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CHAPTER- 1

METHODOLOGY

INTRODUCTION

The Government of India (GOI) has adopted watershed management as a national policy since 2003. Several studies have highlighted that appropriate natural resource management and its utilization results in enhancement agricultural productivity.In order to achieve food security, minimize the water conflicts and reduce poverty, it has become essential to increase productivity of rainfed / dry land farming by 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 & IWDP were brought under one umbrella in the name of Integrated Watershed Management Programme in the year 2008. The scheme is basically for rainfed area, Common Guidelines were framed by National Rainfed Area Authority. Rural Development Department is the Nodal Department for implementation of IWMP through State Level Nodal Agency.

To implement watershedarea (IWMP I)programme a systematic survey has been conducted to know the potentiality of the village. With this view, a baseline survey was conducted in eight micro- watershedsLoherheri (2C5F4k2), Dahkora (2C5F4m2), Jakhoda (2C5F4g2), Kulasi (2C5F4h5), Rohad (2C5F4m3), Asoudha Siwan (2C5F4g4), Nilothi (2C5F4j2), Kanound (2C5F4h4)each village representing the micro- watershed. 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 I) of 8 micro watersheds namelyLoherheri (2C5F4k2), Dahkora (2C5F4m2), Jakhoda (2C5F4g2), Kulasi (2C5F4h5), Rohad (2C5F4m3), Asoudha Siwan (2C5F4g4), Nilothi (2C5F4j2), Kanound (2C5F4h4) with their respective codes.

1.1.2Base Line Survey

Bench mark survey was conducted for collection of base line data on various bio-physical and socio-economic aspects. The methodology adopted was as follows:

1.1.3 Collection of Primary Data

The project was sanctioned in 30th Steering committee meeting for IWMP on 30.01.2013 and the preparatory phase started in 2013.Initially, a meeting was arranged with officials of concerned departments and technical experts located at Loherheri, Dahkora, Jakhoda, Kulasi, Rohad, Asoudha Siwan, Nilothi, Kanoundmicro- watersheds. During this meeting, Preliminary Project Report (PPR) was discussed.

In order to have first hand information, a joint visit in the project area was made along with Panchayati Raj Institution (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 of the area available on the 1:50000 scales were procured of the project area and all assigned villages were marked on the copies of the toposheets as well as on the maps prepared by Soil and Land Use Survey of India (SLUSI).

The primary data was also compiled from revenue records, Anganwari workers and statistical officers of the district. Rainfall data was collected from the Ground Water Cell/ Revenue Department who maintains 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 information on Demographic, socio-economic, infrastructure, land use, primary and secondary occupation, major crops grown and crop production 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 generated through the 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 collected from record and discussions with the PRI and stake-holders.

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 proposedtechno-economical feasible activities were discussed and finalized. Due records of discussions were maintained. Similarly, discussions were held about entry point activities and items of work were finalized keeping in view the availability of funds in the project. Through discussions were held on production activities and innovative techniques of improving crop, fruit and milk production. The women groups were sensitized about income generating activities and skill improvement by various types of trainings. The department field staff facilitated the process of participation at the planning stage. The department officials simultaneously stated the process of forming watershed committees for each village. The roles and responsibilities of all stake holders as per guidelines , the mechanism of fund flows, cost sharing arrangement in different components and operational mechanism of the projects was thoroughly discussed with the community and Watershed Committees (WC) in detail.

1.2.1Participatory Net Planning

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

Based on the experience of the experts working in the area and catchment area characteristics each structures like Water conveyance system, Dug Out Pond (New/Renovation), Ramp/Ghat Inlet and Outlet, Roof top rain water recharge structuresetc. 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, agriculture land etc. were mapped.

1.2.3 Transect Walk

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

1.2.4 Focus Group Discussions

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

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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. All Watershed maps (micro- watershed) have been prepared based on the watershed maps made available by Soil and Land use Survey of India (SLUSI) with coding. The services of HARSAC have been provided through SLNA for preparation of Land use and soil classification map.

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, Soil fertility and Land Capability classes. All these parameters were given weightage as per the guidelines issued by Govt. of India. The map prepared was used during the field visit for finalization of works.

1.3.2 Planning

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

Based on the experience of the experts working in the area and catchment area characteristics each structure like Water conveyance system, Dug Out Pond (New/Renovation), Ramp/Ghat Inlet and Outlet, Roof top rain water recharge structures 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	N.A.
	Online IT connectivity between	Yes
	1. Project and DRDA cell/ZP	Yes
	2. DRDA and SLNA	Yes
	3. SLNA and DoLR	Yes
	Availability of GIS layers	Yes
	1. Survey of India map/imagery /SLUSI map	Yes
	2. Micro- Watershed Boundary	Yes
	3. Drainage pattern	Yes

S.No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	4. Soil (soil fertility status)	Yes
	5. Land use	Yes
	6. Ground water status	Yes
B	Inputs	-
	Bio pesticides	Yes
	Organic manure	Yes
	Vermin- compost	Yes
	Bio Fertilizer	Yes
	Water saving devices	Yes
	Mechanical tools	Yes
	Bio fencing	No
	Nutrient Budgeting	No
	Automatic water level recorder & sedimentation samplers	No

1.4 Preparation of Action Plan and Approval

Based on the need and problems in watershed area; a draft action plan was prepared and placed before the concerned watershed development committee as per schedule circulated by Project Implementing Agency (PIA) 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-I) project is falls in Bahadurgarh block of Jhajjar district in Haryana state. The project is a cluster of eight micro - watersheds namely Loherheri (2C5F4k2), Dahkora (2C5F4m2), Jakhoda (2C5F4g2), Kulasi (2C5F4h5), Rohad (2C5F4m3), Asoudha Siwan (2C5F4g4), Nilothi (2C5F4j2), Kanound (2C5F4h4). The total geographical area of the project is **5255 ha** out of which **3775 ha** has been undertaken to be treated under IWMP-I starting from year 2012-2013. The project is divided into eight micro watersheds. The Base map is shown in Annexure I.

Table 1: Basic Project Information

Sr. No	Name of the project	Name of the micro watersheds	Code No.	Name of the villages	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
1	Bahadurgarh	Loharheri	2C5F4k2	Loharheri	Bahadurgarh	Jhajjar	453	400	48	ASCO, Jhajjar
2	Bahadurgarh	Dohkora	2C5F4m2	Dohkora	Bahadurgarh	Jhajjar	548	510	61.2	ASCO, Jhajjar
3	Bahadurgarh	Kulasi	2C5F4h5	Kulasi	Bahadurgarh	Jhajjar	707	500	60	ASCO, Jhajjar
4	Bahadurgarh	Asauda	2C5F4g4	Asauda sewan	Bahadurgarh	Jhajjar	701	495	59.4	ASCO,

Sr. No	Name of the project	Name of the micro watersheds	Code No.	Name of the villages	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
		sewan								Jhajjar
5	Bahadurgarh	Jakhauda	2C5F4g2	Jakhauda	Bahadurgarh	Jhajjar	564	510	61.2	ASCO, Jhajjar
6	Bahadurgarh	Rohad (part)	2C5F4m3	Rohad (part)	Bahadurgarh	Jhajjar	883	520	62.4	ASCO, Jhajjar
7	Bahadurgarh	Kanaund (Part)	2C5F4h4	Kanaund (Part)	Bahadurgarh	Jhajjar	608	440	52.8	ASCO, Jhajjar
8	Bahadurgarh	Nilothi (Part)	2C5F4j2	Nilothi (Part)	Bahadurgarh	Jhajjar	461	400	48	ASCO, Jhajjar
					Grand Total		**4925**	3775	453	

2.2 NEED OF WATERSHED DEVELOPMENT PROGRAMME

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

i. poverty index,
ii. percentage of SC,
iii. actual wages,
iv. percentage of small and marginal farmers,
v. ground water status,
vi. moisture index,
vii. area under rain fed agriculture,
viii. drinking water situation in the area ,
ix. percentage of degraded land,

x. productivity potential of land,

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

xii. cluster approach for plain terrain,

xiii. cluster approach for hilly terrain,

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

Table 2. Criteria and Weightage for Selection of Watershed

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

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 the project)	15	Above 5 micro-watersheds in cluster (15)	3 to 5 micro-watersheds in cluster (10)	2 to 3 micro-watersheds in cluster (5)	
	Total	**150**	**150**	**93**	**37**	**2.5**

Based on above criteria and weightage of 73.5 concerning these thirteen parameters, a composite ranking was given to Bahadurgarh Watershed (IWMP I) project as given in **Table- 3.**

The total numbers of families under BPL are about 50 to 80% of the total number of households in the village. Hence a score of 7.5 was allotted. Rain fed agriculture is 80 to 90% hence a score of 10 is provided and more than 80% farmers are small and marginal. So the scoring is done 10. The score regarding status of the ground water in the project area is given as 5. The percentage of schedule castes in this watershed are less than 20 percent of the total population, hence 3 score was allotted. With all the parameters taken together gives the watershed score to be 73.5.

Table- 3: Weightage of the Project

1	2	3	4	5	6	7	8													
S. No.	District	Name of the project	No. of micro-watersheds/Villages proposed to be covered	Proposed project area (ha)	Type of project (Hilly/ Desert/ Others)	Proposed cost (Rs. in lakh)	Weight age under the criteria													
							i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	Total
1	Jhajjar	Bahadurgarh Sub-Watershed (IWMP I)	8	3775	Semi Arid	453.00	7.5	3	0	10	3	15	10	5	5	10	0	5	0	73.5

Table 4: Watershed Information

Name of the Project	No. of Micro-Watersheds to be Treated	Watershed codes	Watershed regime/type/order
Bahadurgarh Watershed (IWMP I)	8	2C5F4k2, 2C5F4m2, 2C5F4g2, 2C5F4h5, 2C5F4m3, 2C5F4g4, 2C5F4j2 and 2C5F4h4	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), Total Sanitation Campaign (TSC), Swarnajaynti Gram Swarojgar Yogna (SGSY) and Indira Awas Yojana (IAY), NWDPRA. 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	Loharheri	DRDA, Jhajjar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	99
2	MGNREGA	Dohkora	DRDA, Jhajjar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	-
3	MGNREGA	Kulasi	DRDA, Jhajjar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	86
4	MGNREGA	Asauda Sewan	DRDA, Jhajjar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	17
5	MGNREGA	Jakhauda	DRDA, Jhajjar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	16
6	MGNREGA	Rohad (Part)	DRDA, Jhajjar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	78
7	MGNREGA	Kanaund (Part)	DRDA, Jhajjar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	-
8	MGNREGA	Nilothi (Part)	DRDA, Jhajjar	To provide assured employment of 100 days in a year to unskilled labour and development of village.	154

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

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

Watershed Area Development Treated/Sanctioned										
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)
Jhajjar	323	177460	121	62393	0	0	121	62393	202 (balance) 34	115067 (balance) 14819

CHAPTER – 3

BASIC INFORMATION OF THE PROJECT AREA

GEOGRAPHY AND GEOHYDROLOGY

The Bahadurgarh Watershed (IWMP I) falls in Bahadurgarh Block of District Jhajjar. The area of watershed lies in between 28˚41'15''to 28˚47'10'' N Latitude & 76˚47'00'' to 76˚55'10'' east longitude with general elevation varies between 212-224 m MSL (google earth map) above mean sea level. The average rainfall of district is 455 mm. 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 Bahadurgarh Watershed (IWMP I)

Sr. No.	Name of Micro Watersheds With Code	Name of Villages	Geographical Area in (ha)	Treatable area of the village(ha)	Land under agriculture use (ha)	Rain fed area (ha)	Wasteland	
							Cultivable	Non-Cultivable
1	Loharheri (2C5F4k2)	Loharheri	453	400	326	273	-	127
2	Dahkora (2C5F4m2)	Dohkora	548	510	361	323	12	175
3	Kulasi(2C5F 4h5)	Kulasi	707	500	572	375	-	135
4	Asoudha Siwan (Part) (2C5F4g4)	Asauda sewan	701	495	615	414	19	67
5	Jakhoda(2C5 F4g2)	Jakhauda	564	510	504	460	-	60
6	Rohad (part) (2C5F4m3)	Rohad (part)	883	520	773	385	20	90
7	Kanound (Part) (2C5F4h4)	Kanaund (Part)	608	440	541	333	19	48
8	Nilothi (Part) (2C5F4j2)	Nilothi (Part)	461	400	406	385	-	55
			4925	**3775**	**4098**	**2948**	**70**	**757**

(Source – District Census Handbook, 2001 Jhajjar)

3.2 SOIL AND TOPOGRAPHY

The soils of Bahadurgarh Watershed are very deep, sandy loam to clay loam or clay typic ustipssament, typic haplusteps, typic natrustalf and aeric ustifluvent. The topography of the area ranges from level to gentle slopes. Soils are subject to susceptible to moderate to severe erosion. The slope ranges from 0.5 to 3%, most of the area of micro watersheds falls under level to gentle slopes on dune and level to nearly level in interdunal depressions. Slope map is presented in **Annexure IV.**

Table 2. Soil type and Topography

Sr. No.	Name of Micro Watersheds	Code	Geographical area (ha)	Major Soil types	Topography
1.	Loharheri	2C5F4k2	453	Loamy sand to loam	Level to nearly level slope
2.	Dohkora	2C5F4m2	548	Sandy loam to sandy clay loam	Level to nearly level slope
3.	Kulasi	2C5F4g2	707	Loam to clay loam	Level to nearly level slope
4.	Asauda sewan	2C5F4h5	701	Sandy loam to loam	Level to nearly level slope
5.	Jakhauda	2C5F4m3	564	Sandy loam to sandy clay loam	Level to nearly level slope
6.	Rohad (part)	2C5F4g4	883	Sandy loam to loam	Level to nearly level slope
7.	Kanaund (Part)	2C5F4j2	608	Sandy loam to loam	Level to nearly level slope
8.	Nilothi (Part)	2C5F4h4	461	Sandy loam to sandy clay loam	Level to nearly level slope
			4925		

Source: - Department of Agriculture, Haryana

3.2.1 Flood and Drought Condition

There has been incidence of flood and drought in the watershed villages. The data collected from the revenue department reveals the instances of flood occur once in five Years and drought once in a five Year. The absence of assured irrigation and drought resulted in low to very low yields of the crops.

Table 3. Flood and Drought condition

Sr. No.	Name of Micro- watersheds	Flood Incidence	Drought Incidence
1.	Loharheri	Once in 5 years	Once in 5 years
2.	Dohkora		
3.	Kulasi		
4.	Asauda sewan		
5.	Jakhauda		
6.	Rohad (part)		
7.	Kanaund (Part)		
8.	Nilothi (Part)		

3.3 SOILS

3.3.1 Soil Erosion

In the identified eight micro watersheds, it is observed that due to light texture & less vegetative cove the soil loss is comparatively high. To minimize the loss of soil in the watershed area the efforts are to be made in collective manner. This results in degradation of agricultural land, deforestation and low organic matter contents. Average annual rainfall is 455 mm of the area. In the watershed area the upper soil crest gets washed away in the form of runoff during rainy season. If heavy storm occurs also carries valuable top soil (sheet) and causes heavy losses. Soil erosion in respect of sheet is very severe. Majority of the watershed Community are dependent on agriculture. Agriculture suffers due to deficit rainfall in the region, resulting in further deterioration of socio economic conditions of community.

3.3.2 Soil Salinity/Alkalinity

There is moderate soil salinity in the Project and pH is normal and within the limits of 7.5 to 8.4.

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.	Loharheri	7.7	Medium to Safe
2.	Dohkora	7.9	Medium to Safe
3.	Kulasi	8.4	Salinity and waterlogging problems
4.	Asauda sewan	8.1	Medium to Safe
5.	Jakhauda	7.6	Medium to Safe
6.	Rohad (part)	8.1	Medium to Safe
7.	Kanaund (Part)	8.4	Salinity and waterlogging problems
8.	Nilothi (Part)	7.5	Medium to Safe

3.3.3 SOIL CLASSIFICATION

The Soil map is presented in **Annexure V**. The fertility status of the project area, available nitrogen and available phosphorus are low. However, the available potash is medium. The fertility status map of the project area is exhibited in **Annexure-VI**.

3.3.4 Land Capability Classification

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

management of soils, the land capability sub classes were indicated by adding the following limitation symbols to the capability classes:

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

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

Land capability subclass III e2s2

These soils are very deep, light to coarse loamy/ fine loamy texture located on level to nearly level slope. These soils are well drained, moderately permeable, moderate water holding capacity and moderate to severe erosion hazard.

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

1. Land leveling should be done at 50% subsidy, because formers are not economically capable to bear the rate of land leveling.
2. Engineering measures with other measures be under taken.
3. Agronomic measures like Dry farming, strip& Mixed cropping with other soil conservation measures like agro forestry and rainfed horticulture are recommended.
4. Green manuring should be promoted for increase physical and chemical properties of soil.
5. Strengthening of old abandoned water courses.
6. Provide water storage tanks for storage of excess water for using supplementary irrigation during lean period.

Land capability subclass IV e3s3

These soils are very deep, light textured soils nearly level lands. The water holding capacity is poor to very poor and the water erosion hazard is moderate to severe. The wind erosion is also a main cause to create undulating topography.

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

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

3.3.5 Climatic Conditions

The average rainfall of the district is 455 mm (during the past 10 years data). The highest rainfall is 902 mm during the year 2003. The year wise rainfall from 2003 to 2012 is presented in **Table.5**

Table-5. Rainfall during the years 2003-12

Sr.No.	Year	Rainfall (in mm)
1	2003	902
2	2004	440
3	2005	556

4	2006	352
5	2007	270
6	2008	711
7	2009	460
8	2010	501
9	2011	239
10	2012	121
	Average Rainfall	**455**

(Source: - Deputy Director Agriculture, Jhajjar)

The mean maximum temperature is 41.8˚ C (May and June) and mean minimum is 5.6˚ C (January) of the district.

3.3.6 Physiography and Reliefs

The general Elevation in the area belongs to stabilized sand dunes and Interdunal plains 212-224 m above mean sea level. The water is drained through fields and creates temporary water logging conditions in depressions and along the water bodies**.** The elevation range and percentage slope distribution has been presented in **Table 6.**

Table 6. Physiography and Relief

Project Name	Elevation (MSL)	Slope Range (%)
Bahadurgarh Watershed (IWMP I)	212-224 m	Less than 0.5 to 3%

3.4 LAND AND AGRICULTURE

The land holding pattern of the villages under Bahadurgarh Watershed shows that the majority of the land holding is below 3.0 ha. The lack of assured irrigation source has forced the majority of the small farmers and landless labours of Watershed to migrate from village to the nearby industrial area of Bahadurgarh town and other part of NCR toensure their employment and livelihood. This affects directly the demographic profile of the villages.

The major crops Bajra, Gawar, green fodder and pulses in Kharif under rain fed conditions. The major crops during Rabi wheat, mustard, gram, green fodder and seasonal vegetables in rain fed and irrigated conditions. The soil and water conservation measures such as Engineering like Water conveyance system, Dug Out Pond (New/Renovation), Ramp/Ghat Inlet and Outlet, Roof top rain water harvesting/recharge structures etc. The project would help the farmers to take crop production which will enhance the net production value. The following plants are commonly observed in the Project Area. The natural vegetation in the project area is exhibited in **Table 7.**

Table 7. NATURAL VEGETATION

Sr. No.	Trees	Fruits	Grasses and Shurbs
1	Neem	Guava	Congress grass
2	Shisham	Jamun	
3	Kikar	Mango	
4	Pipal		
5	Papdi Shahshut		
6	Safeda		

3.4.1 Land Ownership Details

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

Table 8:- Land Ownership Details

GENERAL	OBC	SC	ST	Total owners
8098	135	-	-	8233

3.4.2 AGRICULTURE/PATTERN

Table 9. Agriculture/ Pattern

Sr. No.	Name of Micro Watersheds	Village	Land under agriculture use (ha)	Net Sown area (ha)	
				One time	Two times
1	Loharheri	Loharheri	326	276	203
2	Dohkora	Dohkora	591	493	381
3	Kulasi	Kulasi	672	546	435
4	Asauda sewan	Asauda sewan	615	521	371
5	Jakhauda	Jakhauda	504	426	321
6	Rohad (part)	Rohad (part)	773	626	518
7	Kanaund (Part)	Kanaund (Part)	541	444	343
8	Nilothi (Part)	Nilothi (Part)	406	337	261
			4428	**3669**	**2833**

(Source: Department of Agriculture, Haryana)

3.4.3 IRRIGATION

Lack of Assured Irrigation Facilities

The present source of irrigation is canal and ground water where the area is underlain by fresh to marginal. 3637 ha are irrigated with the existing canal network. The remaining cultivable area is under rainfed agriculture. The present source of irrigation in the watershed has been tabulated in **Table 10.**

Table 10. Irrigation Pattern.

Sr. No	Name of Micro Watersheds	Name of Villages	Source 1: Canal		Source 2: Groundwater (Tube wells)	
			Availability months	Net area (ha)	Availability months	Net area (ha)
1	Loharheri	Loharheri	July to June	46	July to June	7
2	Dohkora	Dohkora	July to June	32	July to June	6
3	Kulasi	Kulasi	July to June	184	July to June	13
4	Asauda sewan	Asauda	July to June	121	July to June	80

Sr. No	Name of Micro Watersheds	Name of Villages	Source 1: Canal		Source 2: Groundwater (Tube wells)	
			Availability months	Net area (ha)	Availability months	Net area (ha)
		sewan				
5	Jakhauda	Jakhauda	July to June	31	July to June	13
6	Rohad (part)	Rohad (part)	July to June	198	July to June	190
7	Kanaund (Part)	Kanaund (Part)	July to June	164	July to June	44
8	Nilothi (Part)	Nilothi (Part)	July to June	17	July to June	7
				793		**360**

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

3.4.4 CROPPING PATTERN (crop details)

Cropping Pattern

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

Table 11 A. Crop Details (Rabi)

Sr. No	Name of Micro Watersheds	Village	Wheat				Mustard			
			Area (ha)	Prod. (Qtl.)	Productivity (Qtl./ha) Avg.	Use of fertilizer	Area (ha)	Prod. (Qtl.)	Productivity (Qtl./ha) Avg.	Use of fertilizer
1	IWMP-I	Loharheri	298	9628	36	D.A.P/ Urea	38	418	11	Urea/ Sulphar
2		Dhahkora	312	12480	40	D.A.P/ Urea	110	1210	11	Urea/ Sulphar
3		Kulasi	539	19040	36	D.A.P/ Urea	35	450	12	Urea/ Sulphar

4		Asuoda Siwan	225	8550	38	D.A.P/ Urea	81	972	12	Urea/ Sulphar
5		Jakhoda	195	7215	37	D.A.P/ Urea	5	55	11	Urea/ Sulphar
6		Rohad	1081	39997	37	D.A.P/ Urea	100	1200	12	Urea/ Sulphar
7		Kanaunda	659	23724	36	D.A.P/ Urea	100	1200	12	Urea/ Sulphar
8		Nilothi	648	245254	38	D.A.P/ Urea	11	132	12	Urea/ Sulphar
			3957	**365888**			**480**	**5637**		

Table 11 B. Crop Details (Kharif)

Sr. No	Name of Micro Watersheds	Village	Paddy				Bajra				Jawar		
			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	IWMP-I	Loharheri	-	-	-	-	60	600	10	Urea	148	Fooder +500	10
2		Dhahkora	3	90	30	Urea	67	670	10	Urea	94	Fooder +500	10
3		Kulasi	229	6870	30	Urea	40	400	10	Urea	209	Fooder +800	10
4		Asuoda Siwan	37	1147	35	Urea	54	594	11	Urea	116	Fooder +450	9
5		Jakhoda	19	570	30	Urea	82	820	10	Urea	63	Fooder +500	10
6		Rohad	579	18528	32	Urea	76	836	11	Urea	202	Fooder +900	9
7		Kanaunda	172	5504	32	Urea	31	341	11	Urea	81	Fooder +180	9
8		Nilothi	268	8308	31	Urea	52	572	11	Urea	123	Fooder +160	10
			1307	**41017**			**462**	**4833**			**1036**		

3.4.5 Livestock

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

Table 12. Village Wise Distribution of Milk Production in Bahadurgarh Watershed (IWMP I)

Sr. No	Name of Micro Watersheds	Villages	Buffalo(*Lit/per day/annum) for 6 months	Cow(*lit/per day/annum) for 6 months	Sheep	Goat	Camel
1	Loharheri	Loharheri	585/4095/737100	100/350/63000	--	--	1
2	Dohkora	Dohkora	950/7125/1282500	225/675/121500	--	--	--
3	Kulasi	Kulasi	1000/7000/1260000	200/800/144000	--	10	--
4	Asauda Sewan	Asauda Sewan	950/7600/13680000	350/1575/283500	--	15	--
5	Jakhauda	Jakhauda	1725/12935/2328750	275/960/173250	--	--	--
6	Rohad (Part)	Rohad (Part)	622/5287/951660	215/860/154800	220	50	--
7	Kanaund (Part)	Kanaund (Part)	925/6475/1165500	275/1235/222750	25	125	1
8	Nilothi (Part)	Nilothi (Part)	750/5625/1012500	220/770/138600	--	50	--

(Source: Animal Husbandry, Jhajjar)

***Average milk Yield of Buffalo 7.5 – 8.5 lit/ day and Cow Average milk Yield 3.5- 4.5 lit/ day**

3.4.6 Ground Water Concern

a) Depth to Water

The ground water hydrology focuses on occurrence and distribution of movement of water below the surface. Ground Water Cell of Haryana has fixed hydrograph station scattered in 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 behavior in the watershed reveals the variation of depth to water level from 2.14 to 5.29 m below ground level. The area under Loharheri, Dohkora and Asoda Sewan micro-watersheds have water table less than 2 m. The area under Nilothi, Kulasi and Jakhauda have water table depth in the range of 2 to 3 m. The area under Kanaund and Rohad have water table more than 3 m. The village wise water level data has been tabulated in **Table 13.** Depth to water level map has been prepared and presented in the **Annexure VIII.**

Table 13. Village Wise Depth to Water Level of Bahadurgarh Watershed (IWMP I)

Sr. No.	Name of Micro Watersheds	Name of Villages	Source	Pre- Project level (m)
1	Loharheri	Loharheri	Well	-
2	Dhahkora	Dhahkora	Well	3.21
3	Kulasi	Kulasi	Well	2.74
4	Asuoda Siwan	Asuoda Siwan	Well	2.29
5	Jakhoda	Jakhoda	Well	2.14
6	Rohad	Rohad	Well	3.5
7	Kanaunda	Kanaunda	Well	5.29
8	Nilothi	Nilothi	Well	2.75

The source of drinking water supply is through the tube wells as well as canal network in the area. The micro watershed wise quality ranges from fresh to marginal under shallow water table conditions. The shallow water table area is fresh in

villages located in micro-watershed Nilothi, Loharheri, Asauda Sewan, Kulasi and kanaund, whereas remaining areas lies in marginal water table quality of water table.The water quality map of the area is presented in **Annexure-IX**.

b) Water table fluctuation

From the availability of the data from the period June 1974 to June 2014, it is observed that the water table is marginally declining.

The average seasonal fluctuation i.e. Pre and Post monsoon period is 0.7 m.

c) Rain water harvesting and Recharging

Conservation of ground water is important because it takes years to be replenished. In areas where ground water is used, care must be taken to replenish with rainwater in areas where minor irrigation unit i.e. shallow tubewell units are installed for irrigation.

It has been proposed to make rainwater-harvesting/recharging by construction of water harvesting/recharging structures in the areas where the water table is declining due to the exploitation of ground water.

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

Table 14. Detail of Common Property Resources

Data not available

3.5 SOCIO ECONOMIC AND LITERACY PROFILE

Land holdings: The area under the project is cultivated by small and marginal farmers. Almost 80 percent of the farmers fall under this category.

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

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

3.5.1 Demographic Status

Table 15. Demographic Status/ Population Pattern

S. No.	Name of the Micro watersheds/ villages	Total no. of houses	Total Population			SC			
			Male	Female	Total	Male	Female	Total	%age
1	Loharheri	600	1198	1011	2209	188	159	347	15.7
2	Dohkora	700	1555	1286	2841	180	162	342	12.0
3	Kulasi	2500	2385	1919	4304	315	271	586	13.6
4	Asauda Sewan	700	1534	1292	2826	254	204	458	16.2
5	Jakhauda	3500	2043	1700	3743	274	213	487	13.0
6	Rohad (Part)	1200	4739	3790	8529	1095	935	2,030	23.8
7	Kanaund (Part)	2250	3300	2717	6017	572	472	1,044	17.4
8	Nilothi (Part)	1076	2212	1921	4133	352	298	650	15.7
	Total		**18966**	**15636**	**34602**	**3230**	**2714**	**5944**	**17.2**

(Source- District Census 2011)

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

Sr.No.	Name of the Micro watershed	Name of villages	Total population	Literacy					
				Total Literates	% age	Male	% age	Female	% age
1	Loharheri	Loharheri	2322	1717	73.9	1042	60.7	675	39.3
2	Dohkora	Dohkora	2902	2166	74.6	1307	60.3	859	39.7
3	Kulasi	Kulasi	4069	3018	74.2	1884	62.4	1134	37.6
4	Asauda sewan	Asauda sewan	3121	2201	70.5	1341	60.9	860	39.1
5	Jakhauda	Jakhauda	3799	2856	75.2	1667	58.4	1189	41.6
6	Rohad (part)	Rohad (part)	9256	6441	69.6	3879	60.2	2562	39.8
7	Kanaund (Part)	Kanaund (Part)	5604	3940	70.3	2350	59.6	1590	40.4
8	Nilothi (Part)	Nilothi (Part)	4553	3342	73.4	1924	57.6	1418	42.4
		Total	35626	25681	72.1	15394	59.9	10287	40.1

(Source- District Census- 2011)

Table 17. EMPLOYMENT STATUS

Sr.No.	Name of Micro Watersheds	Name of villages	Schedule caste		Cultivators		Agricultural labourers		Household industry workers		Other workers	
			Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	Loharheri	Loharheri	188	159	292	16	28	7	1	0	132	15
2	Dohkora	Dohkora	180	162	280	10	7	3	2	1	423	51
3	Kulasi	Kulasi	315	271	179	53	43	31	19	0	545	53
4	Asauda sewan	Asauda sewan	254	204	182	7	5	2	11	1	425	35
5	Jakhauda	Jakhauda	274	213	138	15	25	5	54	10	560	69
6	Rohad (part)	Rohad (part)	1,095	935	846	140	170	13	40	22	1191	81
7	Kanaund	Kanaund	572	472	345	56	117	28	26	19	603	77

	(Part)	(Part)										
8	Nilothi (Part)	Nilothi (Part)	352	298	503	22	29	12	5	2	412	50
		Total	**3230**	**2714**	**2765**	**319**	**424**	**101**	**158**	**55**	**4291**	**431**

Source: Census 2011

3.5.2 MIGRATION PATTERN

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

Table 18. Migration Pattern in Bahadurgarh Watershed (IWMP I)

Sr. No.	Name of Micro Watersheds	Name of villages	Total Population	No. of persons migrating	No. of days per year of migration	Main reason for migration	Income during migration/ month/person
1	Loharheri	Loharheri	2600	50	3 month	1. Lack of job opportunity in project area. 2. Poor economic condition of household due to low wages in Agriculture Economy 3. Better employment opportunity outside the native place.	4500
2	Dohkora	Dohkora	4500	200	3 month		4800
3	Kulasi	Kulasi	6500	100	3 month		5500
4	Asauda Sewan	Asauda Sewan	3200	--	--		--
5	Jakhauda	Jakhauda	7250	--	--		--
6	Rohad (Part)	Rohad (Part)	11880	100	4 month		5000
7	Kanaund (Part)	Kanaund (Part)	17500	50	4 month		4500
8	Nilothi (Part)	Nilothi (Part)	9500	100	3 month		5200

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

Table 19. BPL Pattern

S. No.	Name of Micro watersheds/ villages	Total houses	Total Household- BPL	% of BPL HH
1	Loharheri	600	70	11.7
2	Dohkora	700	54	7.7
3	Kulasi	2500	107	4.3
4	Asauda Sewan	700	59	8.4
5	Jakhauda	3500	125	3.6
6	Rohad (Part)	1200	92	7.7
7	Kanaund (Part)	2250	153	6.8
8	Nilothi (Part)	1076	103	9.6
	Total	12526	763	6.1

(Source: District Administration Jhajjar, Haryana)

INFRASTRUCTURE DETAILS

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

Table 20. Village Infrastructure

Sr. No.	Name of Micro watersheds	Name of villages	Bank Y/N	Post office Y/N	School Primary/ High/ Sr.Sec	Milk Collection Centre Y/N	Pucca Road to Village Y/N	Health Facility Govt/Private Y/N	Veterinary facility Y/N
1	Loharheri	Loharheri	N	Y	2 (Govt.) 1 (Pvt.)	N	Y	N	Y
2	Dohkora	Dohkora	N	Y	1 (Govt.) High	N	Y	N	N

Sr. No.	Name of Micro watersheds	Name of villages	Bank Y/N	Post office Y/N	School Primary/ High/ Sr.Sec	Milk Collection Centre Y/N	Pucca Road to Village Y/N	Health Facility Govt/Private Y/N	Veterinary facility Y/N
					School				
3	Kulasi	Kulasi	N	Y	2 (Primary & High School)	N	Y	Y (1 PHC)	Y
4	Asauda Sewan	Asauda Sewan	N	N	2 (Govt.) 1 (Pvt.)	N	Y	Y (1 PHC)	Y
5	Jakhauda	Jakhauda	Y	Y	1 (Govt.) 1 (Pvt.)	N	Y	Y (1 PHC)	Y
6	Rohad (Part)	Rohad (Part)	Y	Y	2 (Govt.) High School	N	Y	Y (1 PHC)	Y
7	Kanaund (Part)	Kanaund (Part)	Y	Y	2 (Govt.) 3 (Pvt.)	N	Y	Y (1 PHC) & (1 CHC)	Y
8	Nilothi (Part)	Nilothi (Part)	N	Y	2 (Govt.) 2 (Pvt.)	N	Y	Y (1 PHC)	Y

FACILITIES/ HOUSEHOLD ASSETS

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

Sr. No.	Name of micro water sheds	Name of villages	Total no. of Houses	HHs with Safe latrines	HHs with phones		HHs with vehicles		HHs with TV sets	HHs with cooking gas	HHs with drinking water	HHs with fridge
					Landline	Mobile	2 wheelers	4 wheelers				
1	Loharheri	Loharheri	600	480	--	1050	400	4	500	330	Pvt. adjustment	400
2	Dohkora	Dohkora	700	580	--	950	250	3 (35 Tractor)	650	300	90	250
3	Kulasi	Kulasi	2500	1275	--	3000	250	80 (105 Tractor)	2300	500	2350	425
4	Asauda Sewan	Asauda Sewan	700	590	35	800	350	12	515	450	670	550

Sr. No.	Name of micro water sheds	Name of villages	Total no. of Houses	HHs with Safe latrines	HHs with phones		HHs with vehicles		HHs with TV sets	HHs with cooking gas	HHs with drinking water	HHs with fridge
					Landline	Mobile	2 wheelers	4 wheelers				
5	Jakhauda	Jakhauda	3500	3350	--	4500	3100	45	3300	3000	3500	1700
6	Rohad (Part)	Rohad (Part)	1200	1200	--	2200	550	--	312	422	1200	750
7	Kanaund (Part)	Kanaund (Part)	2250	1900	300	1875	235	55 (Tractor 65)	1850	1500	1575	1250
8	Nilothi (Part)	Nilothi (Part)	1076	1076	25	2105	1050	155 Tractor	1034	953	1076	835

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 Bahadurgarh Watershed (IWMP I)

Sr. No.	Name of micro watersheds	Name of villages	Agriculture in Rs. P.A	Animal Husbandry in Rs. P.A	Casual labour in Rs. P.A	Others in Rs. P.A	Total income Rs.
1	Loharheri	Loharheri	15000	5000	2000	--	22000
2	Dohkora	Dohkora	6000	8000	2000	--	16000
3	Kulasi	Kulasi	10000	5000	2000	--	17000
4	Asauda Sewan	Asauda Sewan	14000	7000	300	--	21300
5	Jakhauda	Jakhauda	13500	3000	1000	--	17500
6	Rohad (Part)	Rohad (Part)	20000	9000	2000	--	31000

Sr. No.	Name of micro watersheds	Name of villages	Agriculture in Rs. P.A	Animal Husbandry in Rs. P.A	Casual labour in Rs. P.A	Others in Rs. P.A	Total income Rs.
7	Kanaund (Part)	Kanaund (Part)	12000	4000	2000		18000
8	Nilothi (Part)	Nilothi (Part)	14500	4500	2500	--	21500

3.5.4 Comparative Status of crop Productivity

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

3.6 REASONS FOR LOW PRODUCTIVITY

- Lack of assured irrigation for agriculture.
- Poor availability and quality of ground water in deeper aquifer.
- Irregular and erratic rainfall: there is long span between two subsequent rainfalls in the area.
- Sudden change in climate of the area.
- Low organic carbon content.
- Poor physical and chemical properties of the soils are light in texture with boulders in pockets and poor fertility.
- Low water holding/ retention capacity.
- Moderate to rapid permeability.
- Poor phosphorous and medium potash nutrients availability.
- Acceptance of hybrid/ high yielding varieties are nil to negligible.
- Essential micro- nutrient deficiency in the soil.
- Dependence of monsoon.

- Low fertilizer consumption per unit cropped area.
- Lack of economic condition of farmers.
- Lack of good quality of seeds and fertilizer.
- Lack of post harvesting facilities such as storage and marketing.

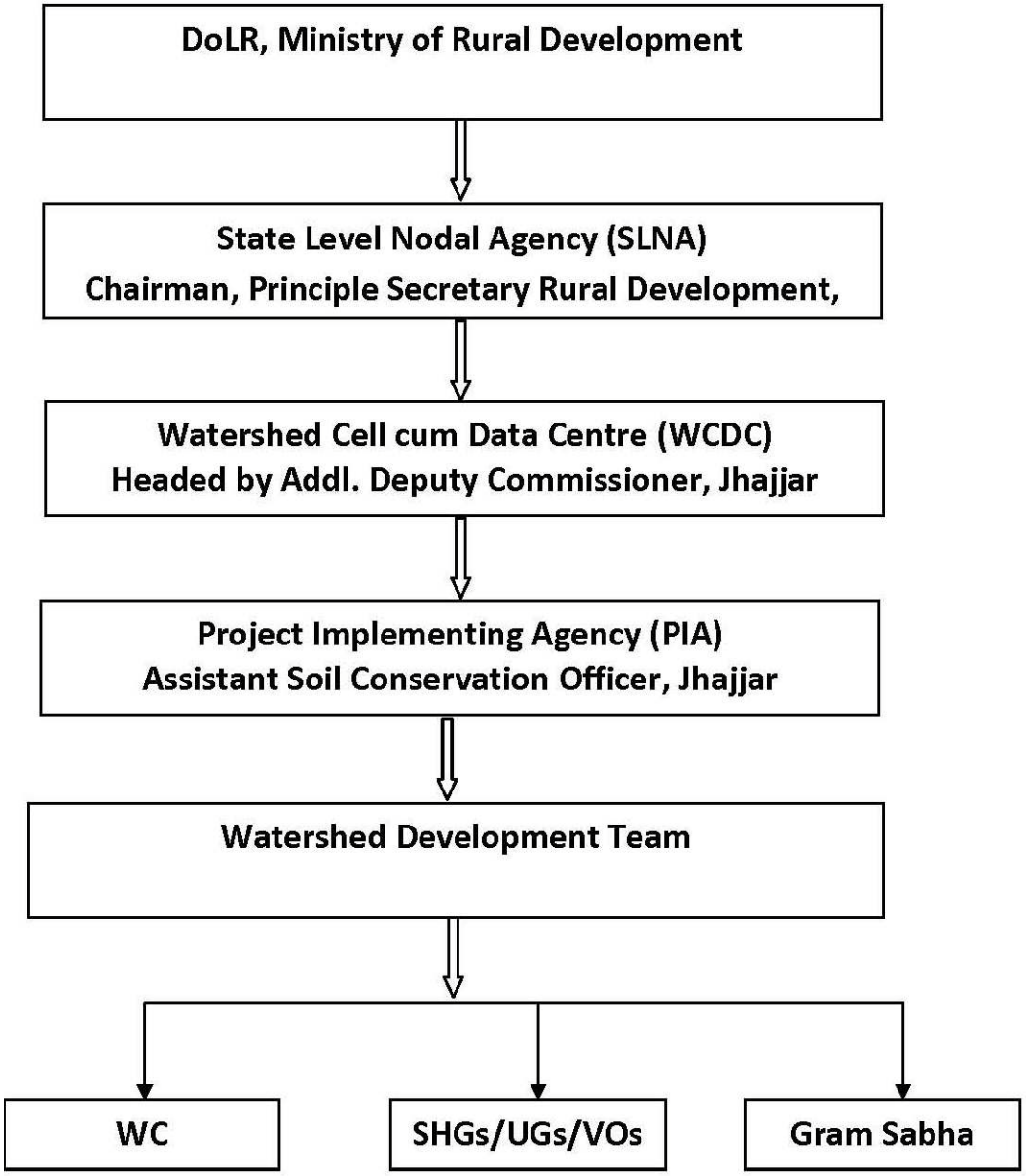
CHAPTER - 4

PROJECT MANAGEMENT AGENCIES

4.1 INSTITUTIONAL ARRANGEMENT

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

The institutional set up is given below:


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

4.2 STATE LEVEL NODAL AGENCY, HARYANA

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

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

4.3 WATERSHED CELL CUM DATA CENTRE, JHAJJAR

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 Jhajjar is selected by the State Level Nodal Agency (SLNA) for Integrated Watershed Management Programme (IWMP) in Haryana. In the District Jhajjar, where the area of development is 14819 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, Jhajjar 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

Sr. No.	Name of the Project	Details of PIA	
1	Bahadurgarh Watershed (IWMP-I)	i) Type of organization	Govt. Organisation
		ii) Name of organization	Department of Agriculture, Haryana
		iii) Designation & Address	Asstt. Soil Conservation Officer , Jhajjar
		iv) Telephone	
		v) Fax	-----
		vi) E-mail	ascojhajjar@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 Jhajjar 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 Members
Loharheri	Smt. Nirmla Devi	Sh. Ranbir singh, Sh. Umed Singh, Sh. Badri, Sh. Ramesh, Sh. Kartar Singh, Ram Kumar, Sh. Sant Kumar, Sh. Jagbir Singh, Sh. Nanha Singh, Sh. Pale Ram, Sh. Kuldeep Singh, Smt. Sajjan Kaur
Dhakora	Smt. Kiran Devi	Sh. Om Parkash, Smt. Sulochana devi, Sh. RajKapoor, Sh. Krishan Chander, Sh. Chander Bhan, Sh. Sant Kumar, Sh. Jaggo, Sh. Manjeet Kumar, Sh. Rajapal
Kulasi	Sh. Ramkuwar	Sh. Saroj, Sh. Dharampal , Sh. Parkash, Sh. Prem Sukh, Sh. Suresh, Sh. Rmme ram, Sh. Shamsher Singh, Sh. Jagbir Singh, Smt. Promila , Sh. Jai Narayan, Sh. Parkash, Sh. Basant, Sh. Sant Ram, Sh. Satish Kumar
Asauda Sewan	Smt. Khjani Devi	Sh. Surajbhan, Sh. Karambir, Sh. Diwan, Sh. Sunil, Sh. Attar Singh, Sh. Rajbir, Sh. Jodha Ram, Sh. Rajesh Jun, Sh. Rajender, Sh. Narender, Sh. Jagdish
Jakhaoda	Sh. Pawan Kumar	Sh. Om Parkash, Sh. Rajender, Smt. Usha, Sh. Darshan, Sh. Mange Ram, Sh. Jai Singh, Sh. Tej bir, Sh. Satish Chhikara, Sh. Balwan, Sh. Jai Singh, Smt. Sheela
Rohad (part)	Sh. Anand	Sh. Ishwar Singh, Sh. Dyanand, Sh. Kuldeep Singh, Smt. Darshana Devi, Smt. Radha, Sh. Hoshiyar Singh, Sh. Jaggi, Sh. Hawa Singh, Sh. Bharma, Sh. Parkash, Sh. Jaswant, Smt. Bala Devi
Kanaunda (Part)	Smt. Babita	Sh. Naresh, Sh. Sandeep, Sh. Krishan, Sh. Mange ram, Sh. Suraj bhan, Sh. Gulab, Sh. Sanjay, Smt. Dayawati, Sh. Devender Singh
Nilothi	Sh. Satbir Singh	Sh. Hemchander, Sh. Suresh Chander, Sh. Ramsaran, Sh. Iqbal Singh, Sh. Umed Singh, Chander Singh, Smt. Santra, Sh. Jagbir singh, Sh. Ram Chander, Sh. Chandu, Smt. kamlesh

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 1 self help group in each village. In each village Self Help Groups consisting of 10 to 15 members having common goal are being formed. The members of SHGs would be drawn from very poor families, BPL families, SC families, Land less families, Small and Marginal farmers SHG would be homogeneous in nature and would work together for their socio-economic up-liftment. SHGs need to be imparted. Under the project, each SHGs would be given revolving fund Rs. 25000 each after 6 months of the date of formation. The income generating activities would be identified. For adopting economic activities would depend upon the decision of Self Help Group. Accordingly the Orientation and Trainings for their skill up gradation would

be arranged in the project as activity. It is the responsibility of Watershed Committee to form SHGs in their respective villages under the guidance of Watershed Development Team and Project Implementing Agency.

4.7.2 User Groups

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

CHAPTER- 5

BUDGETING

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

IWMP- I BAHADURGARH WATERSHED

5.1 BUDGETING

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

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

Area in Hectares and Funds in Rs.

Table 1. Activity wise allocation of funds for Project Village

(BUDGET AT A GLANCE)

Name of the project	Project Area	Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
Bahadurgarh Watershed (IWMP I)	5255	3775	45300000	Administrative costs	453000	453000	1359000	1359000	906000	**4530000**
				Monitoring	0	0	0	453000	0	**453000**
				Evaluation	0	113250	113250	113250	113250	**453000**
				Entry point activities	1812000	0	0	0	0	**1812000**
				Institution and capacity building	0	2265000	0	0	0	**2265000**
				Detailed project report	453000	0	0	0	0	**453000**
				Watershed development works	0	3624000	7248000	7701000	6795000	**25368000**
				Livelihood activities for the asset less persons	0	0	1359000	2265000	453000	**4077000**
				Production system and micro enterprises	0	0	1359000	1812000	1359000	**4530000**
				Consolidation phase	0	0	0	0	1359000	**1359000**
				Total	**2718000**	**6455250**	**11438250**	**13703250**	**10985250**	**45300000**
				Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**100%**

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

Area in Hectares and
Funds in Rs.

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
400	4800000	Administrative costs	48000	48000	144000	144000	96000	**480000**
		Monitoring	0	0	0	48000	0	**48000**
		Evaluation	0	12000	12000	12000	12000	**48000**
		Entry point activities	192000	0	0	0	0	**192000**
		Institution and capacity building	0	240000	0	0	0	**240000**
		Detailed project report	48000	0	0	0	0	**48000**
		Watershed development works	0	384000	768000	816000	720000	**2688000**
		Livelihood activities for the asset less persons	0	0	144000	240000	48000	**432000**
		Production system and micro enterprises	0	0	144000	192000	144000	**480000**
		Consolidation phase	0	0	0	0	144000	**144000**
		Total	**288000**	**684000**	**1212000**	**1452000**	**1164000**	**4800000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**100%**

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

Area in Hectares and Funds in Rs.

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

(**BUDGET AT A GLANCE)**

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
510	6120000	Administrative costs	61200	61200	183600	183600	122400	**612000**
		Monitoring	0	0	0	61200	0	**61200**
		Evaluation	0	15300	15300	15300	15300	**61200**
		Entry point activities	244800	0	0	0	0	**244800**
		Institution and capacity building	0	306000	0	0	0	**306000**
		Detailed project report	61200	0	0	0	0	**61200**
		Watershed development works	0	489600	979200	1040400	918000	**3427200**
		Livelihood activities for the asset less persons	0	0	183600	306000	61200	**550800**
		Production system and micro enterprises	0	0	183600	244800	183600	**612000**
		Consolidation phase	0	0	0	0	183600	**183600**
		Total	**367200**	**872100**	**1545300**	**1851300**	**1484100**	**6120000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**100%**

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and Funds in Rs.

Table 4. PHASING YEAR WISE (Name of the Micro Watershed: Jakhoda)
(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
510	6120000	Administrative costs	61200	61200	183600	183600	122400	**612000**
		Monitoring	0	0	0	61200	0	**61200**
		Evaluation	0	15300	15300	15300	15300	**61200**
		Entry point activities	244800	0	0	0	0	**244800**
		Institution and capacity building	0	306000	0	0	0	**306000**
		Detailed project report	61200	0	0	0	0	**61200**
		Watershed development works	0	489600	979200	1040400	918000	**3427200**
		Livelihood activities for the asset less persons	0	0	183600	306000	61200	**550800**
		Production system and micro enterprises	0	0	183600	244800	183600	**612000**
		Consolidation phase	0	0	0	0	183600	**183600**
		Total	**367200**	**872100**	**1545300**	**1851300**	**1484100**	**6120000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**100%**

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

Area in Hectares and Funds in Rs.

Table 5. PHASING YEAR WISE (Name of the Micro Watershed: Kulasi)
(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
500	6000000	Administrative costs	60000	60000	180000	180000	120000	**600000**
		Monitoring	0	0	0	60000	0	**60000**
		Evaluation	0	15000	15000	15000	15000	**60000**
		Entry point activities	240000	0	0	0	0	**240000**
		Institution and capacity building	0	300000	0	0	0	**300000**
		Detailed project report	60000	0	0	0	0	**60000**
		Watershed development works	0	480000	960000	1020000	900000	**3360000**
		Livelihood activities for the asset less persons	0	0	180000	300000	60000	**540000**
		Production system and micro enterprises	0	0	180000	240000	180000	**600000**
		Consolidation phase	0	0	0	0	180000	**180000**
		Total	**360000**	**855000**	**1515000**	**1815000**	**1455000**	**6000000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**100%**

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

Area in Hectares and Funds in Rs.

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

(**BUDGET AT A GLANCE)**

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
520	6240000	Administrative costs	62400	62400	187200	187200	128400	**627600**
		Monitoring	0	0	0	62400	0	**62400**
		Evaluation	0	15600	15600	15600	15600	**62400**
		Entry point activities	249600	0	0	0	0	**249600**
		Institution and capacity building	0	312000	0	0	0	**312000**
		Detailed project report	62400	0	0	0	0	**62400**
		Watershed development works	0	499200	998400	1060800	932400	**3490800**
		Livelihood activities for the asset less persons	0	0	187200	312000	62400	**561600**
		Production system and micro enterprises	0	0	187200	249600	187200	**624000**
		Consolidation phase	0	0	0	0	187200	**187200**
		Total	**374400**	**889200**	**1575600**	**1887600**	**1513200**	**6240000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**100%**

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

Area in Hectares and Funds in Rs.

Table 7. PHASING YEAR WISE (Name of the Micro Watershed: Asoudha Siwan) (BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
495	5940000	Administrative costs	59400	59400	178200	178200	118800	**594000**
		Monitoring	0	0	0	59400	0	**59400**
		Evaluation	0	14850	14850	14850	14850	**59400**
		Entry point activities	237600	0	0	0	0	**237600**
		Institution and capacity building	0	297000	0	0	0	**297000**
		Detailed project report	59400	0	0	0	0	**59400**
		Watershed development works	0	475200	950400	1009800	891000	**3326400**
		Livelihood activities for the asset less persons	0	0	178200	297000	59400	**534600**
		Production system and micro enterprises	0	0	178200	237600	178200	**594000**
		Consolidation phase	0	0	0	0	178200	**178200**
		Total	**356400**	**846450**	**1499850**	**1796850**	**1440450**	**5940000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**100%**

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

Area in Hectares and Funds in Rs.

Table 8. PHASING YEAR WISE (Name of the Micro Watershed: Nilothi) (BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
400	4800000	Administrative costs	48000	48000	144000	144000	96000	**480000**
		Monitoring	0	0	0	48000	0	**48000**
		Evaluation	0	12000	12000	12000	12000	**48000**
		Entry point activities	192000	0	0	0	0	**192000**
		Institution and capacity building	0	240000	0	0	0	**240000**
		Detailed project report	48000	0	0	0	0	**48000**
		Watershed development works	0	384000	768000	816000	720000	**2688000**
		Livelihood activities for the asset less persons	0	0	144000	240000	48000	**432000**
		Production system and micro enterprises	0	0	144000	192000	144000	**480000**
		Consolidation phase	0	0	0	0	144000	**144000**
		Total	**288000**	**684000**	**1212000**	**1452000**	**1164000**	**4800000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**100%**

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

Area in Hectares and Funds in Rs.

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

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
440	5280000	Administrative costs	52800	52800	158400	158400	105600	**528000**
		Monitoring	0	0	0	52800	0	**52800**
		Evaluation	0	13200	13200	13200	13200	**52800**
		Entry point activities	211200	0	0	0	0	**211200**
		Institution and capacity building	0	264000	0	0	0	**264000**
		Detailed project report	52800	0	0	0	0	**52800**
		Watershed development works	0	422400	844800	897600	792000	**2956800**
		Livelihood activities for the asset less persons	0	0	158400	264000	52800	**475200**
		Production system and micro enterprises	0	0	158400	211200	158400	**528000**
		Consolidation phase	0	0	0	0	158400	**158400**
		Total	**316800**	**752400**	**1333200**	**1597200**	**1280400**	**5280000**
		Percentage of total cost	**6%**	**14.25%**	**25.25%**	**30.25%**	**24.25%**	**100%**

CHAPTER – 6

PREPARATORY PHASES

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

6.1 AWARENESS GENERATION AND MOTIVATION FOR PARTICIPATION

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

6.1.1 Collection of Base Line Data and Hydrological Data

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

6.1.2 Formation of Village Level Institutions

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

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

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

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

Strengths

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

Weaknesses

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

Opportunities

- Rain Water harvesting/recharging for production.
- Promotion of organic farming.
- Promotion of horticultural activities (dry land plants).
- Provide training on dairy farming and other income generating activities.
- Promotion of nursery raising and pasture development.
- There would be horizontal integration and convergence of development programmes being organized and run by govt.

Threats

There are few negative issues that may have adverse effect

- Unreliable rainfall.
- Absence of assured irrigation.
- Lack of cooperation and contribution from local residents.
- Low literacy rate in the project area.

- Rapid climate change affecting crops.
- Lack of awareness of Dairy farming as a commercial activity.
- The area is underlain by marginal to saline ground water.
- Frequent droughts.

CAPACITY BUILDING- 5%
Rs. 22, 65, 000/-

6.2 Capacity Building

1. Introduction

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

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

2. Vision

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

3. Need

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

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

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

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

4. Rationale

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

- Dedicated & decentralized institutional support & delivery mechanism
- Annual Action Plan for Capacity Building

- Pool of resource persons
- Well prepared training modules and reading materials
- Mechanism for effective monitoring and follow-up.

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

5. Objectives

The main objectives of the current action plan for ongoing 13 projects are outlined as follows:-

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

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

Sl. No.	Title of Training Programme and Duration	Level of Participants	Total persons	Trainees Per Programme	Number of Programmes
01	District Level Sensitization Workshop for Watershed Committees. **One Day**				
	Jhajjar	Members of Watershed Committees @ 10 per committee would also include accompanying WDT Members.	330	150-200	2
02	Block Level Functional Programmes for Secretaries of Watershed Committees. **Two Days**				
	Jhajjar	Secretaries of Village Watershed Committees	33	15-45	1
03	Project Level Sensitization Camps for WC **One Days**				
	Jhajjar	Members of Watershed Committees @ 10 Persons (Tentative) per WC	330	50	7
04	Village Level Awareness Camps on IWMP at Micro Watershed Level for User Groups **One Day**				
	Jhajjar	Approximately 50 prospective user groups per micro watershed.	1650	50	33
05	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP **One Day**				
	Jhajjar	Three persons (Leader, Secretary and Treasurer) per Self Help Group @ around one SHG per village.	99	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	40231
2	Block Level Functional Programmes for Secretaries of Watershed Committees. Two Days	7463
3	Village Level Sensitization Camps for WC One Days	38200
4	Village Level Awareness Camps on IWMP at Micro Watershed Level for Prospective User Groups One Day	49141
5	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP One Day	15294
	Total	**150329**

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

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	16000	5	8	40000	1000	2000	80000
2	User groups from each micro watershed	NRM, Post Project Management etc. – Exposure Visit	2	16000	5	8	40000	1000	2000	80000
3	Sub watershed Level- WDT Members	Part II-Module I to V- Exposure Visit Outside State- Conceptual, Technical, Social, Management of Finance, Monitoring and Evaluation.	4	48000	5	8	60000	1500	6000	240000
4	Sub watershed Level- PIA	Exposure Visit- Within	2	24000	5	8	60000	1500	3000	120000

S. No.	Target Group	Training Topics	No. of days	Budget per camp	No. of Camps	No. of Participants per camp	Cost for all participants per day	Cost per participant/ per day	Cost per person	Total Budget
	Members	Fundamentals of Watershed, Finance Management, Final Report on WDP etc								
5	District Level-WDC	Exposure visit to successful watershed/ University.	2	16000	5	8	40000	1000	2000	80000
6	District Level-Line Deptt., WDC	Exposure visit to successful watersheds within state.	2	16000	5	8	40000	1000	2000	80000
7	SLNA and District Level Controlling Officers	Exposure visit to successful watersheds outside state	4	48000	5	8	60000	1500	6000	240000
Total										**920000**

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

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	8	2	16	80	12,000	120000	960000
2.	Propaganda & Documentation (Puppet show, documentary movies show, video-graphy, Photography, wall Painting, Display Board, pamphlets, leaf lets. Etc)	8	1	8	40	5000	50000	200000
3	Contingency charges							34671
	Total							**1194671**

i) **Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD = Rs. 150329/-**

ii) **Micro Watershed Wise Exposure cum training Visit For SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members**
= Rs. 9, 20,000/-

iii) **Farmer's / Beneficiaries training camps with Extension Program's = Rs. 11,94,671/-**

Grand Total = Rs. 22, 65,000/-

6.2.1. EXPECTED OUTCOME OF CAPACITY BUILDING

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

6.3 Entry Point Activities 4%

EPA activities are taken up under the watershed to build rapport with village community at the beginning of the project, generally certain important works which are in urgent demand of the local community are taken up. A group discussion was conducted in the Gram Sabha meeting/watershed committee regarding EPA activities. It was conveyed to the Gram Sabha that an amount of **Rs. 18, 12,000/-** was provided for EPA. The provision of IEC material for community will be met under EPA. The stake holders discussed the various activities which they felt is important but after the discussion the following activities were finalized. The convergence with the other project can also be undertaken.

Table 5. Entry Point Activities in Bahadurgarh Watershed (IWMP I)

(Rs. In Lacs)

Sr. No	Block	Name of Project	No. of EPA Identified	No.of EPAs not yet started	No. of EPA in-progress	No. of EPAs Completed	Nature of EPA	Location Village	Expenditure	Remarks
1	**Bahadurgarh**	**IWMP-I / 2012-13**	**9**	**0**	**2**	**7**	Cow Ghat	Dakhora	216472/-	Completed
2							Cow Ghat	Loharheri	1,36,218/-	Completed
3							Diversion channel for waste water	Kulasi	1,50,000/-	Under Progress
4							R/wall	Jakhauda	1,34,932/-	Completed
5							R/wall	Rohad	2,03,807/-	Completed
6							2 no.Water tanki	Nilothi	55,050/-	Under Progress
7							2no. water tanki+2no. RO+ one water cooler	Asudha Siwan	1,64,990/-	Completed
8							2no. water tanki+2no. RO+ one water cooler	kanounda	1,70,773/-	Completed
								Total	**12,32,242/-**	

Total project Cost @ 4%= Rs. 18,12,000/-

CHAPTER- 7
WORK PHASE

7.1 WATERSHED DEVELOPMENT WORKS - 56%

The Works under the project have been identified after the detailed survey of the Project Area and discussions held with watershed development team members along with officers from other field like Agriculture, Horticulture and Animal Husbandry. Participatory approach has been adopted to identify the activities under the project. The detailed discussions were held with watershed committees and works identified along with villagers after making visits to identified sites. The works mainly relate to soil and water conservation activities like Water conveyance system, Dug Out Pond (New/Renovation), Ramp/Ghat Inlet and Outlet, Roof top rain water recharge structures 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. The detailed action plan finalized have been presented to Additional Deputy Commissioner cum Project Manager along with the officers of lined department and Watershed Development Team, Jhajjar.

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

Natural Resource Management

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 has been undertaken but still at few places inlet of the ponds and outlet needs to be

constructed. So there repair and renovation is proposed. During the discussion it was felt to be genuine demand for repair, renovation and capacity enhancement of ponds in the area.

Proposed System: Run-off from upper area shall be reduced by a-forestation 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.

7.2 Proposed Activity: Renovation and, construction of new ponds have been proposed. The provision for construction of Water Channel, inlet, outlet, ramp and retaining walls are the basic need by project stakeholders which has been provided. In some villages, the constructions of new ponds are proposed, subject to availability of funds. In summer months, it is widely held that buffaloes must spend 3 to 4 hours in pond for cooling which save the animal from heat stress. Hence, there was much demand of ponds renovation and repairs. Ponds as such are the best source of rainwater conservation and ground water recharge.

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

This phase has been started as the preparatory phase is by and large complete. It is considered as the heart of the program in which the DPR proposals shall be implemented in participatory mode. In this watershed management program, it was planned to rehabilitate the degraded watersheds by the control of runoff and soil loss by biological and

masonry works for conservation measures. In this water stressed project area, rainwater harvesting to reduce soil erosion, recharge ground water, improve moisture regime and use of harvesting water for human and livestock use. This was coupled with land development, production improvement, and promotion of subsidiary occupations for improved livelihoods. Many village ponds are silted, several are filled with filth and sewage water and giving foul smell. Repair renovation and retaining walls of village ponds has emerged as an important activity. The scope of integrated watershed regeneration/rehabilitation works which emerged from the PRA is now presented.

Sample estimates are as follows:

7.2.1 Activities under NRM (56%) Micro Watershed Wise (IWMP I Jhajjar) is given below and the proposed action plan/treatment plan map shown in **Annexure-X.**

Table 1 :

Name of the Project: IWMP-I		Name of the watershed: Bhadurgarh (IWMP-I)					Name of the village: Nilothi	
Sr. no	Nature of work	Location	Catchment area, storage capacity, Submergence area and command area	Unit	No. of Work		Estimate Cost Rs. In Lakh	Objectives
					Phy.	Unit cost (Rs. In Lakh)		
1	Deepening of pond	Dada wala pond N-28°48' 488" E-076°52' 186" Bamna wala pond N-28°48'229" E-076°52'349"	20 ha 8600 cum 5700 sqm 14 ha	No	2	4.00	8.00	To check soil erosion and protection of banks.
2	Ramp Inlet outlet	Badabir pond N-28°48'504 E-076°52'196" Gadgagni pond N-28°48'404" E-076°52'185" Badwala pond N-28°48'349" E-076°52'258"		No	3	2.50	7.50	To check soil erosion and protection of banks as well as safe passage for cattle which is also helpful in protect of the bank erosion.

3	Uprooting + leveling *	In Panchyati land N -28°48'775" E-076°52'375"		Ha	4	.75	3	Development of wasteland to increase area under cultivation to check soil erosion as well as to conservation soil moister
4	Field bunding	at the way Nilothi to Bhashru N-28°48'821" E-076°52'.535"		Ha	1	2.5	5.00	Development of wasteland to increase area under cultivation to check soil erosion as well as to conservation soil moister
5	Roof rain water harvesting structure	In Govt. High School	0.05 ha 21.6 cum	No	1	3.00	3.00	Harvesting of rain water to make its use for domestic purpose as well as irrigation is kitchen plantation etc and also for recharging purpose.
6	Plantation(Bio drainage)	At School, near mandir, park		Ha	2	0.50	1.00	To increases biomass covers and provide proper flow of water to facilitate transportation and conservation of natural resources.
Total							27.5	
Available							26.88	
Convergence							0.62	

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

Table 2:

Name of the Project: IWMP-I		Name of the watershed: Bhadurgarh (IWMP-I)					Name of the village: Dahkora	
Sr. no	Nature of work	Location	Catchment area, storage capacity, Submergence area and command area	Unit	No. of Work		Estimate Cost Rs. In Lakh	Objectives
					Phy.	Unit cost (Rs. In Lakh)		
1	Deepening of pond	Bhabi wala pond N28°46'243" E076°49'066" Kharaj wala pond N28°46'248" E076°49'881"	34 ha 14600 cum 9700 sqm 21 ha	No	2	5	10	To enhance the pondage capacity of the pond
2	Ramp inlet-outlet	Bhabi kharaj		No	2	2.50	5	To check soil erosion and protection of banks as well as safe passage for cattle which is also helpful in protect of the bank erosion.
3	Pucca water channel	N28°46'236" E076°49'428"		M	1800	1200 Rs. Per m	21.00	For pucca water channel for irrigation purpose
4	Roof rain water harvesting structure	Govt. High School N28°46'035" E076°49'321"	0.08 ha 34.5 cum	No	1	3	3.00	Harvesting of rain water to make its use for domestic purpose as well as irrigation is kitchen plantation etc and also for recharging purpose.
5	Field bunding	Loharhedi road se naya bans tak N28°46'30.8" E076°49'25.3"		No	4	2	8	Development of wasteland to increase area under cultivation to check soil erosion as well as to conservation soil moister

6	Uprooting + leveling *+field Bunding	At panchyti land N28°46'008" E076°50'128"		Ha	0.75	2	1.50	Development of wasteland to increase area under cultivation to check soil erosion as well as to conservation soil moister
7	Plantation	In school to Hospital		Ha	2	0.50	1.00	To increases biomass covers and provide proper flow of water to facilitate transportation and conservation of natural resources.
Total							49.5	
Available							34.27	
Convergence							15.23	

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

Table 3: Name of the Project: IWMP-I		Name of the watershed: Bhadurgarh (IWMP-I)					Name of the village: Rohad	
Sr. no	Nature of work	Location	Catchment area, storage capacity, Submergence area and command area	Unit	No. of Work		Estimate Cost Rs. In Lakh	Objectives
					Phy.	Unit cost (Rs. In Lakh)		
1	Ramp Inlet-outlet	Shyam ji wala pond N28°44'829" E076°48'217" Jai Ram wala pond N28°44'761" E076°48'137" Lallu ram wala pond N28°44'611" E076°48'167"	-	No	3	2.50	7.50	To check soil erosion and protection of banks as well as safe passage for cattle which is also helpful in protect of the bank erosion.
2	Retaining wall	Shyam ji wala pond N28°44'088" E76°48'216"	-	M	100	9000 per m	9.00	To check soil erosion and protection of banks
3	Pucca water channel	Kharhar wale bridge drain tak N28°44'839" E076°48'277"	-	M	2500	1200 per m	30.00	For pucca water channel for irrigation purpose
4	Field bunding	Kharhar wale bridge se rewari kheda rajvahe tak N28°44'864" E076°48'806"	-	M	2500	4	4.00	To increases biomass covers and provide proper flow of water to facilitate transportation and conservation of natural resources.
5	Roof rain water harvesting structure	Govt. high School N28°44'688" E076°48'522"	0.05 ha 21.6 cum	No	1	3	3.00	Harvesting of rain water to make its use for domestic purpose as well as

								irrigation is kitchen plantation etc and also for recharging purpose.
Total							53.00	
Available							34.94	
Convergence							18.06	

Table 4 :Name of the Project: IWMP-I			Name of the watershed: Bhadurgarh (IWMP-I)					Name of the village: Kulasi
Sr. no	Nature of work	Location	Catchment area, storage capacity, Submergence area and command area	Unit	No. of Work		Estimate Cost Rs. In Lakh	Objectives
					Phy.	Unit cost (Rs. In Lakh)		
1	Deepening of pond	Daboda wala pond N28°46'245" E076°54'911"	16 ha 6900 cum 4600 sqm 9 ha	No	1	4	4.00	To Enhance Pondage capacity.
2	Retaining wall	Daboda wala pond N28°46'602" E076°54'575" Mahuwa wala pond se ghat tak N28°46'245" E076°54'886"		M	100	9000 per m	9.00	For bank protection and erosion
3	Ramp inlet-outlet	Daboda wala pond N28°46'245" E076°54'911" Amba wala pond N28°46'225 **E076°54'897"**		Ha	2	2.50	5.00	To provide easy as well as safe passage for cattle which is also helpful in protect of the bank erosion.
4	Culvert	Kumharo ke ghar pass N28°46'558" E076°54'894"		No	2	2.50	5.00	To Conservation of the Natural Recourses and provide better way of their proper utilization
5	Field bunding	Umed Singh ke khet se Dharam Singh ke khet tak Master sant ram ke khet se Dharam ke khet tak		No	1	8	8.00	To provide suitable field surface for controlling flow of water to check soil erosion. Better surface drainage and conservation of moisture
Total							31.00	
Available							33.60	
Convergence							Nil	

Table 5:

Name of the Project: IWMP-I		Name of the watershed: Bhadurgarh (IWMP-I)					Name of the village: Kanaunda	
Sr. no	Nature of work	Location	Catchment area, storage capacity, Submergence area and command area	Unit	No. of Work		Estimate Cost Rs. In Lakh	Objectives
					Phy.	Unit cost (Rs. In Lakh)		
1	Retaining wall	Manokhar wala pond N28°45'873" E076°56'052" Baniya wala pond N28°45'752" E076°56'193"		M	150	9000 per m	13.00	To check soil erosion and protection of banks.
2	Deepening of pond	Manokhar wala pond N28°45'876" E076°56'063" Baniya wala pond N28°45'748" E076°56'176" Jagshale wala pond N28°45'468" E076°55'949"	36 ha 15500 cum 10300 sqm 23 ha	No	3	4	12.00	To Enhance Pondage capacity.
3	Ramp inlet-outlet	Manokhar wala pond N28°45'858" E076°56'061" Jagshale wala pond N28°45'733" E076°56'178"		No	4	2.50	10	To check soil erosion and protection of banks as well as safe passage for cattle which is also helpful in protect of the bank erosion.
4	Plantation	School, Pond		Ha	2	0.50	1.00	To increases biomass covers and provide proper flow of waterto facilitate transportation and conservation of natural resources.
Total							36.00	
Available							29.57	
Convergence							6.43	

Table 6:

Name of the Project: IWMP-I		Name of the watershed: Bhadurgarh (IWMP-I)					Name of the village: Asoda sewan	
Sr. no	Nature of work	Location	Catchment area, storage capacity, Submergence area and command area	Unit	No. of Work		Estimate Cost Rs. In Lakh	Objectives
					Phy.	Unit cost (Rs. In Lakh)		
1	Retaining wall	Gwo wale pond N28°44'877" E076°51'903"`	-	M	100	9000 Per m	9.00	To check soil erosion and protection of banks.
2	Ramp- inlet - Outlet	Nava pond N28°44'833" E076°51'878"	-	No	3	2.50	7.50	To check soil erosion and protection of banks as well as safe passage for cattle which is also helpful in protect of the bank erosion.
3	Deepening of pond	Nava pond N28°44'833" E076°51'878" Gwo wale pond N28°44'877" E076°51'903"`	23 ha 9900 cum 6600 sqm 14 ha	No	2	5	5.00	To Enhance Pondage capacity.
4	Roof rain water harvesting system	Girls High School N28°45'063" E076°52'345"	0.08 ha 34.5 cum	No	1	5.00	5.00	Harvesting of rain water to make its use for domestic purpose as well as irrigation is kitchen plantation etc and also for recharging purpose.
5	Plantation	Park near Govt. girls high School	-	Ha	2	0.50	1.00	To increases biomass cover and provide proper flow of water to facilitation of transportation System

6	Uprooting + leveling* +field Bunding	Common land village N28°44'668" E076°52'367"	-	Ha	2	2.50	5.00	Development of wasteland to increase area under cultivation to check soil erosion as well as to conservation soil moister
7	Water conveyance system (UGPL)	Shiv mandir se lekar Bhatera Shiv mandir pond N28°27'574" E076°41'563"	-	M	1000	500	5.00	To enhance efficiency of irrigation water and produce water management aspect
Total							37.50	
Available							33.26	
Convergence							4.24	

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

Table 7:

Name of the Project: IWMP-I		Name of the watershed: Bhadurgarh (IWMP-I)					Name of the village: Jakhoda	
Sr. no	Nature of work	Location	Catchment area, storage capacity, Submergence area and command area	Unit	No. of Work		Estimate Cost Rs. In Lakh	Objectives
					Phy.	Unit cost (Rs. In Lakh)		
1	Deepening of pond	Shyeed wala pond N28°43'157" E076°53'195"	16 ha 6900 cum 4600 sqm 9 ha	No	1	4	4.00	To Enhance Pondage capacity
2	Ramp inlet-outlet	Shayawari wala pond N28°43'481 E076°52"546" Shyeed wala pond N28°43'153" E076°53'164" Karan wala pond N28°43'011" E076°53'333"		No	3	2.50	7.50	To check soil erosion and protection of banks as well as safe passage for cattle which is also helpful in protect of the bank erosion.
3	Pucca water Channel	Railway line se school ke pass wale tak N28°43'487" E076°52'529"		M	1000	1200	12.00	For pucca water channel for irrigation purpose
4	Roof rain water harvesting system	Govt. high school N28°43'531" E076°52'047"	0.05 ha 21.5 cum	No	1	3.00	3.00	Harvesting of rain water to make its use for domestic purpose as well as irrigation is kitchen plantation etc and also for recharging purpose.
5	Retaining wall	Shayawari wala pond		M	220	9000 per m	19.00	To check soil erosion and protection of

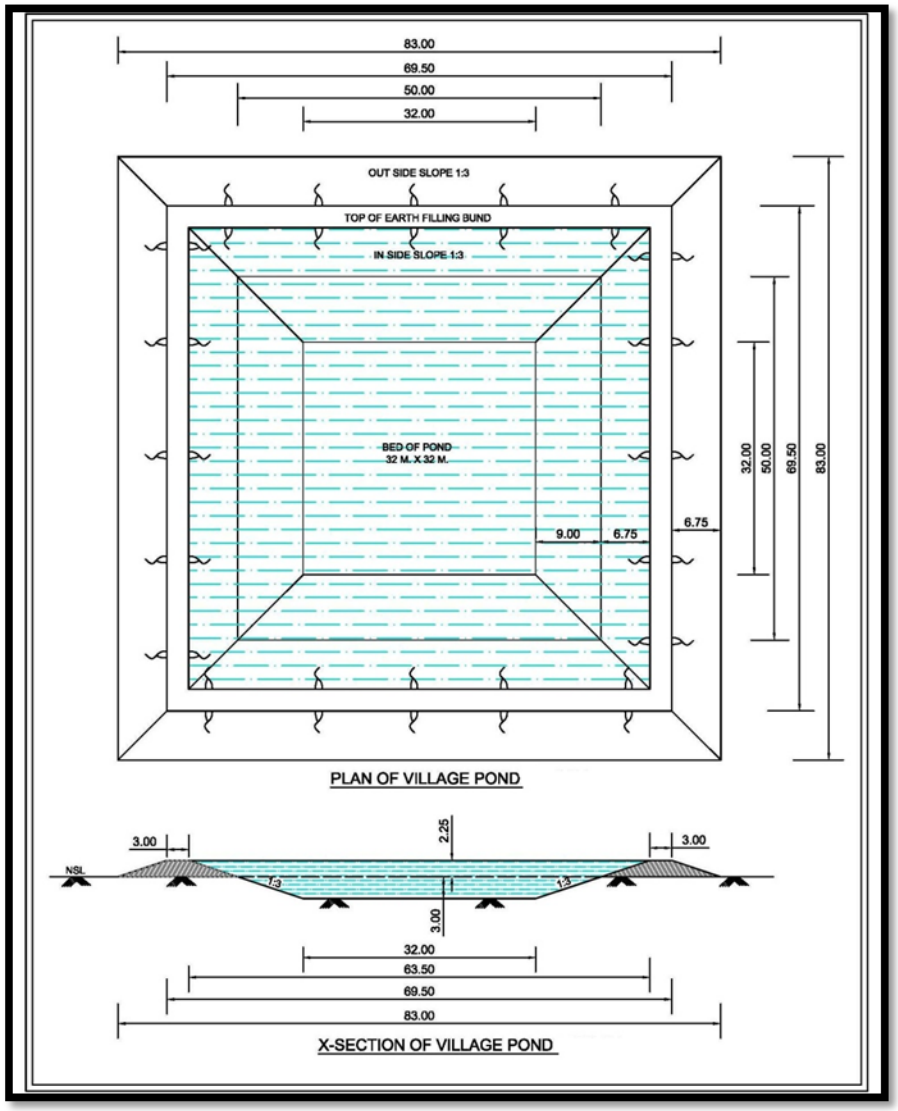
		N28°43’481 E076°52”546” Shyeed wala pond N28°43’153” E076°53’164” Karan wala pond N28°43’011” E076°53’333”						banks.
Total							45.5	
Available							34.27	
Convergence							11.23	

Detailed estimate of Pond

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

Abstract of cost of estimate for Digging Village Pond

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


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

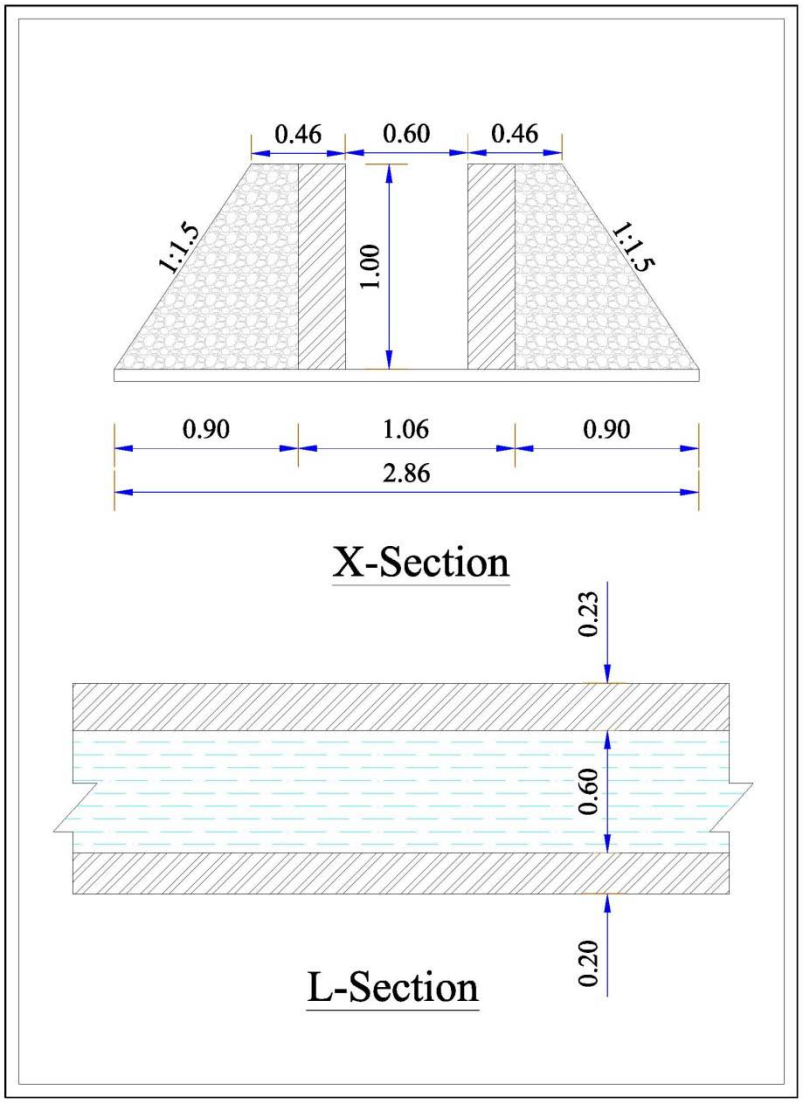
Estimate of Open Channel

Abstract cost of Pucca Disposal open channel in

Detail estimate of Pucca disposal open channel

Sr. No.	Particular	No.	L	B	D/H	Quantity
1	Earth work of excavation in ordinary 2016 1(a)	1	100 m	1.20 m	0.54	64.8m^3
2	Flat brick laid over a bed of 6 mm thick CSM HSR 14-24	1	100 m	1.06 m		106m^2
3	First Class bricks work CSM 3.5 in foundation, plinth Nos. 12.23	2	100 m	0.225	0.45	20.25m^3
4	Plaster on bed in 1.4 CSM 12 MM thick HSR 15.5	1	100	0.60		60m^2
5	Plaster 14.12 mm thick side wall HSR 15.5 inside	2	100		0.45m	90m^2
6	Providing field Gola 14 HSR 15.5	2	100	0.117		23.4m^2
7	Topping 25 mm thick on top CWC HSR 14.8	2	100	0.225		45m^2
8	Earth work for wall protection	2	100	0.565	0.23 + 0.90/2 = 0.45	50.85m^3

Sr. No.	Particular	Quantity	Rate	Unit	Amount
1	Excavation of earth work in ordinary soil as per HSR 6.1(a)	64.8 m3	415.50-15% +425% =1854.16	100 m^3	1201.49
2	Flat bricks laid in bed HSR 14.24	106 m2	520-15%+600% = 296.60	m^2	3279.64
3	First class bricks works land in CSM 1.5 HSR 11.23	20.25 m3	49.85 + 15% + 600% =296.60	m^3	6339.62
4	Plaster bed 1.4 12 mm thick 15.5 HSR	60 m2	5.5 + 15% + 500% = 28.05	m^2	1683.00
5	Plaster 14 m side wall 15.5 HSR	90 m2	5.5 + 15% + 500% = 28.05	m^2	2574.50
6	Field Gota 1.4 HSR 15.5	23.4 m2	5.5 + 15% + 500% = 28.05	m^2	656.37
7	Topping 25 mm thick on top of wall HSR 14.8	46 M2	8.60+15% + 600% = 51.17	m^2	2302.65
8	E/work for wall protection HSR 6.1 (a)	85.50 M3	415.50 +15% + 500%	100 m^3	1077.53
			Total labour cost		**18596.64**
			Material cost		**98783.00**
			Total		**117379.64**
			Contingency 2%		**2347.59**
			Grand total		**49929.23**



Pucca disposal open channel

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 Farmyard Manure, including cost			L.S.	750.00
3	Cost of fertiliser/ pesticide @250gm/plant			L.S.	750.00
4	Cost of plants (including 15% etc. for mortality) including transportation and planting	450.00	Nos.	15/Plant	6750.00
5	Casualty replacement @ 10% of item No. 4 & 5				465.00
6	Cost of 2 weedings and hoeing			1.00/Pant	540.00
7	Contingency and unforeseen (3%)				492.00
				Total	**24044.40**
				Say `	**24000.00**
	Maintenance cost 2nd year			**L.S.**	**1000.00**
	For next 5 years i.e. , ` 1000 x 5				**5000.00**
				Total	**30000.00**
				Say `	**30000.00**

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

B. Horticulture

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

Estimate of Agro- Forestry/ Afforestation

Plantation Model						
Cost statement of 1 Ha. Of activities of Plantation for 1st year (wage rate Rs. 94.13/-)						
Sr. No.	**Item of work**	**Unit**	**Qty.**	**SOR**	**Man days**	**Cost**
B	**Nursery**					
i	Raising of Plants in nursery	Nos.	660	18	5601.00	**11880.00**
C	**Carriage**					
i	Loading/ Unloading of plants up to 100 mtr.	Nos.	605	21.18	1.36	128.139
ii	Multistage carriage of plants					
a)	By tractor up to 10 km.	Nos.	605	18.83	12.10	1139.22
c)	By manual labour in plantation area	Nos.	605	42.36	2.72	256.28
					Total	**1523.63**
D	**Planting**					
ii	Soil working for patch sowing	M3	31.25	61.18	20.31	1911.88
	500 x 0.50 x 0.50 x 0.25					
iii	Planting of seeding including 10% replacement 20 x 30 cm.	Nos.	550	188.26	10.99	1035.43
					Total	**2947.31**
E	**Cultural operations & chemical treatment**					
i	Fertilizer application	Nos.	500	9.41	0.50	47.05
ii	Insecticide application	Nos.	500	9.41	0.50	47.05
iii	First Weeding & hoeing	Nos.	500	141.2	7.5	706.00
vi	Subsequent weeding & hoeing two time	Nos.	1000	94.13	10.00	941.30
					Total	**1741.40**
G	**Material**					

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

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

PRODUCTION SYSTEM- 10%

7.3 PRODUCTION SYSTEM

7.3.1 Crop Production

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

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

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

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

7.3.2 Horticulture

Existing System: Ber, Amla and Guava are the most preferred fruit crop of the farmers and scattered plants of local citrus fruits are seen in farm lands. Some farmers have started raising Guava and Kinnow where irrigation facilities are available. Citrus fruits also raised but mostly for domestic use. Well organized marketing system in fruit plants.

Proposed System: The average annual rainfall is 455 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, Ber and Kinnow 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 technical support on orchard management by involving HAU Farm Advisory Service and department of horticulture.
- Appropriate safeguards from wildlife damage, frost damage and wind breaks.

- Arrangements for limited irrigation at least for first few years.
- Organizing SHGs around horticulture and joint purchase of inputs and marketing.

7.3.3 Vegetable cultivation

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

7.3.4 Promotion of Farm Forestry and Agro-forestry

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

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

7.3.5 Livestock Improvement Including Fodder Production

Livestock rearing is the most important subsidiary occupation of the project villagers. In addition to selling milk for regular daily income, farm yard manure is most needed to maintain fertility and moisture retention of soils. Even landless families also maintain few numbers of animals. The animal breed improvement work was initiated in these villages under Aravali, DDP, DPAP projects and it is a regular program of the Animal Husbandry Department.

However, the availability of animal health services at the door step is grossly lacking. The programs proposed under the project for livestock improvement include:

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

7.3.6 Marketing Arrangements and Proposal for Improvement

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

The efforts through the project are made towards diversification of agriculture to include fruit and vegetable crops and dairy development. The transfer of area to these high value crops would depend on development of irrigation facilities, facilitation in input supplies, transfer of production technology, easy credit and market linkages. Efforts have been made to reactivate the non-functional SHGs and UGs. New watershed committees have been formed in each village. Farmers have shown interest in joint management of resources and join hands for processing, value addition and marketing.
Fortunately, the involvement of Rural Development Department means regular interaction with the district administration whose good offices would be used to involve rural banking institutions in funding support for SHGs, User Groups and other interest groups.

7.3.7 Detail of production system to be promoted

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

Table 8.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	Providing assistance under IWMP per beneficiaries	Total
1	Vermi Compost	Vermi compost is organic matter that is decomposed and recycled, used as fertilizer for soil amendment which is a key ingredient in organic farming. Under IWMP, financial assistance of 25% of total cost of Rs. 24000/- is provided.	8	20	160	6000	960000
2	Green Manuring	Addition of organic matter required, which is deficient in project area. Under IWMP, financial assistance @ Rs. 500 for 20 Kg.s per farmer for 2 Acre (0.8 ha) holding is provided.	8	160	1280	500	640000
3	Bio-fertilizers	For integrated nutrient management (combination of chemical fertilizers, organic manure, crop residue and nitrogen fixing. Under IWMP, financial assistance @ Rs. 40 per farmer for 2 Acre (0.8 ha) holding is provided.	8	100	800	40	32000
4	Pest-Management	For integrated pest Management, the bio control technique has been reported eco-friendly for control of pests. A provision of Azadirachtin bio pesticide @ Rs. 250/lit. per farmer is provided.	8	100	800	250	200000

5	Sprinkler irrigation	Sprinkler irrigation is a method of applying irrigation water which is similar to natural rainfall. Under IWMP, financial assistance @ 25% of Rs. 30000/- or price fixed by agriculture department is provided.	8	15	120	7500	900000
6	Drip Irrigation	Drip Irrigation is an irrigation method that saves water and fertilizer by allowing water to drip slowly to the roots of plants. Under IWMP, financial assistance @ 10% of Rs. 58000 per ha for horticulture fixed by Agriculture Department is provided.	8	20	160	5800	928000
7	Lazer Leveling	Lazer Leveling is one such proven technology that is highly useful in conversation of irrigation water. Under IWMP, financial assistance @ 30% of Rs. 1075 per farmer is provided	8	100	800	322.5	258000
8	Kitchen Gardening	To facilitate with inputs, seeds and equipments etc., for development of Kitchen Gardening. Under IWMP, financial assistance @ Rs. 50 per farmer per season (Rs. 100 per year) is provided.	8	220	1760	100	176000
9	Horticulture	Potential for Grafted Horticulture plants. Supply of plants @ Rs. 40/- per plant under IWMP 50 % cost share for cultivation of fruits like Citrus fruits, Guava, Amla, Ber floriculture and vegetables (especially, turmeric, garlic, onion and tomato)	8	250	2000 (20000 plants)	Rs.20 per plant	400000
Total							4494000
Contingency, printing material other unforeseen items							36000
Total fund available under this component							4530000

Total: Rs. 4530000/-

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

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

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

7.3.8. Vermin Compost

The vermin compost is one of the very useful organic manure. The vermin compost prepared by induction of various types worms (Earth Worm), to de compost and converted from raw animal dung to well de compost highly nutritive organic manure.

One of the important occupations of villagers is the animal husbandry. At present, the animal wastes are not being used by the villagers. This waste can be utilized as vermin- compost on the farm where the productivity and physical condition of the soil can be increased manifold. The animal waste can be used for preparation of vermin- compost. The available nutrients in vermin- compost are higher than country type farmyard manure. As per NHM guideline, the installation cost of structure of 1 vermin compost unit (size) 500 Sq. ft., the total cost of the unit would be is Rs. 60000/-. Out of this the 50% subsidy i.e. Rs.30000/- is met from the ongoing programme of horticulture department. The additional amount i.e. Rs. 10000/- will be form 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 9: Model/ Estimate for a Vermin Compost Unit

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

Components of Vermin Compost Unit

1. **Shed**

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

2. **Vermin- beds**

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

3. **Land**

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

4. **Seed Stock**

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

5. **Machinery**

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

LIVELIHOOD ACTIVITIES FOR THE ASSET LESS PERSONS-9%

7.4 LIVELIHOOD SUPPORT TO SHG'S

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

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

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

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

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

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

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

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

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

1. Cutting and Tailoring
2. Embroidery
3. Mushroom cultivation
4. Plumbing
5. Carpentry
6. Bee keeping
7. Animal husbandry
8. Vermi composting

9. Cattle rearing and selling milk
10. Household wiring, Motor winding
11. Backyard poultry
12. Skill Development in Computer

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

Table 10. Revolving Fund Assistance for SHGs

S.No.	Name of micro watersheds	No. of villages	Total SHGs	Amount of RFA per SHG	Total
1	Loharheri	1	2	25000	50000
2	Dohkora	1	2	25000	50000
3	Kulasi	1	2	25000	50000
4	Asauda sewan	1	2	25000	50000
5	Jakhauda	1	2	25000	50000
6	Rohad (part)	1	2	25000	50000
7	Kanaund (Part)	1	2	25000	50000
8	Nilothi (Part)	1	2	25000	50000
	Total	**8**	**16**		**400000**

Table 11. Skill Trainings/Skill up gradation for SHGs

S.No.	Name of micro watersheds	No. of villages	Total SHGs	Amount of Training per SHG	Total
1	Loharheri	1	2	35000	70000
2	Dohkora	1	2	35000	70000
3	Kulasi	1	2	35000	70000
4	Asauda sewan	1	2	35000	70000
5	Jakhauda	1	2	35000	70000
6	Rohad (part)	1	2	35000	70000
7	Kanaund (Part)	1	2	35000	70000
8	Nilothi (Part)	1	2	35000	70000
	Total	**8**	**16**		**560000**

Note: This training cost includes Travel, boarding/lodging, cost of training and faculty support for different discipline e.g. Bakery Product, Soap and detergent making, fisheries, Bee keeping, Vermi Compost, Domestic poultry, Mushroom cultivation, Plumbing, Carpentry, Food Processing, Animal Husbandry, Product Processing etc.

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

S.No.	Name of micro watersheds	No. of villages	No. of Persons in micro watershed	Amount of Training per trainee for 6 month	Total
1	Loharheri	1	10	10000	100000
2	Dohkora	1	10	10000	100000
3	Kulasi	1	10	10000	100000
4	Asauda sewan	1	10	10000	100000
5	Jakhauda	1	10	10000	100000
6	Rohad (part)	1	10	10000	100000
7	Kanaund (Part)	1	10	10000	100000
8	Nilothi (Part)	1	10	10000	100000
	Total	**8**	**80**		**800000**

Note: The beneficiaries will contribute 10% as cost sharing of the livelihood support programme Rs. 800000 @ 10% cost sharing.

= 800000- 80000

= 720000/-

Table 13. One time assistance as Revolving Fund to unemployed youth who have successfully completed Computer Training for setting up a computer centre

S. No.	Name of micro watersheds	No. of villages	No. of Persons in micro watershed	Amount of Training per Trainee	Total
1	Loharheri	1	4	25000	100000
2	Dohkora	1	4	25000	100000
3	Kulasi	1	4	25000	100000
4	Asauda sewan	1	4	25000	100000
5	Jakhauda	1	4	25000	100000
6	Rohad (part)	1	4	25000	100000
7	Kanaund (Part)	1	4	25000	100000
8	Nilothi (Part)	1	4	25000	100000
	Total	**8**	**32**		**800000**

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. 800000 @ 10% cost sharing.

= 800000- 80000
= 720000/-

Table 14. Cutting and Tailoring Centre for female beneficiaries

S. No.	Name of micro watersheds	No. of villages	No. of centre's	Requirement for sewing machines per village (2 No.)	Payment to trainer per months	Period of training for each centre	Total payment to trainer
1	Loharheri	1	1	2	2000	6	12000
2	Dohkora	1	1	2	2000	6	12000
3	Kulasi	1	1	2	2000	6	12000

4	Asauda sewan	1	1	2	2000	6	12000
5	Jakhauda	1	1	2	2000	6	12000
6	Rohad (part)	1	1	2	2000	6	12000
7	Kanaund (Part)	1	1	2	2000	6	12000
8	Nilothi (Part)	1	1	2	2000	6	12000
	Total	**8**	**8**	**16**			**96000**

Total cost for 10 Centres

1. Payment to trainers 96000/-
2. Sewing Machine Cost 96000/- @ Rs. 6000 per machine
3. Total 192000/-

Table 15. Embroidery Centre for female beneficiaries

S.No.	Name of micro watersheds	No. of villages	No. of centers	Payment to Trainer per Month	Period months	Payment to trainer for 6 months @ Rs. 2000 p.m	Total trainers	Grand Total
1	Loharheri	1	1	2000	6	12000	1	12000
2	Dohkora	1	1	2000	6	12000	1	12000
3	Kulasi	1	1	2000	6	12000	1	12000
4	Asauda sewan	1	1	2000	6	12000	1	12000
5	Jakhauda	1	1	2000	6	12000	1	12000
6	Rohad (part)	1	1	2000	6	12000	1	12000
7	Kanaund (Part)	1	1	2000	6	12000	1	12000
8	Nilothi (Part)	1	1	2000	6	12000	1	12000
	Total	**8**	**8**					**96000**

Total Cost:

Payment to trainer: Rs.96000/-

Sewing Machine Cost Rs. 160000/- @ Rs. 20000 per machine

Total Cost Rs. 256000/-

Table 16. Livelihood Support

S.No.	Name of micro watersheds	No. of villages	Revolving fund assistance to individuals unemployed youth/ landless, women		
			Bee-Keeping	Dairy Farming	Mushroom Production
1	Loharheri	1	20	10	3
2	Dohkora	1	20	10	3
3	Kulasi	1	20	10	3
4	Asauda sewan	1	20	10	3
5	Jakhauda	1	20	10	3
6	Rohad (part)	1	20	10	3
7	Kanaund (Part)	1	20	10	3
8	Nilothi (Part)	1	20	10	3
	Total	**8**	**160**	**80**	**24**
	Rate (Rs)		**2400**	**2400**	**24000**
	Cost (Lakh Rs)		**3.84**	**1.92**	**5.76**

Contingency, printing material and other unseen items: Rs. 77000/-

Total funds available under this component are Rs. 4077000/-

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)

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

CONVERGENCE

7.5 INTRODUCTION

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

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

7.5.1 Convergence between MGNREGA and Watershed Programmes

Most of the activities under watershed development are covered under MGNREGA and there is a need for convergence to meet gap in requirement under IWMP. The labour component would be met out of funds made available under MGNREGA. The village wise details of the fund requirement are exhibited below (table. 35)

Detail of Convergence of IWMP and other schemes

Table 17. 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	Loharheri	36.5	26.88	9.62	9.62
2	Dohkora	49.5	34.27	15.23	15.23
3	Kulasi	31.0	33.6	-	-
4	Asauda sewan	37.5	33.26	4.24	4.24
5	Jakhauda	45.5	34.27	11.23	11.23
6	Rohad (part)	53.0	34.94	18.06	18.06
7	Kanaund (Part)	36.0	29.57	6.43	6.43
8	Nilothi (Part)	27.5	26.88	0.62	0.62
	Total	**316.5**	**253.67**	**65.43**	**58.97**

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

7.5.2 Non-Negotiable for works executed under MGNREGA

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

Need for Convergence: Since more than 56% of activities related to Watershed development are covered under MGNREGA, there is need for convergence to meet gap in Funds requirements under IWMP. Detailed survey had been conducted in Watershed villages and it has emerged that there is need for more funds to augment and strengthen the activities under IWMP. All nine 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 14 ha horticulture development programme with the financial assistance of Rs.

7.00 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 Water conveyance system, Dug Out Pond (New/Renovation), Ramp/Ghat Inlet and Outlet, Roof top rain water recharge structures 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 program mmes.

CHAPTER – 8

QUALITY AND SUSTAINABILITY

8.1 Monitoring and Evaluation

8.1.1 Plans for Monitoring and Evaluation:

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

8.1.2 Monitoring

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

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

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

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

Table 1. Micro Watershed wise details

S.no	Name of the Micro Watersheds	Effective Area	Total Cost	Monitoring 1%
1	Loharheri	400	48,00,000	48,000
2	Dohkora	510	61,20,000	61,200
3	Kulasi	500	60,00,000	60,000
4	Asauda sewan	495	59,40,000	59,400
5	Jakhauda	510	61,20,000	61,200
6	Rohad	520	62,40,000	62,400
7	Kanaund	440	52,80,000	52,800
8	Nilothi	400	48,00,000	48,000

8.2 EVALUATION

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

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

Table 2. Micro Watershed wise details

S.no	Name of the Micro Watersheds	Effective Area	Total Cost	Evaluation 1%
1	Loharheri	400	48,00,000	48,000
2	Dohkora	510	61,20,000	61,200
3	Kulasi	500	60,00,000	60,000
4	Asauda sewan	495	59,40,000	59,400
5	Jakhauda	510	61,20,000	61,200
6	Rohad	520	62,40,000	62,400
7	Kanaund	440	52,80,000	52,800
8	Nilothi	400	48,00,000	48,000

CONSOLIDATION PHASE- 3 %
Consolidation Phase = Rs. 18, 21,240 /-

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: Loharheri

Table 3. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. In lacs)
1	Managing/ upgrading of all activities taken up under the project	0.29
2	Preparation of Project completion report	0.07
3	Documentation of success stories	0.07
4	Management of proper utilization of WDF	0.22
5	Mechanism for quality and sustainability issues under the Project	0.07
6	Watershed activities	0.72

Total: 1.44 lacs

Name of Micro watershed: Dohkora

Table 4. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. In lacs)
1	Managing/ upgrading of all activities taken up under the project	0.37
2	Preparation of Project completion report	0.09
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.28
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.92

Total: 1.84 lacs

Name of Micro watershed: Kulasi

Table 5. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. In lacs)
1	Managing/ upgrading of all activities taken up under the project	0.36
2	Preparation of Project completion report	0.09
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.27
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.90

Total: 1.80 lacs

Name of Micro watershed: Asauda sewan

Table 6. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. In lacs)
1	Managing/ upgrading of all activities taken up under the project	0.35
2	Preparation of Project completion report	0.09
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.27
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.89

Total: 1.78 lacs

Name of Micro watershed: Jakhauda

Table 7. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. In lacs)
1	Managing/ upgrading of all activities taken up under the project	0.37
2	Preparation of Project completion report	0.09
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.28
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.92

Total: 1.84 lacs

Name of Micro watershed: Rohad

Table 8. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. In lacs)
1	Managing/ upgrading of all activities taken up under the project	0.37
2	Preparation of Project completion report	0.10
3	Documentation of success stories	0.09
4	Management of proper utilization of WDF	0.28
5	Mechanism for quality and sustainability issues under the Project	0.09
6	Watershed activities	0.94

Total: 1.87 lacs

Name of Micro watershed: Kanaund

Table 9. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. In lacs)
1	Managing/ upgrading of all activities taken up under the project	0.31
2	Preparation of Project completion report	0.08
3	Documentation of success stories	0.08
4	Management of proper utilization of WDF	0.24
5	Mechanism for quality and sustainability issues under the Project	0.08
6	Watershed activities	0.79

Total: 1.58 lacs

Name of Micro watershed: Nilothi

Table 10. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. In lacs)
1	Managing/ upgrading of all activities taken up under the project	0.29
2	Preparation of Project completion report	0.07
3	Documentation of success stories	0.07
4	Management of proper utilization of WDF	0.22
5	Mechanism for quality and sustainability issues under the Project	0.07
6	Watershed activities	0.72

Total: 1.44 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 3775 ha and the Project Cost is 453.00 lacs covering 8 no. micro watersheds and in all 8 villages. Benefits will be much more than the project cost as detailed below:

With the several interventions under IWMP I project such as Livelihood support, Farm production system, various types of activities relating to soil conservation measures for diversification of crops, Protection to field by constructing the structures etc, it is expected that these Watershed villages will gain a lot. This intervention will have multiple benefits available to communities in terms of employment, check in migration, improvement in water table, more area under agriculture and horticulture, check in soil loss and decrease in Flood and drought incidences, improvement in crop yield, milk yield, check in degradation of land etc. The benefits thus accrued would be short term and long term. With the judicious use of funds available under IWMP and with convergence from MGNREGA and other schemes of Departments, this project of Bahadurgarh Watershed I will prove to be very beneficial in improving socio – economic status of people residing in Project villages.

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

9.1 EMPLOYMENT

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

Table 1. Expected Employment Generation in the Project area

S. No.	Name of micro watersheds	Wage employment						Self employment			
		No of man days			No. of Beneficiaries			No. of Beneficiaries			
		SC	others	Total	SC	others	Total	SC	others	Women	Total
1	Loharheri	675	3626	4301	84	453	538	11	11	-	22
2	Dohkora	658	4825	5484	82	603	686	11	-	11	22
3	Kulasi	731	4645	5376	91	581	672	-	11	11	22
4	Asauda sewan	862	4460	5322	108	558	665	-	11	11	22
5	Jakhauda	713	4771	5484	89	596	686	11	-	11	22
6	Rohad (part)	1331	4260	5591	166	533	699	11	11	-	22
7	Kanaund (Part)	823	3908	4731	103	489	591	-	11	11	22
8	Nilothi (Part)	675	3626	4301	84	453	538	11	-	11	22
	Total	**6469**	**34120**	**40589**	**809**	**4265**	**5074**	**55**	**55**	**66**	**176**

40589 man days would be generated with the implementation of the project in Bahadurgarh Watershed (IWMP I), which means about 80 person for 100 days per year would be employed for the period of five years. In addition to this cropped area/ productivity would be increased and will also generate employment.

9.2 MIGRATION PATTERN

Table 2. Pre and Post Migration in Bahadurgarh Watershed (IWMP I)

S. No	Name of micro watersheds	No. of persons migrating		No. of days per year of migration		Comments
		Pre Project	Expected post project	Pre Project	Expected post project	
1	Loharheri	50	25	90	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
2	Dohkora	200	100	90	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
3	Kulasi	100	50	90	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
4	Asauda sewan	--	-	-	-	-
5	Jakhauda	--	-	-	-	-
6	Rohad (part)	100	50	120	60	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
7	Kanaund (Part)	50	25	120	60	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%

8	Nilothi (Part)	100	50	90	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%

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

9.3 GROUND WATER TABLE

The ground water behavior in the watershed reveals the variation of depth to water level from 2.14 to 5.29 m below ground level. The area under Loharheri, Dohkora and Asoda Sewan micro-watersheds have water table less than 2 m. The area under Nilothi, Kulasi and Jakhauda have water table depth in the range of 2 to 3 m. The area under Kanaund and Rohad have water table more than 3 m. The necessary provision for rain water harvesting/recharging has been provided in the project proposals through construction of percolation tank/ ponds.

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

S.No	Name of micro watersheds	Source	Existing pre- project ground water table level (m)
1	Loharheri	Well	-
2	Dhahkora	Well	3.21
3	Kulasi	Well	2.74
4	Asuoda Siwan	Well	2.29
5	Jakhoda	Well	2.14
6	Rohad	Well	3.5
7	Kanaunda	Well	5.29

8	Nilothi	Well	2.75

Source: Ground Water Cell, Haryana

9.4 CROPS

To enhance the productivity, the integrated land and water management are important in the watershed area. The planned Water conveyance system, Dug Out Pond (New/Renovation), Ramp/Ghat Inlet and Outlet, Roof top rain water recharge structures etc. can preserve 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 Bahadurgarh Watershed (IWMP I)

Name of Micro-Watersheds	Village	Name of Crops	Pre project		Total Production (in Qtl)	Total Value Rs (in lacs)	Expected post project		Total Production	Total Value Rs (in lacs)
			Area ha	Average yield Qtl. Per ha			Area ha	Average yield Qtl. Per ha	(in Qtl)	
IWMP-I	Loharheri	Wheat	298	36	9628	14.44	328	40	13120	196.8
		Musturd	38	11	418	9.19	42	12	504	11.08
		Paddy	0	0	0	-	-	-	-	-
	Dhahkora	Wheat	312	40	12480	187.2	343	42	14406	31.09
		Musturd	110	11	1210	26.62	120	12	1440	34.68
		Paddy	3	30	90	20.7	6	31	186	42.78
	Kulasi	Wheat	539	36	19404	291.06	593	37	21943	329.11
		Musturd	35	12	420	9.24	39	13	507	11.15

		Paddy	229	30	6870	158.01	252	31	7812	179.76
	Asuoda Siwan	Wheat	225	38	8550	129.25	251	40	10040	220.88
		Musturd	81	12	272	5.98	89	13	1157	26.15
		Paddy	37	31	1147	26.38	41	32	1312	30.17
	Jakhoda	Wheat	195	37	7215	10.82	204	38	7752	116.28
		Musturd	5	11	55	1.26	6	12	72	1.65
		Paddy	19	30	570	13.11	21	31	651	14.97
	Rohad	Wheat	1081	37	3997	59.96	1189	38	45182	677.73
		Musturd	100	12	1200	26.4	110	13	1430	31.46
		Paddy	579	32	18528	325.9	637	34	24206	256.73
	Kanaunda	Wheat	659	36	23724	355.86	725	40	29000	435
		Musturd	100	12	1200	26.4	110	13	1430	31.46
		Paddy	172	32	5504	36.78	189	34	6426	147.79
	Niothi	Wheat	648	38	24524	12.66	713	40	28.52	427.8
		Musturd	11	12	132	36.78	12	12	144	3.16
		Paddy	268	31	8308	367.8	295	32	9440	217.12

Source: Revenue Department and Department of Agriculture, Jhajjar (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	Loharheri	-	0.70	0.70
2	Dahkora	1	0.85	1.85
3	Kulasi	-	0.90	0.90
4	Asuoda Siwan	2	0.68	2.68
5	Jakhoda	-	-	-
6	Rohad	-	-	-
7	Kanaunda	1	2.45	3.45
8	Nilothi	-	-	-
	Total	**4**	**4.05**	**9.58**

9.6 AFFORESTATION/ VEGETATIVE COVER

Table 6. Pre and post project forest and vegetative cover

S.No.	Name of micro watersheds	Existing area under tree covered, (ha)	Area under tree cover proposed (ha)	Total
1	Loharheri	2.2	1.3	3.5
2	Dehkora	1.85	1.15	3
3	Kulasi	1.9	1.1	3
4	Asuoda Siwan	1.22	1.32	2.54
5	Jakhoda	1.85	-	1.85
6	Rohad	2.2	-	2.2
7	Kanaunda	1.75	1.55	3.3

8	Nilothi	-	2	2
	Total	**12.97**	**8.42**	**21.39**

9.8 LIVESTOCK

Table 7. Details of livestock in the project area

S. No.	Name of micro watershed	Type of Animals	Pre project			Post project			Remarks
			No.	Yield Kg/ day	Income In Rs per day	No.	Yield Kg/ day	Income In Rs per day	
1	Loharheri	Buffalo	808	6464	289800	969	7752	387600	Increase in milk yield and number of animals by approx. 15%
		Cow	122	732	21960	144	864	30240	Increase in milk yield and number of animals by approx. 15%
2	Dhakroa	Buffalo	922	17737	338165	1106	9401	470050	Increase in milk yield and number of animals by approx. 15%
		Cow	214	1391	4170	237	15041	53935	Increase in milk yield and number of animals by approx. 15%
3	Kulasi	Buffalo	1435	114080	517100	1777	14216	710800	Increase in milk yield and number of animals by approx. 15%
		Cow	279	1734	42020	347	2080	72810	Increase in milk yield and number of animals by approx. 15%
4	Asuda Siwan	Buffalo	816	6120	243480	979	7337	366850	Increase in milk yield and number of animals by approx. 15%
		Cow	227	1362	40860	252	1514	52290	Increase in milk yield and number of animals by approx. 15%
5	Jakhoda	Buffalo	1032	8772	394640	1238	8772	438600	Increase in milk yield and number of animals by approx. 15%

S. No.	Name of micro watershed	Type of Animals	Pre project			Post project			Remarks
			No.	Yield Kg/ day	Income In Rs per day	No.	Yield Kg/ day	Income In Rs per day	
		Cow	306	1989	69670	367	2386	83510	Increase in milk yield and number of animals by approx. 15%
6	Rohad	Buffalo	1781	14239	641107	2037	160296	814800	Increase in milk yield and number of animals by approx. 15%
		Cow	432	2592	77460	514	3084	107940	Increase in milk yield and number of animals by approx. 15%
7	Kanunda	Buffalo	1611	13694	616023	1933	16431	821550	Increase in milk yield and number of animals by approx. 15%
		Cow	456	2964	88920	547	3556	124460	Increase in milk yield and number of animals by approx. 15%
8	Nilothi	Buffalo	1324	9930	436850	1589	11960	595350	Increase in milk yield and number of animals by approx. 15%
		Cow	244	1464	43920	292	1752	61320	Increase in milk yield and number of animals by approx. 15%

9.9 LINKAGES

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

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

Table. 8: Backward-Forward Linkages

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

		Any other (please specify)	-	-	-
			Vermi-compost unit	Convergence with NHM (Horticulture) department	To be increased
			Mushroom Cultivation	Convergence with NHM (Horticulture) department	To be increased
			Animal vitamins/ Minerals Deficit	Coordinate with lined department, to organize camps in watershed area	Animal vitamins feeds Would be promoted

9.9.1 LOGICAL FRAMEWORK ANALYSIS

Table 9. Logical Framework Analysis

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

Components	Activities	Outputs	Effect	Impact
	• 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	• Federations of UGs and WC to be formed.	• Increased awareness amongst women about village resources • Women participation enhanced in decision-making of GVCs. • Involvement of youth and children in village development.	

Components	Activities	Outputs	Effect	Impact
	communities to involve children and youth in development			
Fund Management	• Improve management and utilization of UGs and WCs • Prepare communities to explore other sources of income for UGs and WCs.	UGs and WCs operating bank account and managing resources on their own.	• Purpose, frequency and volume of use of the fund enhanced • Volume of funds generated for UGs and WCs from other sources of income increased	
Ecological restoration	• Protection, Treatment and regeneration of common and private lands. • Protection, treatment and regeneration of forest lands. • Plantation of fruits and forest species.	• 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	• Fodder availability from common and private land increased. • Accessibility to common and forest lands increased with removal of encroachments and resolution of conflicts	• Better Ecological order in the area. • Increase in the proportion of households having more security of fodder. • Reduction in drudgery of fodder and fuel collection, especially women

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

Components	Activities	Outputs	Effect	Impact
	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,	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.	• 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.	

Components	Activities	Outputs	Effect	Impact
	processing and packaging. • Promotion of better irrigation practices like drip irrigation • Impart trainings, conduct meetings and organize exposure visits of communities.			
Women's socio-political and economic empowerment	• Formation and strengthening of women' SHG groups • Capacity building of women folk. • Capacity building of SHG leaders and accountants Linking SHGs with external financial institutions	• Women's SHG groups to be formed. • Federation of Women's SHGs to be formed. • Trainings to be conducted for preparation of woolen products from sheep and goats	• Enhanced capacities of leaders of women's group in taking initiatives to solve problems at different levels. • Improved access to credit for livelihood purposes Increased household income.	• Position of women in household, community, society (politically, socially and economically) as perceived by women and community at large. • Performance enhancement of SHGs in terms of participation, decision-making, leadership and fund management.

Components	Activities	Outputs	Effect	Impact
				• 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.