Generation in the Project area**

S. No.	Name of micro watershed/ villages	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	Sanwar	847	10937	11784	198	728	926	11	-	-	11
2	Jaishree	56	2632	2688	17	52	69	-	-	11	11
3	Jhinjher A+B	279	12451	12730	87	467	554	-	11	11	22

4	Kohlawas	354	7065	7419	108	125	233	11	-	-	11
	<b>Total</b>	<b>34621</b>	<b>1536</b>	<b>33085</b>	<b>410</b>	<b>1372</b>	<b>1782</b>	<b>22</b>	<b>11</b>	<b>22</b>	<b>55</b>

33085 man days would be generated with the implementation of the project in Sanwar Watershed (IWMP VI), which means 827 person for 200 days per year would be employed for the period of five years. In addition to this cropped area/ productivity would be increased and will also generate employment.

## 9.2 MIGRATION PATTERN

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

S. No	Name of micro watersheds/ villages	No. of persons migrating		No. of days per year of migration		Comments
		Pre Project	Expected post project	Pre Project	Expected post project	
1	Sanwar	--	--	--	--	--
2	Jaishree	--	--	--	--	--
3	Jhinjher A+B	--	--	--	--	--
4	Kohlawas	--	--	--	--	--

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

### 9.3 GROUND WATER TABLE (Drinking Water)

The Drinking Water supply is managed by Public health Department through canal network and farmer had also installed the Shallow Tube well which are located along the canal network/ water bodies. The most of the area is underlain by marginal to brackish water quality. The marginal ground water is exploited in the area and the area falls in critical category.

**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	Sanwar	Open Well	2.80	Techniques will be introduced to check the further rise in water table (conjunctive use and bio-drainage)
2	Jaishree	Open Well	2.60	
3	Jhinjher A+B	Open Well	3.40	
4	Kohlawas	Open Well	4.10	

**Source:** Ground Water Cell, Haryana

### 9.4 CROPS

Agriculture primary depends upon water, but this is availability of this is lacking without existence of canal network and deeper ground water conditions. All this can change with the integrated land and water management during the watershed project. The planned percolation tanks, sub surface dam etc. can preserve sub moisture in the soil. This will help in additional area coming under cultivation and increasing productivity too. The crop yield pre project and expected and post project is presented in table 4.

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

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		
Sanwar	Wheat	174	4266	742284	100.21	191	4394	841007.772	113.54
	Mustered	265	1797	476205	142.86	297	1887	560017.08	168.01
	Bajra	284	1337	379708	47.46	315	1390	438334.915	54.79
Jaishree	Wheat	142	4066	577372	77.95	156	4188	654162.476	88.31
	Mustered	201	1787	359187	107.76	225	1876	422403.912	126.72
	Bajra	201	1338	268938	33.62	223	1392	310462.027	38.81
Jhinjher A+B	Wheat	216	4158	898128	121.25	238	4283	1017579.02	137.37

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		
	Mustered	358	1797	643326	193.00	401	1887	756551.376	226.97
	Bajra	256	1313	336128	42.02	284	1366	388026.163	48.50
Kohlawas	Wheat	167	4166	695722	93.92	184	4291	788253.026	106.41
	Mustered	231	1792	413952	124.19	259	1882	486807.552	146.04
	Bajra	205	1337	274085	34.26	228	1390	316403.724	39.55
<b>Total</b>		<b>2700</b>				<b>3001</b>			

Source: Revenue Department and Department of Agriculture, Bhiwani (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	Sanwar	3	8	11
2	Jaishree	2	4	6
3	Jhinjher A+B	2	5	7
4	Kohlawas	3	5	8
	<b>Total</b>	<b>10</b>	<b>22</b>	<b>32</b>

## 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	Sanwar	12	20	32
2	Jaishree	13	20	33
3	Jhinjher A+B	8	25	33



4	Kohlawas	7	15	22
	<b>Total</b>	<b>40</b>	<b>80</b>	<b>120</b>

## 9.7 LIVESTOCK

Table 7. Details of livestock in the project area

S. No.	Name of micro watershed	Type of Animals	Pre project			Post project			Remarks
			No.	Yield Kg/ day	Income In Rs per day	No.	Yield Kg/ day	Income In Rs per day	
1	Sanwar	Buffalo	1794	10- 11	400- 440	2063	12- 14	425- 467	Increase in milk yield and number of animals by approx. 15%
		Cow	377	7-8	224- 256	433	9- 11	245- 280	Increase in milk yield and number of animals by approx. 15%
2	Jaishree	Buffalo	187	11- 12	440- 480	215	13- 15	467- 510	Increase in milk yield and number of animals by approx. 15%
		Cow	16	7-8	224- 256	18	9- 11	245- 280	Increase in milk yield and number of animals by approx. 15%
3	Jhinjher A+B	Buffalo	1632	14- 15	560- 600	1876	16- 17	595- 637	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	
		Cow	244	8-9	256- 288	280	10- 11	280- 315	Increase in milk yield and number of animals by approx. 15%
4	Kohlawas	Buffalo	323	9- 10	360- 400	371	11- 12	382- 425	Increase in milk yield and number of animals by approx. 15%
		Cow	35	7- 8	224- 256	40	9- 11	245- 280	Increase in milk yield and number of animals by approx. 15%

## 9.8 LINKAGES

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

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

**Table No. 8: Backward-Forward Linkages**

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

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

			Minerals Deficit	to organize camps in watershed area	feeds Would be promoted
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### 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	<ul style="list-style-type: none"> <li>Watershed Committee each village</li> <li>Number of user groups depending on the coverage of particular intervention</li> </ul>	Project can be implemented and managed in a democratic and Participatory way ensuring equity and transparency.	<ul style="list-style-type: none"> <li>Unity and prosperity in the village management.</li> <li>People's Participation and positive perception towards the programme.</li> </ul>
Strengthening Village operations	<ul style="list-style-type: none"> <li>Organizing training and awareness programme for village institutions (I.E.C. Activities).</li> <li>Capacity Building workshops and exposure visits</li> </ul>	<ul style="list-style-type: none"> <li>Awareness camps to be organized</li> <li>Trainings and exposure visits UGs and WCs to be held Capacity building workshops to be organized one.</li> <li>Federations of UGs and WC to be formed.</li> </ul>	<ul style="list-style-type: none"> <li>Quality of management of common resources improved.</li> <li>Quality of distribution of benefits between people improved.</li> <li>Increased awareness amongst women about village resources</li> </ul>	

Components	Activities	Outputs	Effect	Impact
	<p>for User Group and Watershed Community</p> <ul style="list-style-type: none"> <li>• Facilitating and monitoring the functioning of UGs and WCs</li> <li>Strengthen linkages between UGs and WCs and Panchayat Institutions</li> <li>• Gender sensitization of UGs and WCs to increase inclusiveness of Samuh (Joint) decision making.</li> <li>• Sensitize Village communities to involve children and youth in development</li> </ul>		<ul style="list-style-type: none"> <li>• Women participation enhanced in decision-making of GVCs.</li> <li>• Involvement of youth and children in village development.</li> </ul>	

Components	Activities	Outputs	Effect	Impact
Fund Management	<ul style="list-style-type: none"> <li>• Improve management and utilization of UGs and WCs</li> <li>• Prepare communities to explore other sources of income for UGs and WCs.</li> </ul>	UGs and WCs operating bank account and managing resources on their own.	<ul style="list-style-type: none"> <li>• Purpose, frequency and volume of use of the fund enhanced</li> <li>• Volume of funds generated for UGs and WCs from other sources of income increased</li> </ul>	
Ecological restoration	<ul style="list-style-type: none"> <li>• Protection, Treatment and regeneration of common and private lands.</li> <li>• Protection, treatment and regeneration of forest lands.</li> <li>• Plantation of fruits and forest species.</li> <li>• Input trainings, conduct meetings and organize exposure visits</li> </ul>	<ul style="list-style-type: none"> <li>• Common and private lands to be brought under new plantations and agro-horti- forestry like Neem, Adussa, prosopis, Banyan and Peepul.</li> <li>• Forest lands to be brought under new plantations and protection.</li> <li>• Trainings, exposure visits and meetings to be organized for communities, village volunteers and staff.</li> </ul>	<ul style="list-style-type: none"> <li>• Fodder availability from common and private land increased.</li> <li>• Accessibility to common and forest lands increased with removal of encroachments and resolution of conflicts</li> </ul>	<ul style="list-style-type: none"> <li>• Better Ecological order in the area.</li> <li>• Increase in the proportion of households having more security of fodder.</li> <li>• Reduction in drudgery of fodder and fuel collection, especially women</li> </ul>

Components	Activities	Outputs	Effect	Impact
	<p>for communities, village volunteers and staff to effectively plan, execute and monitor activities.</p> <ul style="list-style-type: none"> <li>• Identification and promotion of non-timber forest produce based income generation activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Income generation intervention promoted</li> </ul>		
Rainfed Area Development	<ul style="list-style-type: none"> <li>• Treatment of land through improved soil and moisture conservation practices on watershed basis.</li> <li>• Promotion of good agricultural</li> </ul>	<ul style="list-style-type: none"> <li>• Land to be brought under improved soil moisture conservation practices.</li> <li>• Good agricultural practices to be promoted.</li> <li>• Organic farming to be promoted. Fodder banks to be</li> </ul>	<ul style="list-style-type: none"> <li>• Improved productivity of treated land.</li> <li>• Increased availability of water in cells.</li> <li>• Increase in annual agricultural production.</li> <li>• Farmers adopt organic farming</li> </ul>	<p>Increase in proportion of households having more security of food Increase in contribution of agricultural income to the household income</p>



Components	Activities	Outputs	Effect	Impact
	<p>practices- horticulture, improved crop and vegetable.</p> <ul style="list-style-type: none"> <li>• Promotion of organic farming practices.</li> <li>• Formation of Fodder banks to increase fodder security and promote dairy development among communities.</li> <li>• Identification and promotion of agri-produce based income generation activities like grading, processing and packaging.</li> <li>• Promotion of better irrigation practices like</li> </ul>	<p>established.</p> <ul style="list-style-type: none"> <li>• Agriculture based livelihood income generation activities to be promoted</li> <li>• Water harvesting structures to be constructed.</li> <li>• Drip irrigation facilities to be distributed among farmers.</li> <li>• Approx 15000 person days of employment to be generated.</li> <li>• Trainings, exposure visits and meetings to be organized for communities, village volunteers.</li> </ul>	<p>practices.</p> <ul style="list-style-type: none"> <li>• Fodder security of farmers enhanced.</li> <li>• Increased availability of water for 9 to12 months.</li> <li>• Increased availability of water for livestock</li> <li>• Increase in agricultural productivity of land.</li> <li>• Augmentation of drinking water supply.</li> </ul>	

Components	Activities	Outputs	Effect	Impact
	drip irrigation <ul style="list-style-type: none"> <li>• Impart trainings, conduct meetings and organize exposure visits of communities.</li> </ul>			
Women's socio-political and economic empowerment	<ul style="list-style-type: none"> <li>• Formation and strengthening of women' SHG groups</li> <li>• Capacity building of women folk.</li> <li>• Capacity building of SHG leaders and accountants</li> </ul> Linking SHGs with external financial institutions	<ul style="list-style-type: none"> <li>• Women's SHG groups to be formed.</li> <li>• Federation of Women's SHGs to be formed.</li> <li>• Trainings to be conducted for preparation of woolen products from sheep and goats</li> </ul>	<ul style="list-style-type: none"> <li>• Enhanced capacities of leaders of women's group in taking initiatives to solve problems at different levels.</li> <li>• Improved access to credit for livelihood purposes Increased household income.</li> </ul>	<ul style="list-style-type: none"> <li>• Position of women in household, community, society (politically, socially and economically) as perceived by women and community at large.</li> <li>• Performance enhancement of SHGs in terms of participation, decision-making, leadership and fund management.</li> <li>• Equality and equity in gender relations at home (decision making, expenditure, children's education,</li> </ul>

Components	Activities	Outputs	Effect	Impact
				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.