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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 V) 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 three micro- watersheds Kaliyana (6D1E7b4), Birhi Kalan (6D1E7a6) and Kheri Batter (6D1E7a4). 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 V) of 3 micro watersheds namely Kaliyana (6D1E7b4), Birhi Kalan (6D1E7a6) and Kheri Batter (6D1E7a4) with their respective codes.

1.1.2 Base Line Survey

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

1.1.3 Collection of Primary Data

Though the project was sanctioned in September, 2011 the preparatory phase started in 2012. Initially, a meeting was arranged with officials of concerned departments and technical experts located at Kaliyana, Birhi Kalan and Kheri Batter 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, slope, 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 meeting were organized at common places and problem and possible solution were debated, discussed and efforts were made to reach agreement on activities required under the projects. This was followed by transect walks across the entire area of the village and spots indicated by the community. The Technical possibilities were discussed and measurements were recorded for jointly agreed activities. Similarly, discussions were held about entry point activities and items of work were finalized keeping in view the availability of funds in the project. Through discussions were held on production activities and innovative techniques of improving crop, fruit and milk production. The women groups were sensitized about income generating activities and skill improvement by various types of trainings. The department field staff facilitated the process of participation at the planning stage. The department officials simultaneously stated the process of forming watershed committees for each village. The roles and responsibilities of all stake holders as per guidelines, the mechanism of fund flows, cost sharing arrangement in different components and operational mechanism of the projects was thoroughly discussed with the community and Watershed Committees (WC) in detail.

1.2.1 Participatory Net Planning

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

Based on the experience of the experts working in the area and catchment area characteristics each structures like 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, Water conveyance system, Silt detention dam, Drain etc. were recommended to conserve and store water used for life saving additional irrigation potential in the rainfed area and to avoid further degradation of the land.

1.2.2 Community Participants in Social Mapping

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

1.2.3 Transect Walk

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



Transect walk

1.2.4 Focus Group Discussions

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



Gram Sabha member's participation in group discussion

1.3 USE OF GIS TECHNOLOGY FOR PLANNING

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

Various maps were prepared such as Base map, Present Land Use, Geo-hydrological, Micro Watershed, Drainage, Contours, Slope, Soil Classification, Land Capability Classification, Soil Fertility, Ground Water Depth and Quality, Proposed activities of works. Micro-watershed wise maps 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, Soil fertility. 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, Water conveyance system, Silt detention dam, 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

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

S.No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	2. Micro- Watershed Boundary	Yes
	3. Drainage pattern	Yes
	4. Soil (soil fertility status)	Yes
	5. Land use	Yes
	6. Ground water status	Yes
B	Inputs	-
	Bio pesticides	Yes
	Organic manure	Yes
	Vermi- compost	Yes
	Bio Fertilizer	Yes
	Water saving devices	Yes
	Mechanical tools	Yes
	Bio fencing	No
	Nutrient Budgeting	No

S.No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	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- V) project is falls in Dadri II block of Bhiwani district in Haryana state. The project is a cluster of three micro- watersheds namely Kaliyana (6D1E7b4), Birhi Kalan (6D1E7a6) and Kheri Batter (6D1E7a4). The total geographical area of the project is **3721 ha** out of which **3047 ha** has been undertaken to be treated under IWMP V starting from year 2011-2012. The project is divided into three 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 / Villages	Code No.	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
1	Kaliyana Watershed (IWMP V)	Kaliyana (part)	6D1E7b4	Dadri II	Bhiwani	1366	1115	133.80	ASCO Dadri
2	Kaliyana Watershed (IWMP V)	Kheri Batter	6D1E7a4	Dadri II	Bhiwani	1006	915	109.80	ASCO Dadri

3	Kaliyana Watershed (IWMP V)	Birhi Kalan	6D1E7a6	Dadri II	Bhiwani	1349	1017	122.04	ASCO Dadri
				Grand Total		3721	3047	365.64	

2.2 NEED OF WATERSHED DEVELOPMENT PROGRAMME

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

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

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

Table 2. Criteria and Weightage for Selection of Watershed

S. No.	Criteria	Maximum Score	Ranges and Scores			
i.	Poverty index (% of poor to population)	10	Above 80 % (10)	80 to 50 % (7.5)	50 to 20 % (5)	Below 20% (2.5)
ii.	% of SC/ST population	10	More than 40 % (10)	20 to 40 % (5)	Less than 20% (3)	
iii.	Actual wages	5	Actual wages are significantly lower than minimum wages (5)	Actual wages are equal to or higher than minimum wages (0)		
iv.	% of small and marginal farmers	10	More than 80 % (10)	50 to 80 % (5)	Less than 50% (3)	
v.	Ground water status	5	Over exploited (5)	Critical (3)	Sub Critical (2)	Safe (0)
vi.	Moisture index/ DPAP/DDP block	15	-66.7 & below (15) DDP block	-33.3 to -66.6 (10) DPAP Block	0 to -33.2 (0) Non DPAP/DDP Block	
vii.	Area under rainfed agriculture	15	More than 90 % (15)	80 to 90 % (10)	70 to 80 % (5)	Below 70 % (Reject)
viii.	Drinking water	10	No source (10)	Problematic village (7.5)	Partially covered (5)	Fully covered(0)
ix.	Degraded land	15	High-above 20 % (15)	Medium-10 to 20 % (10)	Low-less than 10 % of TGA (5)	

S. No.	Criteria	Maximum Score	Ranges and Scores			
x	Productivity potential of the land	15	Lands with low production & where productivity can be significantly enhanced with reasonable efforts (15)	Lands with moderate production & where productivity can be enhanced with reasonable efforts (10)	Lands with high production & where productivity can be marginally enhanced with reasonable efforts (5)	
xi	Contiguity to another watershed that has already been developed/treated	10	Contiguous to previously treated watershed & contiguity within the micro-watersheds in the project (10)	Contiguity within the micro-watersheds in the project but non contiguous to previously treated watershed (5)	Neither contiguous to previously treated watershed nor contiguity within the micro-watersheds in the project (0)	
xii	Cluster approach in the plains (More than one contiguous micro-watersheds in the project)	15	Above 6 micro-watersheds in cluster (15)	4 to 6 micro-watersheds in cluster (10)	2 to 4 micro-watersheds in cluster (5)	
xiii	Cluster approach in the hilly tract (More than one contiguous micro-watersheds in	15	Above 5 micro-watersheds in cluster (15)	3 to 5 micro-watersheds in cluster (10)	2 to 3 micro-watersheds in cluster (5)	

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

Based on above criteria and weightage of 93 concerning these thirteen parameters, a composite ranking was given to Kaliyana Watershed (IWMP V) 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. Rainfed agriculture is more and more than 70 percent and more than 50 % farmers are small and marginal. So the scoring is done 10. So accordingly, scoring was done like project area comes under Arravali range, semi arid to arid and dune topography along hillocks of Dadri II block district Bhiwani of Haryana and has no assured irrigation facility, erratic rainfall, deep, poor quality and less ground water discharge, hence the ground water status score is 5. The percentage of 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 7.5. More than 60 percent of the farmers are small and marginal in 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 93.

Table- 3: Weightage of the Project

1	2	3	4	5	6	7	8	9
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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	Kaliyana Watershed (IWMP V)	3	3721	3047	others	365.64	7.5	5	0	10	3	15	5	7.5	10	10	10	10	0	93

Table 4: Watershed Information

Name of the Project	No. of Micro-Watersheds to be Treated	Watershed codes	Watershed regime/type/order
Kaliyana Watershed (IWMP V)	3	6D1E7b4, 6D1E7a4, 6D1E7a6	others

2.3 OTHER ONGOING DEVELOPMENT PROJECTS / SCHEMES IN THE PROJECT VILLAGES

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

Table 5. Ongoing Developmental Programs in the Project Area

S. No.	Name of the Program /Project	Name of Micro watersheds	Sponsoring agency	Objective	Estimated number of beneficiaries for year 2013-14 (Job card issued)
1	MGNREGA	Kaliyana (part)	DRDA, Bhiwani	To provide assured employment of 100 days in a year to unskilled labour and development of village.	43
2	MGNREGA	Kheri Batter	DRDA, Bhiwani	To provide assured employment of 100 days in a year to unskilled labour and development of village.	36
3	MGNREGA	Birhi Kalan	DRDA, Bhiwani	To provide assured employment of 100 days in a year to unskilled labour and development of village.	69

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)

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

CHAPTER – 3

BASIC INFORMATION OF THE PROJECT AREA

GEOGRAPHY AND GEOHYDROLOGY

The Kaliyana Watershed (IWMP V) falls in Dadri II Block of District Bhiwani. Physiographically the area consists of flat and nearly level to gentle interrupted from place to place by sand dunes along the hill side slopes. The area of watershed lies in between 28°31'16" to 28°37'48" N Latitude & 76°07'35" to 76°13'05" east longitude with general elevation varies between 217-425 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. Dohan Basin is the only ephemeral stream of the area and flows in direct response of precipitation. Only the tail of this ephemeral stream falls in the southern corner of the project area and ultimately merges in the sand dunes around the project area. 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 Kaliyana Watershed (IWMP V)

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	Kaliyana (part) (6D1E7b4)	1366	1115	895	644	122	349
2	Kheri Batter (6D1E7a4)	1006	915	736	645	75	195
3	Birhi Kalan (6D1E7a6)	1349	1017	1147	815	69	133
	Total	3721	3047	2778	2104	266	677

(Source – District Census Handbook, 2001 Bhiwani)

3.2 SOIL AND TOPOGRAPHY

The soils of the Kaliyana Watershed are deep to very deep develop on level to steep slopes, family of sandy to coarse loamy, typic ustipssammant, typic- haplustepts and typic haplocambids. The topography of the area ranges from level to steep slope susceptible to water and wind erosion hazard. The slope ranges from 1 to 15% and above. Most of the area of micro watershed falls under rain fed agriculture land. 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.	Kaliyana (part)	6D1E7b4	1366	Sandy to sandy loam, coarse fragment and rock out crops adjoining foothills.	Level to steep slope
2.	Kheri Batter	6D1E7a4	1006	Sandy to sandy loam, coarse fragment and rock out crops adjoining foothills.	Level to steep slope
3.	Birhi Kalan	6D1E7a6	1349	Sandy to sandy loam	Level to gentle slope
	Total		3721		

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 Period	Drought Incidence Period (from 2002 to 2011)
1	Kaliyana	2008 & 2010	2002, 2006 & 2009
2	Kheri Batter		
3	Birhi Kalan		

(Source: Ground Water Cell and Revenue Department, Bhiwani)

3.3 SOILS

3.3.1 Soil Erosion

In all 3 micro watersheds it is observed that due to light textured soils; the sloping topography at adjoining hills, thin vegetative cover and wind erosion create dune formation. This results in degradation of agricultural land. Deforestation, illegal mining and unscientific

farm management create hostile conditions for sustainable agriculture. Soil erosion in respect of sheet and wind erosion is quite high. Majority of the watershed Community is dependent on agriculture. Agriculture suffers due to area being rain fed and due to insufficient rains in the region, resulting in further deterioration of socio economic conditions of community.

3.3.2 Soil Salinity/Alkalinity

There is moderate salinity in the Project and pH is normal and within the limits of 7.05 to 8.25

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

Table 4. Soil pH and Salinity

Sr. No.	Name of Micro Watersheds	Soil pH	Type of salinity
1.	Kaliyana	7.15- 8.15	Moderate salinity in pockets
2.	Kheri Batter	7.25- 8.25	Moderate salinity in pockets
3.	Birhi Kalan	7.05- 8.00	Moderate salinity in pockets

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- 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- 12 (Dalawas Soil Association)

The Dalawas soil series is only series in this soil association. The soil series is well drained, Sandy loam, Coarse loamy Mixed hyperthermic Paleorthidic Haplustepts. The soil series is violently calcareous, very deep, pH 7.37-8.79, brown to yellowish brown in colour (10YR 4/3- 10YR 4/4) developed on Nearly level to gently sloping plains over Fluvo-aeolian with Few fine lime concretions in B horizon.

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

The Nimriwal soil series is dominated series in this soil association and Sandwa is associated series. The dominant soil series is well drained, Loamy sand to Sandy loam, Coarse loamy Mixed hyperthermic Typic Haplocambids and associate soil series Sandwa is well drained, Loamy sand to Sandy loam, Coarse loamy Mixed hyperthermic Typic Haplocambids. The dominant 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 associate soil series is moderate to violent 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- 14 (Atela- Harita Soil Association)

The Atela soil series is dominated series in this soil association and Harita is associated series. The dominant soil series is moderately drained, Loamy sand to Sand, Sandy Mixed hyperthermic Aridic Ustipsamments and associate soil series Harita is well drained, Loamy sand to Sandy loam, Coarse loamy Mixed hyperthermic Aridic Haplustepts. The dominant soil series is non calcareous, very deep, pH 7.00-7.10, dark yellowish brown in colour (10YR 3.5/4-10YR 4/5) developed on Partially stabilized to stabilized dunes/plains of Fluvio-aeolian origin with Sometimes limes concretions are present and associate soil series is non calcareous, very deep, pH 7.00-7.30, brown in colour (10YR 4/3-10YR 5/3.5) developed on Fluvio-aeolian plain/Interdunal valleys and dunal areas with Few lime concretions (40% by volume) in C horizon.

Soil Mapping Unit- 18 (Bapaura- Mitathal Soil Association)

The Bapaura soil series is dominated series in this soil association and Mitathal is associated series. The dominant soil series is moderately well drained, Sandy loam to Loam to Clay loam to Sandy Clay loam, Fine loamy Mixed hyperthermic Typic Haplustepts and associate soil series Mitathal is well drained, Sandy loam to Sand, Fine loamy Mixed hyperthermic Udic Haplustepts. The dominant soil series is weak to strongly 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 and associate 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.

(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 four 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 formers 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.

Land capability subclass VI es

These soils are deep, gravely/ bouldry light textured soils developed on gently sloping severely eroded lands. The water holding capacity is very poor and the water and wind erosion hazard is moderately severe.

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

1. Specific and special soil conservation measures should be adopted to check water erosion and rill control; soils should be provided permanent vegetation (Agro forestry) cover to check further deterioration of soils.
2. Soils would be suitable for pasture development, agro forestry, water harvesting activity and other major water conservation structures (Water harvesting structure, silt detention dam, percolation tanks, drop structures etc).

Land capability subclass VII es

These soils are shallow to deep, gravely/ bouldry/ rock out crops, light to medium textured soils on gentle to very gentle sloping hillocks. The water holding/ retention are poor to negligible and the water erosion hazard is severe to highly severe.

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

1. Specific and special soil conservation measures should be adopted to check water erosion and gully control; soils should be provided permanent vegetation (Agro forestry) cover to check further deterioration of soils.
2. Soils would be suitable for forestation; recreation activity and other major water conservation structures (Water harvesting structure, percolation embankment etc).
3. Area should be rehabilitate at the sites there mining activities are closed.

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

S. 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
Average		537

(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 South- West to North- East. The general Elevation in the area belongs to old alluvium plains with sand overburden in pockets along foothills to make small hummocks in the area. 217-425 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 6**.

Table 6. Physiography and Relief

Project Name	Elevation (MSL)	Slope Range (%)	Major Streams
Kaliyana Watershed (IWMP V)	217-425 m	1- 15	Dohan Basin

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, Water conveyance system, Silt detention dam, 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

S. No.	Trees	Fruits	Grasses and Shurbs
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

S. No.	Name of micro watersheds/ villages	Total owned land in ha		
		General	OBC/BC	SC
1	Kaliyana	225	371	154
2	Kheri Batter	154	360	36
3	Birhi Kalan	332	563	55

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	Kaliyana	1295	974	851
2	Kheri Batter	736	622	455
3	Birhi Kalan	1147	898	767
	Total	3178	2494	2073

(Source: Department of Agriculture, Haryana)

3.4.3 IRRIGATION

Lack of Assured Irrigation Facilities

The present source of irrigation is ground water where the area is underlain by fresh to marginal water quality and partially (266 ha) by lift canal network. 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.

S. No	Name of Micro Watersheds/ Villages	Source 1: Canal		Source 2: Groundwater (Tube wells)		Total
		Availability months	Net area (ha)	Availability months	Net area (ha)	
1	Kaliyana	July to March	145	July to June	581	726
2	Kheri Batter	July to March	28	July to June	114	142
3	Birhi Kalan	July to March	93	July to June	372	465
	Total		266		1067	1333

(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.	Name of	Rabi crops(Wheat)	(Mustard)	(Gram)
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No.	Micro Watersheds / Village	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	Kaliyana	358	1618518	4521	Yes	224	295680	1320	Yes	45	41760	928
2	Kheri Batter	204	923100	4525	Yes	138	184230	1335	Yes	35	32585	931
3	Birhi Kalan	251	1135022	4522	Yes	325	435825	1341	Yes	48	44880	935
	Total	813				687				128		

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.	Use of fertilizer
1	Kaliyana	374	684046	1829	Yes	168	238728	1421	Nil	66	24750	375	Yes

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.	Use of fertilizer
2	Kheri Batter	431	790885	1835	Yes	77	108185	1405	Nil	22	8822	401	Yes
3	Birhi Kalan	356	651124	1829	Yes	115	163530	1422	Nil	57	21945	385	Yes
	Total	1161				360				145			

3.4.5 Livestock

Farmers in these villages have already been keeping the milch animals; mostly buffalos. The milk production of these animals (local breeds) is low (**Table 13**). There is a need for the improvement of the local breed through artificial insemination, proper vaccination and nutritive feed. Introduction of cross breed cows and 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 Kaliyana Watershed (IWMP V)

S. No.	Name of Micro Watersheds/ Villages	Buffalo(*Lit/per day/annum) for 6 months	Cow(*lit/per day/annum) for 6 months	Goat
1	Kaliyana	808/8080/1454400	110/770/138600	300
2	Kheri Batter	971/10681/1922580	98/686/123480	16
3	Birhi Kalan	1875/26250/4725000	283/2264/407520	47

(Source: Animal Husbandry, Bhiwani)

***Average yield of Buffalo is 12-18 kg/day and Average yield of Cow is 8-12 kg/day**

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 of all micro watershed varies from 3-10m depth; however a small pocket of Birhi kalan is under water logged conditions (1.5- 3m). 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 Kaliyana Watershed (IWMP V)

S. No.	Name of Micro Watershed/ Villages	Source	Pre- Project level (m)
1	Kaliyana	Open well	8.00
2	Kheri Batter	Open well	10.00
3	Birhi Kalan	Open well	4.00

The water quality of the area of the watershed varies from marginal to saline. In Birhi Kalan and most of the area of Kheri batter and Kaliyana is under marginal quality where as remaining area is under saline to highly saline (the water quality map of the area is presented in **Annexure-IX**) are saline. There is adequate availability of drinking water in the villages.

Name of the Project	CPR Particulars	Total Area, ha (Area owned/in possession of)				Area available for treatment (ha)			
		Pvt. Person	Govt.	PRI	Any Other	Pvt. Person	Govt.	PRI	Any Other
	Forest/Agro-Forestry	-	113	-	-	40	-	-	-
	Village ponds, lake	-	-	31	-	-	-	7	-
	Community Buildings	-	15	8	-	-	-	-	-
	Weekly Mkts	-	-	-	-	-	-	-	-
	Permanent Mkts	5	-	-	-	-	-	-	-
	Temples/place of worship	-	-	3	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-

3.5 SOCIO ECONOMIC AND LITERACY PROFILE

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

Sr. No.	Name of the Micro watersheds/ villages	Total no. of houses	Total Population			SC			
			Male	Female	Total	Male	Female	Total	%age
1	Kaliyana	756	2180	2008	4188	777	722	1499	36
2	Kheri Batter	397	1165	1085	2250	522	487	1009	45
3	Birhi Kalan	879	2433	2216	4649	430	385	815	17
	Total	2032	5778	5309	11087	1729	1594	3323	30

(Source- District Census 2011)

Table16. Village wise Literacy Rate in Kaliyana Watershed (IWMP V)

Sr. No.	Name of the Micro watersheds/ villages	Total population	Literacy					
			Total Literates	% age	Male	% age	Female	% age
1	Kaliyana	4188	2587	62	1571	61	1016	39
2	Kheri Batter	2250	1407	62	853	60	554	40
3	Birhi Kalan	4649	3012	65	1840	61	1172	39
	Total	11087	7006	63	4264	61	2742	39

(Source- District Census- 2011)

Table 17. EMPLOYMENT STATUS

Sr. No.	Name of Micro Watersheds/ villages	Schedule caste		Cultivators		Agricultural labourers		Household industry workers		Other workers	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	Kaliyana	777	722	146	78	125	100	2	5	520	50
2	Kheri Batter	522	487	342	6	175	1	13	0	48	10
3	Birhi Kalan	430	385	573	50	24	1	7	1	315	82
	Total	1729	1594	1061	134	324	102	22	6	883	142

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 19**.

Table 18. Migration Pattern in Kaliyana Watershed (IWMP V)

S. 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	Kaliyana	4188	201	90-180	Earning Livelihood	5500
2	Kheri Batter	2250	202	90-180	Earning Livelihood	5500

S. 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	Birhi Kalan	4649	202	90-180	Earning Livelihood	5500

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

Table 19. BPL Pattern

Sr. No.	Name of Micro watersheds/ villages	Total houses	Total Household- BPL	% of BPL HH
1	Kaliyana	756	154	20
2	Kheri Batter	397	97	24
3	Birhi Kalan	879	90	10
	Total	2032	341	17

(Source: District Administration Bhiwani, Haryana)

INFRASTRUCTURE DETAILS

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

Table 20. Village Infrastructure

Sr. No.	Name of Micro watersheds/ 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	Kaliyana	N	Y	Sr. Sec. School	N	Y	Y	Y
2	Kheri Batter	Y	N	Middle School	N	Y	N	Y
3	Birhi Kalan	N	Y	High School	N	Y	Y	Y

FACILITIES/ HOUSEHOLD ASSETS

Table 21. Facilities/ Household assets in Kaliyana Watershed (IWMP V)

S. No.	Name of micro watersheds/ 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	Kaliyana	756	108	369	801	720	225	738	495	594	405
2	Kheri Batter	397	66	226	489	440	137	451	302	363	247
3	Birhi Kalan	879	114	389	845	760	237	779	522	627	427

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 Kaliyana Watershed (IWMP V)

Sr. 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	Kaliyana	16192	12672	3696	4312	36872
2	Kheri Batter	19008	16192	4752	3784	43736
3	Birhi Kalan	21560	18040	5720	4840	50160

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.
- Improper 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.

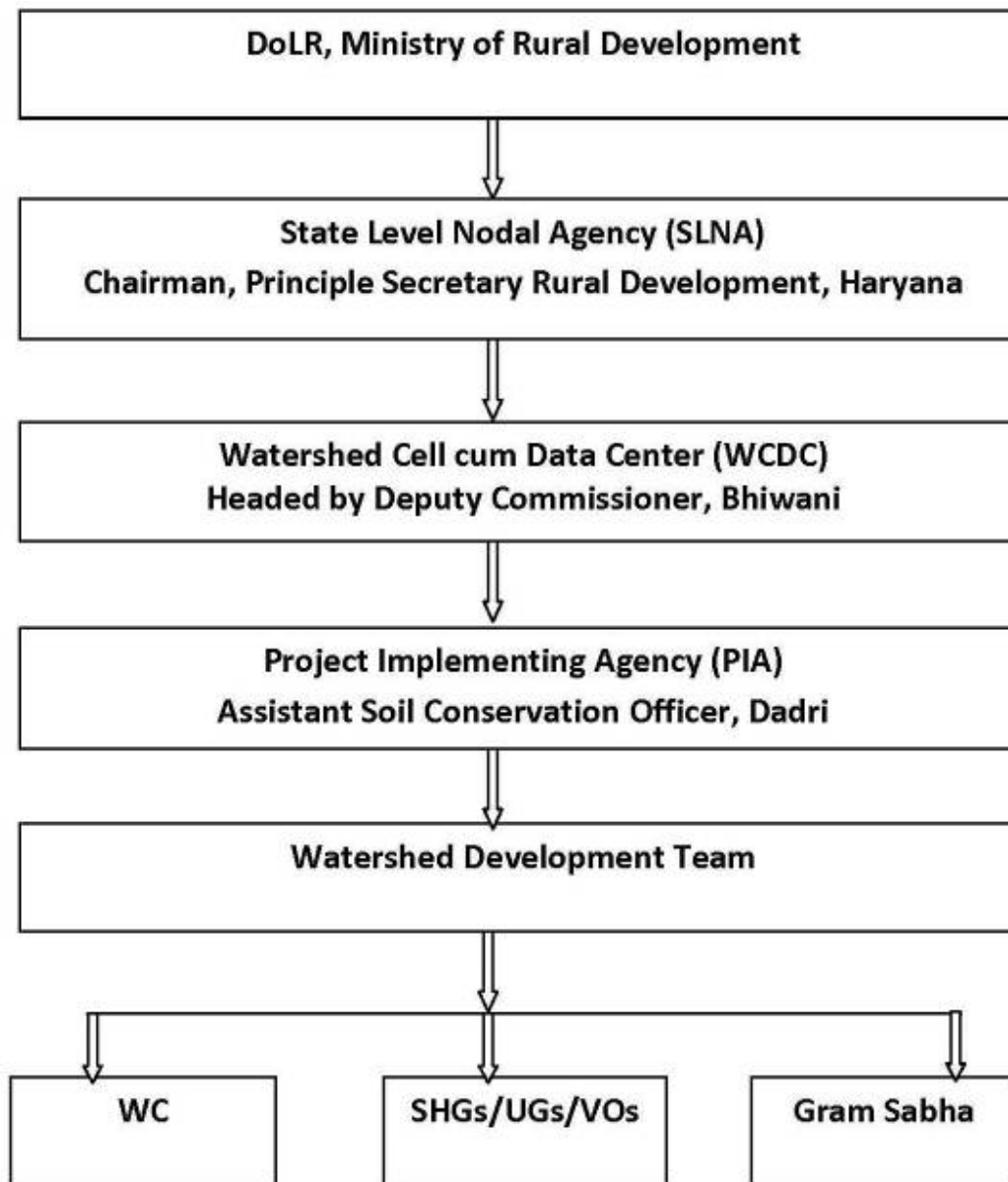
CHAPTER-4

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 be headed by Deputy Commissioner and Additional Deputy Commissioner has been designated as Project Manager under IWMP. The WCDC members comprise of Technical Expert, Computer Operator and Accountant. As per guideline 3 to 6 full time staff (3 in district with less than 25000 ha project area and 6 in districts with more than 25000 ha project area) would assist the Project Manager. The Project Manager will prepare well defined annual goals against which the performance will be monitored. The WCDC will be financially supported by the DoLR after review of available staff, infrastructure and actual requirement.

Organization of WCDC and its Objective

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

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

4.4 Project Implementation Agency

The project Implementing Agencies (PIA), ASCO 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, 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	Kaliyana Watershed (IWMP V)	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

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

Name of Micro Watersheds	Name of President	Name of Secretary	Name of Cashier	Name of Members
Kaliyana	Rati Ram	Anil Kumar	Imrat	Sher Singh, Mahipal, Parbhathi, Imrat, Bhagat, Birmati, Vidha devi, Lali, Hazari, Ravinder, Satish
Kheri Batter	Omparkash	Sajjan Singh	Jaiparvesh	Krishnawati, Satwant, Maya devi, Chand ram, Balwan, Rajender, Nathuram, Bir Singh, Ravinder, Manisha
Birhi Kalan	Surender	Sajjan Singh	Madan Kumar	Rohtash, Jageram, Kavita, Reshma, Sushila devi, Udaybhan, Omparkash, Vijender, Omparkash, Ravinder

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 V KALIYANA 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 V

Area in Hectares and

Funds in Rs.

Table 1. Activity wise allocation of funds for Project Village

(BUDGET AT A GLANCE)

Name of the project	Project Area	Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
Kaliyana	3721	3047	36564000	Administrative costs	365640	365640	1096920	1096920	731280	3656400

Watershed (IWMP V)	Monitoring	0	0	0	365640	0	365640
	Evaluation	0	0	0	0	365640	365640
	Entry point activities	1462560	0	0	0	0	1462560
	Institution and capacity building	0	1828200	0	0	0	1828200
	Detailed project report	365640	0	0	0	0	365640
	Watershed development works	0	2925120	5850240	6215880	5484600	20475840
	Livelihood activities for the asset less persons	0	0	1096920	1828200	365640	3290760
	Production system and micro enterprises	0	0	1096920	1462560	1096920	3656400
	Consolidation phase	0	0	0	0	1096920	1096920
	Total	2193840	5118960	9141000	10969200	9141000	36564000
	Percentage of total cost	6%	14%	25%	30%	25%	100%

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and

Funds in Rs.

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
1115	13380000	Administrative costs	133800	133800	401400	401400	267600	1338000
		Monitoring	0	0	0	133800	0	133800
		Evaluation	0	0	0	0	133800	133800
		Entry point activities	535200	0	0	0	0	535200
		Institution and capacity building	0	669000	0	0	0	669000
		Detailed project report	133800	0	0	0	0	133800

		Watershed development works	0	1070400	2140800	2274600	2007000	7492800
		Livelihood activities for the asset less persons	0	0	401400	669000	133800	1204200
		Production system and micro enterprises	0	0	401400	535200	401400	1338000
		Consolidation phase	0	0	0	0	401400	401400
		Total	802800	1873200	3345000	4014000	3345000	13380000
		Percentage of total cost	6%	14%	25%	30%	25%	100%

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and

Funds in Rs.

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	Total	
915	10980000	Administrative costs	109800	109800	329400	329400	219600	1098000	
		Monitoring	0	0	0	109800	0	109800	
		Evaluation	0	0	0	0	109800	109800	
		Entry point activities	439200	0	0	0	0	439200	
		Institution and capacity building	0	549000	0	0	0	549000	
		Detailed project report	109800	0	0	0	0	109800	
		Watershed development works	0	878400	1756800	1866600	1647000	6148800	
		Livelihood activities for the asset less persons	0	0	329400	549000	109800	988200	
		Production system and micro enterprises	0	0	329400	439200	329400	1098000	
		Consolidation phase	0	0	0	0	329400	329400	
		Total		658800	1537200	2745000	3294000	2745000	10980000
		Percentage of total cost		6%	14%	25%	30%	25%	100%

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

Area in Hectares and
Funds in Rs.

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
1017	12204000	Administrative costs	122040	122040	366120	366120	244080	1220400
		Monitoring	0	0	0	122040	0	122040
		Evaluation	0	0	0	0	122040	122040

	Entry point activities	488160	0	0	0	0	488160
	Institution and capacity building	0	610200	0	0	0	610200
	Detailed project report	122040	0	0	0	0	122040
	Watershed development works	0	976320	1952640	2074680	1830600	6834240
	Livelihood activities for the asset less persons	0	0	366120	610200	122040	1098360
	Production system and micro enterprises	0	0	366120	488160	366120	1220400
	Consolidation phase	0	0	0	0	366120	366120
	Total	732240	1708560	3051000	3661200	3051000	12204000
	Percentage of total cost	6%	14%	25%	30%	25%	100%

CHAPTER – 6

PREPARATORY PHASES

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

6.1 AWARENESS GENERATION AND MOTIVATION FOR PARTICIPATION

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

6.1.1 Collection of Base Line Data and Hydrological Data

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

6.1.2 Formation of Village Level Institutions

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

The self- Help Groups were formed during earlier projects but most of them are inactive and non – functional. 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, Slope, Soil Classification, Soil fertility, Land Capability Classification, Ground Water Depth and Quality, Proposed Activities of works. All the works proposed in the DPR are location specific and are as per the local demand and socio- economic conditions of the watersheds.

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

A critical analysis of main strength of the proposed project, evident weaknesses, opportunities available for successful implementation and scope of achieving set objectives was made. Attention is also paid to possible threat against which sufficient inbuilt safeguards are provided. Such an analysis was done for the project in hand and summaries of observations were made and are mentioned below for the all six watersheds in 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.18, 28, 200/-

6.2 Capacity Building

1. Introduction

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

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

2. Vision

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

3. Need

The term Capacity Development is understood as the development of 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

Sr. 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. <u>One Day</u>				
	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. <u>Two Days</u>				
	Bhiwani	Secretaries of Village Watershed Committees	27	35-40	1
03	Project Level Sensitization Camps for WC <u>One Days</u>				
	Bhiwani	Members of Watershed Committees @ 10 Persons (Tentative) per WC	270	50	5

Sr. No.	Title of Training Programme and Duration	Level of Participants	Total persons	Trainees Per Programme	Number of Programmes
04	Village Level Awareness Camps on IWMP at Micro Watershed Level for User Groups <u>One Day</u>				
	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 <u>One Day</u>				
	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, GoI in 2010** have been strictly used [for fixed and variable costs].

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

Sr. No.	Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member’s , SHG & UG organize by HIRD	Total Funds
1	District Level Sensitization Workshop(s) for Watershed Committees	18552
2	Block Level Functional Programmes for Secretaries of Watershed Committees. <u>Two Days</u>	2654
3	Village Level Sensitization Camps for WC <u>One Days</u>	12084
4	Village Level Awareness Camps on IWMP at Micro Watershed Level for Prospective User Groups <u>One Day</u>	28039
5	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP <u>One Day</u>	4974
	Total	66303

Table 3. Micro Watershed Wise Exposure cum training Visit for SLNA, WDT, PIA, Field Functionary, WDC, SHG & UG Members of IWMP V (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	16800	5	12	8400	700	2100	126000
2	User groups from each micro watershed	NRM, Post Project Management etc. –Exposure Visit	2	16800	5	12	8400	700	2100	126000
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	54000	5	9	13500	1500	4500	202500
4	Sub watershed Level- PIA Members	Exposure Visit- Within Fundamentals of Watershed, Finance Management,	2	16800	5	12	8400	700	4500	270000

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
		Final Report on WDP etc								
5	District Level-WDC	Exposure visit to successful watershed/ University.	2	16800	5	12	8400	700	1400	84000
6	District Level-Line Deptt., WDC	Exposure visit to successful watersheds within state.	2	16800	5	12	8400	700	1400	84000
7	SLNA and District Level Controlling Officers	Exposure visit to successful watersheds outside state	4	54000	5	9	13500	1500	6000	270000
Total			18		35	78				1162500

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

S. No.	District	No. Micro watersheds	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	3	2	6	30	12,000	72,000	3, 60, 000	
2.	Propaganda & Documentation (Puppet show, documentary movies show, video-graphy, Photography, wall Painting, Display Board, pamphlets, leaf lets. Etc)	3	2	6	30	5000	30,000	1, 50, 000	
3	Contingency charges							89397	
	Total								599397

i) Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD = Rs. 66,303/-

ii) Micro Watershed Wise Exposure cum training Visit For SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members = Rs. 11, 62,500/-

iii) Farmer's / Beneficiaries training camps with Extension Program's = Rs. 5,99,397/-

Grand Total = Rs. 18, 28,200/-

6.2.1. EXPECTED OUTCOME OF CAPACITY BUILDING

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

6.3 Entry Point Activities 4%

EPA activities are taken up under the watershed to build rapport with village community at the beginning of the project, generally certain important works which are in urgent demand of the local community are taken up. A group discussion was conducted in the Gram Sabha meeting/watershed committee regarding EPA activities. It was conveyed to the Gram Sabha that an amount of **Rs. 14 62,560/-** was provided for EPA. The provision of IEC material for community will be met under EPA. The stake holders discussed the various activities which they felt is important but after the discussion the following activities were finalized. The convergence with the other project can also be undertaken.

Table 5. Entry Point Activities in Kaliyana Watershed (IWMP V)

(Rs. In Lacs)

Sr. No.	Block	Name of Project	No. of EPAs Identified	No. of EPAs Completed	No. of EPAs in progress	Name/Nature of EPA	Location	Expenditure
1.	Dadri II	Kaliyana Watershed (IWMP V)	5	0	0	Retaining Wall and Pond (2 No.)	Kaliyana	4.85
						Retaining Wall for village Pond	Kheri Batter	4.85
						Retaining Wall and Ramp	Birhi Kalan	4.85
						Total		14.55

Total project Cost @ 4%= Rs. 14 62,560/-

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, Water conveyance system, Silt detention dam, 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 nearly level, however at few places near hillocks or sand dunes where slopes are gentle to steep, small gullies with complex slope have been formed which need specific treatment like

construction of Water Conveyance System, Silt detention dam, Earthen Embankment with pucca outlet, Small Earthen Embankment with vegetative Support etc.

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, outlets 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 meger 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 V Bhiwani) is given below and the proposed Action/ Treatment Plan map shown in Annexure X.

Table-1: Village wise distribution of works: Village– Kaliyana

Name of micro-watersheds	Activity/work with location/identification mark	Unit	Unit cost (Rs. in lacs)	Phy.	Estimated amount (Rs in lacs)	Objectives
Kaliyana	Renovation/new village pond	No.	3	4	12.00	For ground water harvesting & availability of water for village community animals.
	Ramp, inlet, outlet & protection wall, if necessary at old ponds	cum	0.0326	280	9.13	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	1	2.00	For the conservation of water and ground water harvesting.
	Earthen Embankment with pucca outlet	No.	0.77+0.20=0.97	10	9.70	For the control of soil erosion, in situ moisture conservation.
	Small Earthen Embankment with vegetative Support	100cum	0.029	25560	7.41	For the control of soil erosion, in situ moisture conservation.
	Community Water Storage Tank with Pipe line	No.	3	4	12.00	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

Name of micro-watersheds	Activity/work with location/identification mark	Unit	Unit cost (Rs. in lacs)	Phy.	Estimated amount (Rs in lacs)	Objectives
	Drain from village to old pond	No.	5	1	5	Drain out steagnate water to avoid water logging
	Silt detention dam	No.	4.95	2	9.9	Water harvesting for ground water recharging
	Rainfed Horticulture	ha	0.25	5	1.25	Proper utilization of uncultivated fields and additional income for farmers.
	Agro- Forestry	ha	0.15	10	1.50	Increase biomass and additional income to the farmers
Total Funds					76.89	
Available Funds					74.93	
Convergence					1.96	

Table-2: Village wise distribution of works: Village– Birhi Kalan

Name of micro-watersheds	Activity/work with location/identification mark	Unit	Unit cost (Rs. in lacs)	Phy.	Estimated amount (Rs. In Lacs)	Objectives
Birhi Kalan	Renovation/new village pond	No.	3	4	12	For ground water harvesting & availability of water for village community animals.
	Ramp, inlet, outlet & protection wall, if necessary at old ponds	cum	0.0326	130	4.24	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 harvesting.
	Earthen Embankment with pucca outlet	No.	0.77+0.20=0.97	20	19.4	For the control of soil erosion, in situ moisture conservation.
	Small Earthen Embankment with vegetative Support	100cu m	0.029	24361	7.06	For the control of soil erosion, in situ moisture conservation.
	Community Water Storage Tank with Pipe line	No.	3	3	9	For store surplus canal water for use during lean period
	Water conveyance system from Dadri minor to Mirjani pond	Mtr.	0.007	800	5.6	To ensure availability of water in pond 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
	Drain from village to old pond	No.	5	1	5	Drain out steagnate water to avoid water logging
	Rain fed 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
Total Funds					69.80	
Available Funds					68.34	
Convergence					1.46	

Table-3: Village wise distribution of works: Village– Kheri Battar

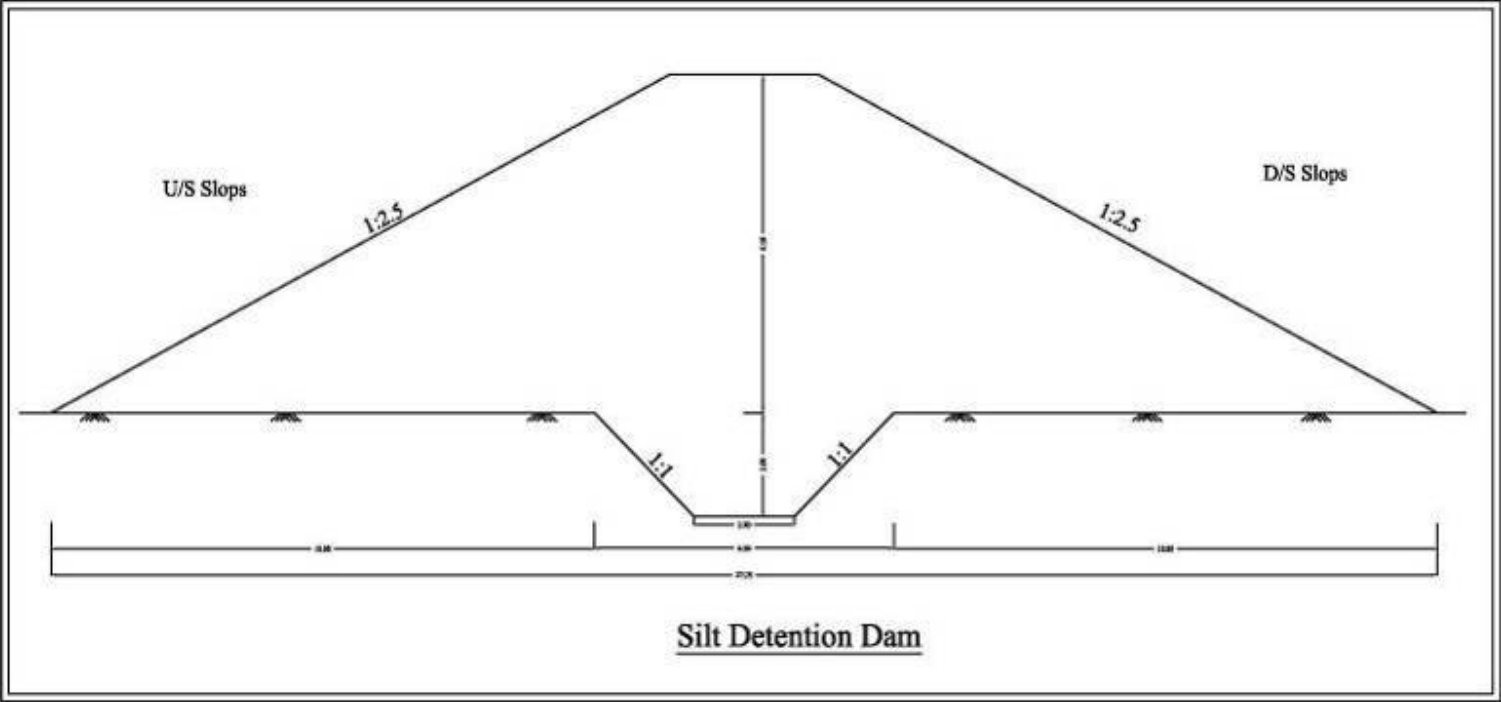
Name of micro-watersheds	Activity/work with location/identification mark	Unit	Unit cost (Rs. in lacs)	Phy.	Estimated amount (Rs. In Lacs)	Objectives
Kheri Battar	Renovation/new village pond	No.	3	1	3	For ground water harvesting & availability of water for village community animals.
	Ramp, inlet, outlet & protection wall, if necessary at old ponds	cum	0.0326	95	3.097	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	1	2	For the conservation of water and ground water harvesting.
	Earthen Embankment with pucca outlet	No.	0.77+0.20=0.97	15	14.55	For the control of soil erosion, in situ moisture conservation.
	Small Earthen Embankment with vegetative Support	100 cum	0.029	34012	9.86348	For the control of soil erosion, in situ moisture conservation.
	Community Water Storage Tank with Pipe line	No.	3	3	9	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
	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
	Silt detention dam	No.	4.95	2	9.9	Water harvesting for ground water recharging
	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
Total Funds					65.41	
Available Funds					61.49	
Convergence					3.92	

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. 4. DETAILED ESTIMATE OF SILT DETENTION DAM

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



Silt Detention Dam

Table. 5. Leads Statement

Leads Statement :-

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

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

Vertical leads = (Height +0.60) x 0.4 x 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 = Length x Average base i.e. $50.00 \times 27.75 = 1387.50$ Sq. meters

Area from where E/W is to be excavated = Av. Length x 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 :-

(Cross Section Area X Length) + Loose soil to be removed i.e.(69.19 x 50.00)+ 416.25 = 3875.75 cum

DETAILED ESTIMATE OF CHUTE OUTLET

S. No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)	
1	Excavation of earthwork in foundation And plinth			H.S.R 6.6			
	Crest wall	1	2.00	1.00	1.50	3.00	
	Side walls	2	24.00	1.00	1.50	72.00	
	Wing walls	2	2.00	1.00	1.50	6.00	
	Toe with extension	1	4.00	1.00	1.50	6.00	
	Apron	1	24.00	2.00	(2.0+1.0)/2 =1.50	72.00	
				Total =		159.00	
2	Cement concrete work 1 : 4 : 8 in the Foundation and plinth			H.S.R 10.39			
	Crest wall	1	2.00	0.90	0.20	0.36	
	Side walls	2	24.00	0.90	0.20	8.64	
	Wing walls	2	2.00	0.90	0.20	0.72	
	Toe with extension	1	4.00	0.90	0.20	0.72	

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

	On top of crest wall	1	2.00	0.50	0.05	0.05	
	On top of side walls	2	24.00	0.50	0.05	1.20	
	On top of wing walls	2	2.00	0.50	0.05	0.10	
	On top of Toe wall	1	4.00	0.50	0.05	0.10	
	Apron	1	24.00	2.00	0.10	4.80	
				Total =		6.25	
6	Cement plastering work 1:4 on the						
	Crest wall both side	2	2.00	–	1.30	5.20	
	Side walls	2	24.00	–	$(1.0+0.6)/2=0.80$	38.40	
	Wing walls	2	2.00	–	2.30	9.20	
	Toe with extensions	1	4.00	–	0.20	0.80	
	Toe wall extensions	2 x 2	1.00	–	0.60	2.40	
				Total =		56.00	

Material Statement and cost of Material:-

S. No.	Item of Work	Quantity (cum)	Cement (bags)	Sand (cum)	Stone blast (cum)	Bajri 20 mm (cum)	Stone boulders (cum)
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1	C.C work 1 : 4 : 8	20.04	68.136	9.6192	19.2384	–	–
2	Sq. Rub. Masonry 1: 5 in foundation.	16.38	28.1736	4.914	–	–	18.018
3	Sq. Rub. Masonry 1: 5 above ground level.	22.10	38.012	6.63	–	–	24.31
4	C.C work 1 : 2 : 4	6.25	39.375	2.75	–	5.50	–
5	C. plastering work 1 : 4	56.00 sqm	6.16	0.84	–	–	–
Total =			179.8566	24.7532	19.2384	5.5	42.328
Rates of material			245.00 per bag	950.00 per cum	965.00 per cum	985.00 per cum	945.00 per cum
Cost of Materials			44065	23516	18565	5418	40000
Total Cost of Materials =			Rupees	131563	/-only		
ABSTRACT OF COST							
S.No.	Item of Work	Quantity		Rate		Unit	Amount
1	Jungle clearance including uprooting of rank vegetarian, grass, bush	5984.50 sq.m		Rs.66.80 + 300% C. Prem.		100 sq.m	15990.58

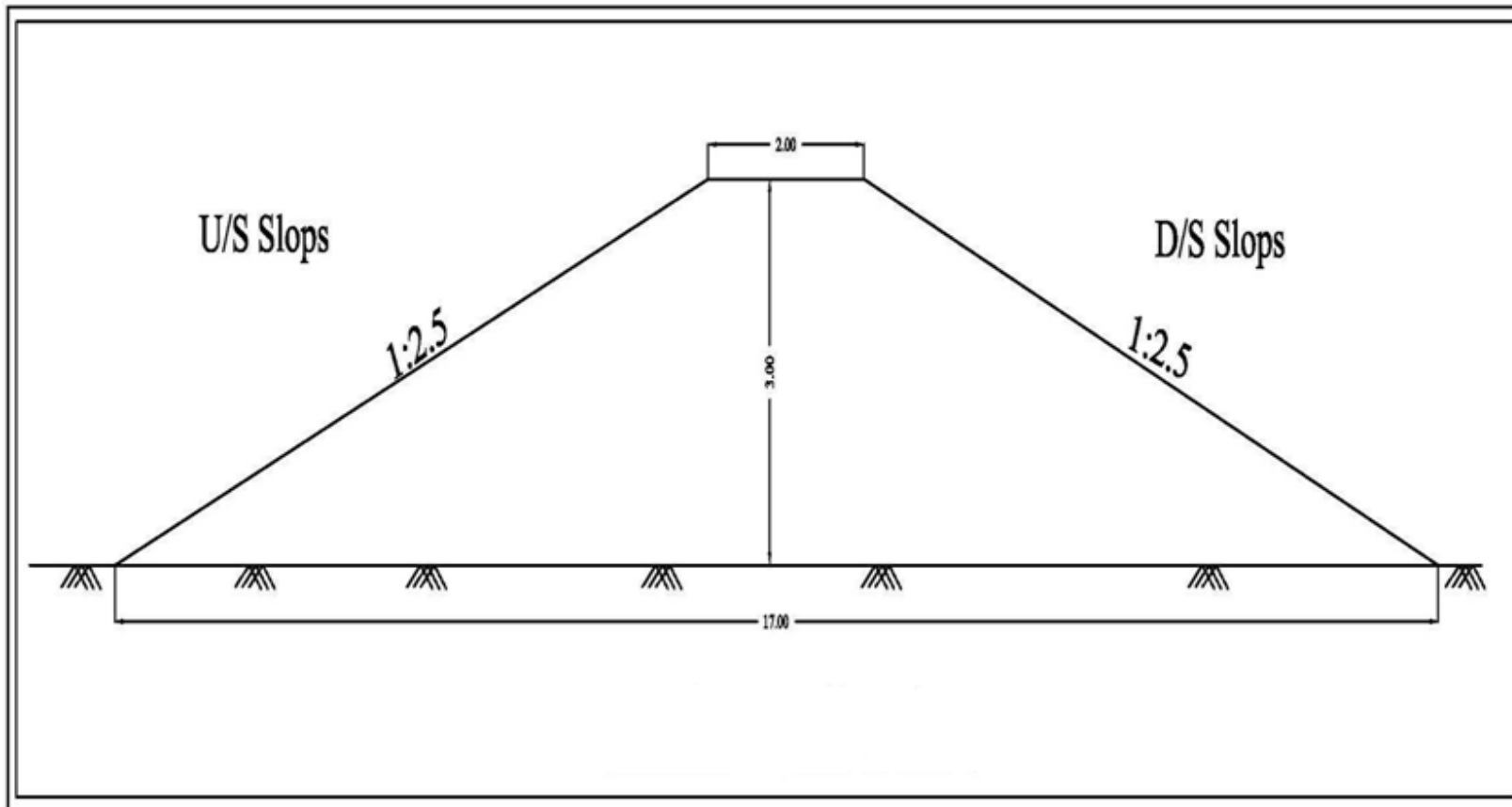
	woods etc H.S.R.6.26		=267.20		
2	Removal of loose soil up to 0.3 m below Natural surface level H.S.R. 6.2 (b)	416.25 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	10987.75
3	E/Work excavation for digging of the key trench H.S.R. 6.6	360.00 cum	Rs.1108.10 + 350% C. Prem.= 4986.45	100 cum	17951.22
4	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	3875.75 cum	[(15.00 x 6 No.)+ (13.25 x 5	100 cum	27251.17

	by the animal or animal driven cart (11 leads) H.S.R. 6.2 (c) (ii)		No.)) + 350% C. Prem.= 703.12		
9	Extra for compaction and watering earth laying in 25cm layers source of water leads up to 1 km. H.S.R. 6.2 (g) (ii),(i)	3875.75 cum	Rs.(75.00+ 68.10)+350% C. Prem.= 643.95	100 cum	24957.89
10	Extra for rolling with road roller / tractor H.S.R. 6.2 (g) (v)	3875.75 cum	Rs.225.00 + 110 % C. Prem.= 472.50	100 cum	18312.92
11	Excavation of earthwork in foundation and plinth H.S.R 6.6	159.00 cum	Rs.1108.10 + 350 % C. Prem. =4986.45	100 cum	7928.46
12	Cement concrete work 1 : 4 : 8 in the Foundation and plinth H.S.R 10.39	20.04 cum	Rs. 64.95 + 370 % C. Prem. =305.27	cum	6117.61
13	Square rubble stone masonry course1: 5 in foundation and plinth H.S.R 12.23	16.38 cum	Rs. (160.35+26.00) +250% C. Prem. =652.22	cum	10683.36
14	Square rubble stone masonry course1: 5 above G.L. H.S.R 12.23 and 12.31	22.10 cum	Rs. (160.35+26.00+27.20) +200% C. Prem.= 747.42	cum	16517.98

15	Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41	6.25 cum	Rs.64.95 + 370 % C. Prem. =305.27	cum	1907.94
16	Cement plastering work 1:4 on the stone walls H.S.R 15.5	56.00 sqm	Rs. 5.50 + 340 % C. Prem. =24.20	cum	1355.20
17	Total Cost of Materials =				131562.923
Total =					480352.726
Add Contingency at the rate of 3% =					14410.5818
Grand Total =					494763.31
					Say Rs. 4.95 Lacs

Table 6. 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

S. No.	Item of Work	Quantity	Rate	Unit	Amount
1	Jungle clearance including uprooting of rank vegetarian, grass, bush woods etc H.S.R.6.26	2546.00 sq.m	Rs.66.80 + 300% C. Prem. =267.20	100 sq.m	6802.91
2	Removal of loose soil up to 0.3 m below Natural surface level H.S.R. 6.2 (b)	204.00 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	5384.99
3	E/work excavation for making 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

Total =	74243.4712
Add Contingency at the rate of 3% =	2227.30
Grand Total =	76470.78

Table. 7. Detail Estimate of Cement Stone Masonry Structure

S. No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
1	Excavation of earthwork in foundation And plinth			H.S.R 6.6		
	Crest wall with extensions	1	8.00	2.00	1.20	19.20
	Side walls	2	1.50	1.00	1.20	3.60
	Wing walls	2	2.00	1.00	1.20	4.80
	Toe wall with extensions	1	6.00	1.00	1.20	7.20

S. No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
	Apron	1	4.00	1.50	0.30	1.80
				Total =		36.60
2	Cement concrete work 1 : 4 : 8 in the Foundation and plinth			H.S.R 10.39		
	Crest wall with extensions	1	8.00	1.70	0.20	2.72
	Side walls	2	1.50	0.70	0.20	0.42
	Wing walls	2	2.00	0.70	0.20	0.56
	Toe wall with extensions	1	6.00	0.70	0.20	0.84
	Apron	1	4.00	1.50	0.20	1.20
				Total =		5.74
3	Square rubble stone masonry course1: 5 in foundation and plinth			H.S.R 12.23		
	Crest wall with extensions	1	8.00	$(1.5+1.0)/2= 1.25$	1.00	10.00
	Side walls	2	1.50	0.50	1.00	1.50
	Wing walls	2	2.00	0.50	1.00	2.00
	Toe wall with extensions	1	6.00	0.50	1.00	3.00
				Total =		16.50
4	Square rubble stone masonry course1: 5 above G.L. H.S.R 12.23 and 12.31					

S. No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
	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
				Total =		13.38
5	Cement concrete work 1 : 2 : 4 in the Foundation and plinth			H.S.R 10.41		
	On the top of crest wall	1	4.00	$(1.0+0.5)/2= 0.75$	0.05	0.15
	On the top of crest wall extensions	2	2.00	0.50	0.05	0.10
	On the top of side walls	2	1.50	0.50	0.05	0.08
	On the top of wing walls	2	2.00	0.50	0.05	0.10
	Toe wall with extensions	1	6.00	0.50	0.05	0.15
	Apron	1	4.00	1.50	0.10	0.60
				Total =		1.18
6	Cement plastering work 1:4 on the					
	Crest wall both side	2	4.00	–	1.20	9.60

S. No.	Description	No.	Length (mts)	Breadth (mts)	Height (mts)	Content (cums)
	Crest wall extensions	2 x 2	2.00	–	0.50	4.00
	Side walls	2	$(1.5+2.0)/2= 1.75$	–	$(1.7+0.5)/2= 1.1$	3.85
	Wing walls	2	2.00	–	1.70	6.80
	Toe wall with extensions	1	6.00	–	0.20	1.20
	Toe wall extensions	2 x 2	1.00	–	0.50	2.00
				Total =		27.45

Table. 8. MATERIAL STATEMENT AND COST OF MATERIAL

S. No.	Item of work	Quantity	Cement	Sand	Stone blast	Bajri 20 mm	Stone boulders
		(cum)	(bags)	(cum)	(cum)	(cum)	(cum)
1	C.C work 1 : 4 : 8	5.74	19.516	2.7552	5.5104	–	–
2	Sq. stone masonry work	16.50	28.38	4.95	–	–	18.15
	1: 5 in foundation.						
3	Sq. stone masonry work	13.38	23.005	4.0125	–	–	14.7125

	1: 4 above ground level.					
4	C.C work 1 : 2 : 4 1.18	7.4025	0.517	–	1.034	–
5	C. plastering work 1 : 4 27.45 sqm	3.02	0.41	–	–	–
	Total =	81.323	12.64645	5.5104	1.034	32.8625
	Rates of material	245.00 per bag	950.00 per cum	965.00 per cum	985.00 per cum	945.00 per cum
	Cost of Materials	19924	12014	5318	1018	31055
	Total Cost of Materials =	Rupees	69329	/-only		

Table. 9. LABOUR COST

S. No.	Item of work Quantity	Rate	Unit	Amount
1	Excavation of earthwork in foundation and plinth H.S.R 6.6 36.60 cum	1108.10 +350% C. Prem. =4986.45	100 cum	1825.04
2	Cement concrete work 1 : 8 : 16 in the Foundation and plinth H.S.R 10.39 5.74 cum	64.95 +370% C. Prem. =305.27	cum	1752.25
3	Square rubble stone masonry course 1: 5 in 16.50 cum	(160.35+26.00) +250% C. Prem. =652.22	cum	10761.63

S. No.	Item of work Quantity	Rate	Unit	Amount
	foundation and plinth H.S.R 12.23			
4	Square rubble stone masonry course 1: 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	9996.74
5	Cement concrete work 1 : 2 : 4 in the Foundation and plinth H.S.R 10.41	1.18 cum	64.95 +370% C. Prem. =305.27	358.69
6	Cement plastering work 1:4 on the stone walls H.S.R 15.5	27.45 sqm	5.50 +340 % C. Prem. =24.2	664.29
	Total =	29.875 cum		25358.64525
				or say Rs.25359/- only

Table. 10. ABSTRACT OF COST

Labour cost	25359.00
Cost of Materials as per detail attached	69329.00

Total = 94688.00

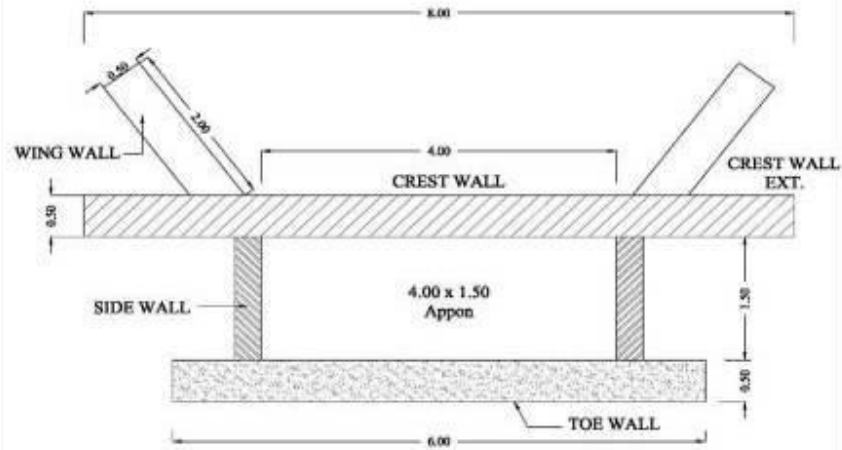
Add contingency at the rate of 3%

2841.00

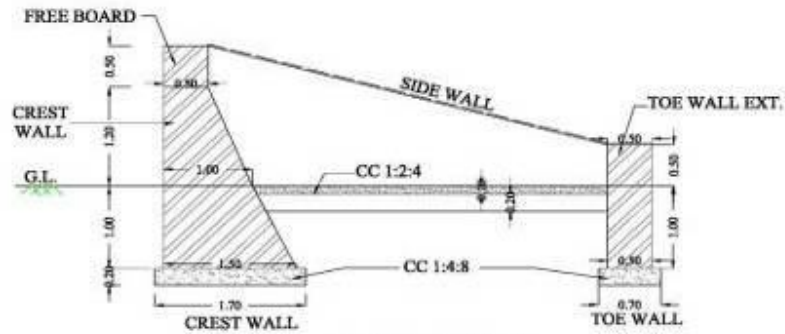
Grand Total = 97529.00

Per cum Rate = $97529 / 29.88 = 3264.02$ or say Rs.3260/- only

WORK PLAN OF CEMENT STONE MASONRY STRUCTURE



PLAN



X-SECTION

* Not to Scale
* All Dimension in m.

X-section of Masonry Structure

Table. 11. Detailed estimate of Pond

Detail Estimate of village Pond

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

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

Leads Statement

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

$$\text{Vertical Leads} = (\text{Depth} + \text{Height}) \times 0.4 \times 10$$

$$= 21.00 \text{ mtr.}$$

$$\text{Total Leads} = \{(61.94 + 21.00) - 15.00\} / 7.5$$

$$= 9 \text{ Leads}$$

Table. 12. 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	6.2 (g_(ii))	5124.00	286.88	100 cum	14699.73

	specifications for compaction					
6	Extra for rolling in 25 cm layers as per specifications by sheep foot roller	6.2 (g)(v)	5124.00	401.62	100 cum	20579.01
Total						251458.76
Add. Contingency @2%						5029.1753
Grand Total						256487.94
Or say						2.60 Lac

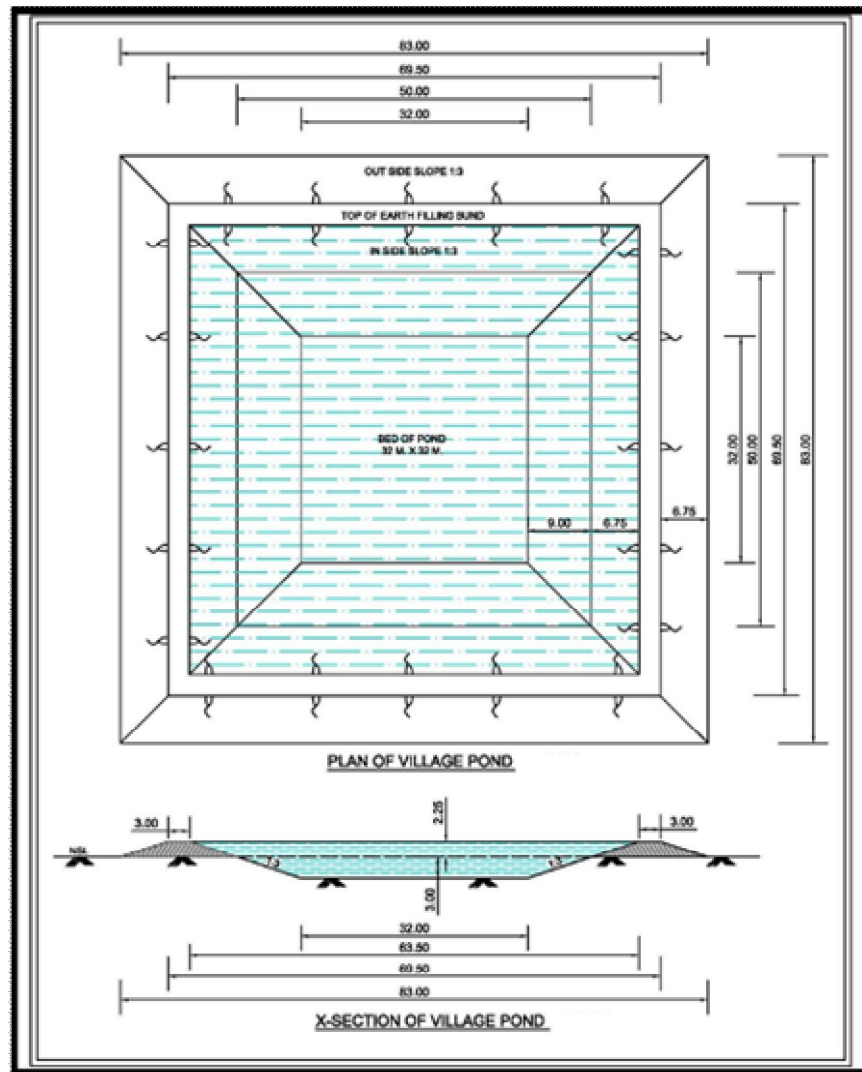


Table. 13. Estimate of Orchard Development in the Watersheds Per Hectare (Lemon & Kinnoo)

A. Horticulture

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

Say `	30000.00
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Estimate of Orchard Development in the Watersheds Per Hectare (Guava, Amla & Ber)

A. Horticulture

Sr. No.	Particulars	Quantity	Unit	Rate	Amount
1	Soil working 1m x 1m x 1m size pits (225 Nos.) including cost of refilling(At the distance 20'x20')	225.00	cum	36.66	8248.50
2	Application of 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
Total					18445.50
Say `					18500.00

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

Table. 14. Estimate of Agro- Forestry/ Afforestation

Plantation Model						
Cost statement of 1 Ha. Of activities of Plantation for 1st year (wage rate Rs. 94.13/-)						
Sr. No.	Item of work	Unit	Qty.	SOR	Man days	Cost
B	Nursery					
i	Raising of Plants in nursery	Nos.	660	18	5601.00	11880.00
C	Carriage					
i	Loading/ Unloading of plants up to 100 mtr.	Nos.	605	21.18	1.36	128.139
ii	Multistage carriage of plants					

a)	By tractor up to 10 km.	Nos.	605	18.83	12.10	1139.22
c)	By manual labour in plantation area	Nos.	605	42.36	2.72	256.28
					Total	1523.63

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

E	Cultural operations & chemical treatment					
i	Fertilizer application	Nos.	500	9.41	0.50	47.05
ii	Insecticide application	Nos.	500	9.41	0.50	47.05
iii	First Weeding & hoeing	Nos.	500	141.2	7.5	706.00

vi	Subsequent weeding & hoeing two time	Nos.	1000	94.13	10.00	941.30
					Total	1741.40

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

					G. Total =	18767.34
					or Say =	18767.00

PRODUCTION SYSTEM- 10%

7.3 PRODUCTION SYSTEM

7.3.1 Crop Production

Present Status: Agriculture is the mainstay of the inhabitants of the project area which is mainly rain fed 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 15.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 80 farmers of each micro watershed/year @ Rs.200/ kit as assistance is provided.	3	240(farmers)	1200 (mini kits)	200 per mini kits	240000
	Agriculture	Application of farm inputs like Zinc Sulphate or Sulphur or weedicides or pesticides. 80 farmer of each micro	3	240(farmers)	1200 (mini kits)	200 per mini kits	240000

S. No.	Particulars	Contents	No. of micro watersheds	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
		watershed/ year @ Rs.200/ kits as assistance is provided.					
	Agriculture	Supplying of Agriculture implements – 30 farmers (average) per micro watershed @ Rs. 1000/ units as assistance is provided.	3	90(farmers)	450	1000	450000
	Agriculture	Agro Forestry: Eucalyptus/ neem on 50% subsidy @ Rs. 10/ plant as assistance is provided.	3	3000(plants)	15000 plants	Rs. 10 per plant	150000
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)	3	1500 plants	7500 plants	Rs.40 per plant	300000
	Horticulture	Kitchen gardening Packets distributed to 100 farmers in each micro watershed/ year @ Rs.25/ packet.	3	300	1500	Rs. 25 Per packet	37500
	Horticulture	Five units of Bee keeping in each micro watershed @ 3000/ unit as assistance are provided.	3	15	75	3000	225000
	Horticulture	Five units of Vermi compost in each micro watershed per year @ Rs. 10000 per unit as assistance is provided.	3	15	75	10000	750000
3	Animal	Problems being faced due to some	3	240	1200	225	270000

S. No.	Particulars	Contents	No. of micro watersheds	No. of beneficiaries per micro watershed	No. of total beneficiaries	Cost per beneficiaries	Total
	Husbandry	diseases in the animals and low yield of milk. Production of free life saving medicines/ minerals for animals – the provision for 80 farmers of each micro watershed/year @ Rs.225 has been provided.					
	Animal Husbandry	Livestock Management supply of feed supplements to improve health of cattle's. The provision to benefit 80 farmers of each micro watershed/year @ Rs.225 has been kept in the project proposals.	3	240	1200	225	270000
	Animal Husbandry	Supply of mini- kits of high yielding variety green fodder seeds to 25 farmers in each micro watershed/year @ Rs.200/- mini kits.	3	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).	3	6	30	20000	600000
		Contingency					48900

Total: Rs. 3656400/-

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. 10,000/- 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 16: Model/ Estimate for a Vermin Compost Unit

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

Components of Vermin Compost Unit

1. Shed

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

2. Vermin- beds

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

3. Land

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

4. Seed Stock

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

5. Machinery

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

LIVELIHOOD ACTIVITIES FOR THE ASSET LESS PERSONS-9%

7.4 LIVELIHOOD SUPPORT TO SHG'S

The key issue of inclusion of this chapter is that about 80% of the population in the proposed villages depends on agriculture and allied activities, but it rarely provides sufficient means of survival to small and marginal farmers. During the base line survey, this aspect was discussed with the existing Self Help Group/ Gram Sabha members. The representative of WAPCOS, 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 17. Revolving Fund Assistance for SHGs

S. No.	Name of micro watersheds	Total SHGs	Amount of RFA per SHG	Total
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1	Kaliyana	4	25000	100000
2	Kheri batter	4	25000	100000
3	Birhi Kalan	4	25000	100000
	Total	12		300000

Table 18. Skill Trainings/Skill up gradation for SHGs

S. No.	Name of micro watersheds	Total SHGs	Amount of Training per SHG	Total
1	Kaliyana	4	35000	140000
2	Kheri batter	4	35000	140000
3	Birhi Kalan	4	35000	140000
	Total	12		420000

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

S. No.	Name of micro watersheds	No. of Persons in micro watershed	Amount of Training per trainee for 6 month	Total
1	Kaliyana	25	10000	250000
2	Kheri batter	25	10000	250000
3	Birhi Kalan	25	10000	250000
	Total	75		750000

Note: The beneficiaries will contribute 10% as cost sharing of the livelihood support programme Rs. 750000 @ 10% cost sharing.

$$= 750000 - 75000$$

$$= 675000/-$$

Table 20. One time assistance as Revolving Fund to unemployed youth who have successfully completed Computer Training for setting up a computer centre

S. No.	Name of micro watersheds	No. of Persons in micro watershed	Amount of Training per Trainee	Total
1	Kaliyana	25	20000	500000

2	Kheri batter	25	20000	500000
3	Birhi Kalan	25	20000	500000
	Total	75		1500000

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. 1500000 @ 10% cost sharing.

= 1500000- 150000

= **1350000/-**

Table 21. 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	Kaliyana	1	2	2000	6	12000
2	Kheri batter	1	2	2000	6	12000
3	Birhi Kalan	1	2	2000	6	12000

	Total	3	6			36000
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Total cost for 3 Centres

1. Payment to trainers 36000/-

2. Sewing Machine Cost 15000/- (lump sum)

Table 22. Embroidery Centre for female beneficiaries

Sr. No.	Name of micro watersheds	No. of centers	Payment to Trainer per Month	Period months	Payment to trainer for 6 months @ Rs. 2000 p.m	Total trainers	Grand Total
1	Kaliyana	1	2000	6	12000	1	12000
2	Kheri batter	1	2000	6	12000	1	12000
3	Birhi Kalan	1	2000	6	12000	1	12000
	Total	3					36000

Total Cost:

Payment to trainer: Rs.36000/-

Table 23. Livelihood Support

Sr. 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	Kaliyana	1	4	4
2	Kheri batter	1	3	3
3	Birhi Kalan	1	4	4
	Total	3	11	11
	Rate (Rs)		25000	10000
	Cost (Lakh Rs)		2.75	1.10

Contingency, printing material and other unseen items: Rs. 73760/-

Total funds available under this component are Rs. 3290760/-

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/- 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. 24)

Detail of Convergence of IWMP and other schemes

Table 24. 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	Kaliyana	76.89	74.93	1.96	1.96
2	Kheri Batter	65.41	61.49	3.92	3.92
3	Birhi Kalan	69.80	68.34	1.46	1.46
	Total	212.10	204.76	7.34	7.34

- 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 rainfed 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 three 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 15 ha horticulture development programme with the financial assistance of Rs. 3.75 lakh has been provided in the project proposals. This would also be undertaken by convergence with the horticulture department.

7.5.5 Convergence with Agriculture Department

The activities under NRM like 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, Water conveyance system, Silt detention dam, 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

Sr. No.	Name of the Micro Watersheds	Effective Area	Total Cost	Monitoring 1%
1	Kaliyana (part)	1115	13380000	133800
2	Birhi Kalan	1017	12204000	122040
3	Kheri Batter	915	10980000	109800

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

Sr. No.	Name of the Micro Watersheds	Effective Area	Total Cost	Evaluation 1%
1	Kaliyana (part)	1115	13380000	133800
2	Birhi Kalan	1017	12204000	122040
3	Kheri Batter	915	10980000	109800

CONSOLIDATION PHASE- 3 %

Consolidation Phase = Rs. 10, 96,920 /-

8.3 CONSOLIDATION PHASE

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

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

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

Name of Micro watershed: Kaliyana

Table 3. Consolidated Phase

S. No.	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.80
2	Preparation of Project completion report	0.20
3	Documentation of success stories	0.20
4	Management of proper utilization of WDF	0.60
5	Mechanism for quality and sustainability issues under the Project	0.20
6	Watershed activities	2.01

Total: 4.01 lacs

Name of Micro watershed: Birhi Kalan

Table 4. Consolidated Phase

S. No.	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.73

2	Preparation of Project completion report	0.19
3	Documentation of success stories	0.18
4	Management of proper utilization of WDF	0.55
5	Mechanism for quality and sustainability issues under the Project	0.18
6	Watershed activities	1.83

Total: 3.66 lacs

Name of Micro watershed: Kheri Batter

Table 5. Consolidated Phase

S. No.	Type of activity	Amount earmarked
1	Managing/ upgrading of all activities taken up under the project	0.66
2	Preparation of Project completion report	0.17
3	Documentation of success stories	0.16
4	Management of proper utilization of WDF	0.49
5	Mechanism for quality and sustainability issues under the Project	0.16
6	Watershed activities	1.65

Total: 3.29 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 3047 ha and the Project Cost is 365.64 lacs covering 3 no. micro watersheds and in all 3 villages. Benefits will be much more than the project cost as detailed below:

With the several interventions under IWMP V 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 Kaliyana Watershed V 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 engaged for 4 to 5 months. Similarly due to lack of fodder animal husbandry does not keep them engaged full time. Thus the people mainly depend upon casual labour either in the villages is in Charkhi Dadri and Bhiwani 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	Kaliyana	4051	7937	11988	127	154	281	22	11	11	44
2	Kheri Batter	5223	5594	10817	138	149	287	11	11	22	44
3	Birhi Kalan	3122	11382	14504	95	178	273	11	22	11	44
	Total	12396	24913	37309	360	481	841	44	44	44	132

37309 man days would be generated with the implementation of the project in Kaliyana Watershed (IWMP V), which means 933 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 Kaliyana Watershed (IWMP V)

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	Kaliyana	201	100	90-180	45-90	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
2	Kheri Batter	202	90	90-180	45-90	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
3	Birhi Kalan	202	101	90-180	45-90	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%

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

9.3 GROUND WATER TABLE (Drinking Water)

The Drinking Water supply is managed by Public health Department through canal network and farmer had also installed the Shallow Tube well which are located along the canal / water bodies. The most of the area is underlain by marginal to brackish water. 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 Watershed/ Villages	Source	Pre- Project level (m)	Expected post- project level (m)
1	Kaliyana	Open well	8.00	Techniques will be introduced to check the further rise in water table (conjunctive use and bio-drainage)
2	Kheri Batter	Open well	10.00	
3	Birhi Kalan	Open well	4.00	

Source: Ground Water Cell, Haryana

9.4 CROPS

Agriculture primary depends upon water, but this is availability of this is lacking without existence of canal network and deeper ground water conditions. All this can change with the integrated land and water management during the watershed project. The planned Dug out Ponds, Drain, Water Conveyance System 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 Kaliyana Watershed (IWMP V)

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 yieldKg. Per ha			Area ha	Average yield Kg. Per ha		
Kaliyana	Wheat	358	4521	1618518	218.50	394	4657	1833781	247.56
	Mustard	224	1320	295680	88.70	251	1386	347720	104.32
	Bajra	374	1829	684046	85.51	415	1902	789663	98.71
Kheri Batter	Wheat	204	4525	923100	124.62	224	4661	1045872	141.19
	Mustard	138	1335	184230	55.27	155	1402	216654	65.00
	Bajra	431	1835	790885	98.86	478	1908	912998	114.12
Birhi Kalan	Wheat	251	4522	1135022	153.23	276	4658	1285980	173.61
	Mustard	325	1341	435825	130.75	364	1408	512530	153.76
	Bajra	356	1829	651124	81.39	395	1902	751658	93.96

Total		2661				2952			
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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 Watersheds	Existing area under horticulture (ha)	Additional Area under horticulture proposed to be covered through IWMP	Total area in ha – Post Project
1	Kaliyana	5	10	15
2	Kheri Batter	6	10	16
3	Birhi Kalan	4	15	19
	Total	15	35	50

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
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1	Kaliyana	25	10	35
2	Kheri Batter	15	15	30
3	Birhi Kalan	14	15	29
	Total	54	40	94

9.7 LIVESTOCK

Table 7. Details of livestock in the project area

S. No.	Name of micro watersheds	Type of Animals	Pre project			Post project			Remarks
			No.	Yield Kg/ day	Income In Rs per day	No.	Yield Kg/ day	Income In Rs per day	
1	Kaliyana	Buffalo	808	12-18	360- 540	929	14-19	414- 621	Increase in milk yield and number of animals by approx. 15%
		Cow	110	8-12	160- 240	127	9- 14	184- 276	Increase in milk yield and number of animals by approx. 15%
2	Kheri Batter	Buffalo	971	10-16	300- 480	1117	11- 18	345- 552	Increase in milk yield and number of animals by approx. 15%
		Cow	98	8-11	160- 220	113	10- 13	184- 253	Increase in milk yield and number of

S. No.	Name of micro watersheds	Type of Animals	Pre project			Post project			Remarks
			No.	Yield Kg/ day	Income In Rs per day	No.	Yield Kg/ day	Income In Rs per day	
									animals by approx. 15%
3	Birhi Kalan	Buffalo	1875	12-18	360- 540	2156	14-19	414- 621	Increase in milk yield and number of animals by approx. 15%
		Cow	283	8-12	160- 240	325	9- 14	184- 276	Increase in milk yield and number of animals by approx. 15%

9.8 LINKAGES

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

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

Table. 8: Backward-Forward Linkages

Sr. No.	Project	Type of Marketing Facility	Pre-Project (no.)	During the Project (no.)	Post-project (no.)
1	Kaliyana Watershed (IWMP V)	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

Sr. No.	Project	Type of Marketing Facility	Pre-Project (no.)	During the Project (no.)	Post-project (no.)
		Labour	-	Employment generate through works activities	Migration reduce
		Any other (please specify)	-	-	-
		Road network	Available	Coordinate with lined department	Would be strengthen
		Transport facilities	Moderate	Coordinate with lined department	Would be promoted
		Markets / Mandies	Exists	Coordinate with lined department	Intensity would be increased
		Agro and other industries	-	Coordinate with lined department to establish Cottage industries (Kutir Udyog) for landless and unemployed youth	Would be strengthen
		Milk and other collection centres	Milk collection centre in long distance	Coordinate with lined department	For installation on nearest door steps
		Any other (please specify)	-	-	-
			Vermi-compost unit	Convergence with NHM (Horticulture) department	To be increased

Sr. No.	Project	Type of Marketing Facility	Pre-Project (no.)	During the Project (no.)	Post-project (no.)
			Mushroom Cultivation	Convergence with NHM (Horticulture) department	To be increased
			Animal vitamins/ Minerals Deficit	Coordinate with lined department, to organize camps in watershed area	Animal vitamins feeds Would be promoted

9.8.1 LOGICAL FRAMEWORK ANALYSIS

Table 9. Logical Framework Analysis

Components	Activities	Outputs	Effect	Impact
Village Institution Formation	Formation of Watershed Community, User Groups	<ul style="list-style-type: none"> • Watershed Committee each village • Number of user groups depending on the coverage of particular intervention 	Project can be implemented and managed in a democratic and Participatory way ensuring equity and transparency.	<ul style="list-style-type: none"> • Unity and prosperity in the village management. • People's Participation and positive perception towards the programme.
Strengthening Village operations	<ul style="list-style-type: none"> • Organizing training and awareness programme for village institutions 	<ul style="list-style-type: none"> • Awareness camps to be organized • Trainings and exposure 	<ul style="list-style-type: none"> • Quality of management of common resources improved. 	

Components	Activities	Outputs	Effect	Impact
	<p>(I.E.C. Activities).</p> <ul style="list-style-type: none"> • Capacity Building workshops and exposure visits for User Group and Watershed Community • Facilitating and monitoring the functioning of UGs and WCs Strengthen linkages between UGs and WCs and Panchayat Institutions • Gender sensitization of UGs and WCs to increase inclusiveness of Samuh (Joint) decision making. • Sensitize Village communities to involve children and youth in development 	<p>visits UGs and WCs to be held Capacity building workshops to be organized one.</p> <ul style="list-style-type: none"> • Federations of UGs and WC to be formed. 	<ul style="list-style-type: none"> • Quality of distribution of benefits between people improved. • Increased awareness amongst women about village resources • Women participation enhanced in decision-making of GVCs. • Involvement of youth and children in village development. 	
Fund Management	<ul style="list-style-type: none"> • Improve management and utilization of UGs and 	UGs and WCs operating bank account and managing resources on	<ul style="list-style-type: none"> • Purpose, frequency and volume of use of the fund enhanced 	

Components	Activities	Outputs	Effect	Impact
	<p>WCs</p> <ul style="list-style-type: none"> • Prepare communities to explore other sources of income for UGs and WCs. 	<p>their own.</p>	<ul style="list-style-type: none"> • Volume of funds generated for UGs and WCs from other sources of income increased 	
<p>Ecological restoration</p>	<ul style="list-style-type: none"> • Protection, Treatment and regeneration of common and private lands. • Protection, treatment and regeneration of forest lands. • Input trainings, conduct meetings and organize exposure visits for communities, village volunteers and staff to effectively plan, execute and monitor activities. • Identification and promotion of non-timber forest produce based income generation activities. 	<ul style="list-style-type: none"> • Common and private lands to be brought under new plantations and agro-horti- forestry like Neem, Adussa, prosopis, Banyan and Peepul. • Forest lands to be brought under new plantations and protection. • Trainings, exposure visits and meetings to be organized for communities, village volunteers and staff. • Income generation intervention promoted 	<ul style="list-style-type: none"> • Fodder availability from common and private land increased. • Accessibility to common and forest lands increased with removal of encroachments and resolution of conflicts 	<ul style="list-style-type: none"> • Better Ecological order in the area. • Increase in the proportion of households having more security of fodder. • Reduction in drudgery of fodder and fuel collection, especially women

Components	Activities	Outputs	Effect	Impact
Rainfed Area Development	<ul style="list-style-type: none"> • Treatment of land through improved soil and moisture conservation practices on watershed basis. • Promotion of good agricultural practices- horticulture, improved crop and vegetable. • Promotion of organic farming practices. • Formation of Fodder banks to increase fodder security and promote dairy development among communities. • Identification and promotion of agri-produce based income generation activities like grading, processing and packaging. • Promotion of better irrigation practices like drip 	<ul style="list-style-type: none"> • Land to be brought under improved soil moisture conservation practices. • Good agricultural practices to be promoted. • Organic farming to be promoted. Fodder banks to be established. • Agriculture based livelihood income generation activities to be promoted • Water harvesting structures to be constructed. • Drip irrigation facilities to be distributed among farmers. • Approx 15000 person days of employment to be generated. • Trainings, exposure visits and meetings to be organized for communities, village volunteers. 	<ul style="list-style-type: none"> • Improved productivity of treated land. • Increased availability of water in cells. • Increase in annual agricultural production. • Farmers adopt organic farming practices. • Fodder security of farmers enhanced. • Increased availability of water for 9 to12 months. • Increased availability of water for livestock • Increase in agricultural productivity of land. • Augmentation of drinking water supply. 	<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
	irrigation <ul style="list-style-type: none"> • Impart trainings, conduct meetings and organize exposure visits of communities. 			
Women's socio-political and economic empowerment	<ul style="list-style-type: none"> • Formation and strengthening of women' SHG groups • Capacity building of women folk. • Capacity building of SHG leaders and accountants Linking SHGs with external financial institutions 	<ul style="list-style-type: none"> • Women's SHG groups to be formed. • Federation of Women's SHGs to be formed. • Trainings to be conducted for preparation of woolen products from sheep and goats 	<ul style="list-style-type: none"> • Enhanced capacities of leaders of women's group in taking initiatives to solve problems at different levels. • Improved access to credit for livelihood purposes Increased household income. 	<ul style="list-style-type: none"> • Position of women in household, community, society (politically, socially and economically) as perceived by women and community at large. • Performance enhancement of SHGs in terms of participation, decision-making, leadership and fund management. • Equality and equity in gender relations at home (decision making, expenditure, children's education, health)

The adoption of soil and water management practices, renovation of village ponds and plantations not only improve productivity but also improve village environment. The investments made in water resources development would ease shortage of water both for domestic use and livestock and also make available water for supplemental irrigation.

The introduction of improved production technologies would stabilize crop production, save crops from adverse impacts of droughts and raise income level of farmers. The increased fodder availability and animal health care, the milk production would increase. There would be increased cash flows from subsidiary occupations. The increased awareness, operations through SHGs and easy availability of finance would make the communities more vibrant and enterprising.