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CHAPTER- 1

METHODOLOGY

INTRODUCTION

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, Haryali & IWDP were brought under one umbrella in the name of Integrated Watershed Management Programme in the year 2008. The scheme is basically for rainfed area. Common Guidelines were framed by National Rainfed Area Authority. Rural Development Department is the Nodal Department for implementation of IWMP through State Level Nodal Agency.

To implement watershed (IWMP I) area programme a systematic survey has been conducted to know the potentiality of each village / Micro-Watershed. With this view, a baseline survey was conducted in four micro-watersheds Ghamroj (2C5D4m5), Rai Sena A (2C5D4m6), Rai Sena B (2C5D4n5) and HaryaHeri (2C5D4m4). The baseline survey conducted be considered as benchmark against which the results of project could be compared at the end of the implementation. It would also help in guiding watershed programmes and to plan its goal in identifiable terms and be used as future reference. Participatory Rural Appraisal (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 4 micro watersheds namely Ghamroj (2C5D4m5), Rai Sena A (2C5D4m6), Rai Sena B (2C5D4n5) and HaryaHeri (2C5D4m4) with their respective codes.

1.1.2 Base Line Survey

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

1.1.3 Collection of Primary Data

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 Ghamroj, Rai Sena A, Rai Sena B and HaryaHeri micro-watersheds. During this meeting, preliminary details of the proposed project including location of villages and criteria of selection and PPR were discussed.

In order to have first hand information, a joint visit in the project area was made along with 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 meetings were organized at common places and problem and possible solutions were debated, discussed and efforts were made to reach agreement on activities required under the projects. This was followed by transect walks

across the entire area of the village and spots indicated by the community. The proposed techno-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 stakeholders as per guidelines, the mechanism of fund flows, cost sharing arrangement in different components and operational mechanism of the projects was thoroughly discussed with the community and Watershed Committees (WC) in detail.

1.2.1 Participatory Net Planning

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

Based on the experience of the experts working in the area and catchment area characteristics each structures like the Construction of Dams, Construction of Ponds, Ramps, inlet & outlets, Earthen Embankments /Marginal bunds with pucca outlet, Small earthen embankment with vegetative support for dune stabilization, Community water storage Tank, Water Conveyance System etc. were recommended to conserve and store water used for life saving irrigation potential in the rain fed area and to avoid further degradation of the land.

1.2.2 Community Participants in Social Mapping

The village communities were appr ised ab out pr oject act ivities. G roup m eetings were or ganized at co mmon pl aces, problems and possi ble so lutions were debat ed, di scussed a nd ef forts were m ade t o r each agr eement on act ivities required u nder t he pr oject. Social m apping involv ing local co mmunity was prepared. Infrastructure se rvices and ot her village resources such as ponds, agriculture land etc. were mapped.

1.2.3 Transect Walk

Reconnaissance su rvey was carried out t hrough transect walk in order to i dentify the needs, t reatments 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 i n co mplementing t he asse ssment em erged from PRA and t o der ive t he op inion of t he co mmunities on various issues.



Gram Sabha Member's Participation in Group Discussion

1.3 USE OF GIS TECHNOLOGY FOR PLANNING

A scientific tool has been promoted at various stages of watershed development planning. Various maps were prepared such as Base map, Present Land Use, Geo-hydrological, Micro Watershed, Drainage, Contours, Slope, Soil Classification, Land Capability Classification, Soil Fertility, Ground Water Depth and Quality, Proposed activities of works. 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 need and experience of the experts working in the area and catchment area, structures like the Construction of Dams, Construction of Pond, Ramp, inlet & outlet, Earthen Embankments /Marginal bunds with pucca outlet, Small earthen embankment with vegetative support for dune stabilization, Community water storage Tank, Water Conveyance System etc. were provided in consultation with the Gram Sabha Members. However finally only those activities are included which were suggested by the Gram Sabha according to their needs.

1.3.3 Hydrological modeling

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

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

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

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

1.4 Preparation of Action Plan and Approval

Based on the need and problems in watershed area; a draft action plan was prepared and placed before the concerned watershed development committee as per schedule circulated by Additional Deputy Commissioner for approval of the Watershed Committees. After detailed 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 falls in Sohna block of Gurgaon district in Haryana state. The project is a cluster of four micro- watersheds namely Ghamroj (2C5D4m5), Rai Sena A (2C5D4m6), Rai Sena B (2C5D4n5) and Harya Heri (2C5D4m4).The total geographical area of the project is **3661 ha** out of which **3180 ha** has been undertaken to be treated under IWMP I starting from year 2012-2013. The project is divided into four 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	Rai Sena	Ghamroj	2C5D4m5	Ghamroj	Sohna	Gurgaon	1100	950	114	ASCO, Gurgaon
2	Rai Sena	Rai Sena A	2C5D4m6	Rai Sena A	Sohna	Gurgaon	842	720	86.4	ASCO, Gurgaon
3	Rai Sena	Rai Sena B	2C5D4n5	Rai Sena B	Sohna	Gurgaon	914	780	93.6	ASCO, Gurgaon
4	Rai Sena	Herya Heri	2C5D4m4	Herya Heri	Sohna	Gurgaon	338	330	39.6	ASCO, Gurgaon
5	Rai Sena	Herya Heri	2C5D4m4	Alipur	Sohna	Gurgaon	467	400	48	ASCO, Gurgaon
Grand Total							3661	3180	381.6	

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 Weight-age for Selection of Watershed

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

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

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

The total numbers of families under BPL are in the range of 50-80% of the total number of household in the village. Hence a score of 10 was allotted. Ground water status of the area is over exploited and area the score is given as 5. The percentage of schedule castes in this watershed is more than 40 percent of the total population, hence 10 score was allotted. Due to high percentage of the poor population i.e. in the range of 50-80 percent thus the scope of poverty index is

7.5. More than 80 percent of the farmers are small and marginal in nature. Hence a rank of 5 is allotted. Considering these parameters watershed score is 92.5.

Table- 3: Weightage of the Project

District	Name of the project	No. of micro-watersheds 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
Gurgaon	Rai Sena Watershed (IWMP I)	4	3180	Sub-Hilly	381.60	7.5	10	0	10	5	0	10	5	15	15	5	5	5	92.5

Table 4: Watershed Information

Name of the Project	No. of Micro-Watersheds to be Treated	Watershed codes	Watershed regime/type/order
Rai Sena Watershed (IWMP I)	4	2C5D4m5, 2C5D4m6, 2C5D4n5 and 2C5D4m4	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), Swarnajayanti Gram Swarajgar Yojana (SGSY) and Indira Awas Yojana (IAY), NWDPR etc. All the active programmes are tabulated in **Table 5**.

Table5. Ongoing Developmental Programs in the Project Area

S. No.	Name of the Program /Project	Name of Villages	Sponsoring agency	Objective	Estimated number of beneficiaries for year 2013-14 (Job card issued)
1	MGNREGA	Ghamroj	DRDA, Gurgaon	To provide assured employment of 100 days in a year to unskilled labour and village development	117
2	MGNREGA	Rai Sena A+B	DRDA, Gurgaon	To provide assured employment of 100 days in a year to unskilled labour and village development	101
3	MGNREGA	Harya Heri	DRDA, Gurgaon	To provide assured employment of 100 days in a year to unskilled labour and village development	---
4	MGNREGA	Alipur	DRDA, Gurgaon	To provide assured employment of 100 days in a year to unskilled labour and village development	65

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)

Names of Districts	Total micro-watersheds in the District		Micro-watersheds covered so far						Net watersheds to be covered	
			Dept. of Land Resources		Other Ministries/ Depts.		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.)
Gurgaon	141	81624	2	2300	33	22756	35	25056	106 (Balance)	56568 (Balance)

CHAPTER – 3

BASIC INFORMATION OF THE PROJECT AREA

GEOGRAPHY AND GEOHYDROLOGY

The Rai Sena Watershed (IWMP-I) falls in Sohna block of District Gurgaon. Physiographically, the area falls under dune and interdunal plains. The area of watershed lies in between 28°19'45”to 28°18'00” N Latitude & 76°59'15” to 77°02'45” east longitude with general elevation varies between 194-276 m (MSL) above mean sea level. Annual average rainfall of the district is 494 mm and about 80 per cent of its annual rainfall is received in the month of July to September. Despite total rainfall received in this area, water retention is very low, due to light texture and dune topography. 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 Rai Sena Watershed (IWMP-I)

Sr. No.	Name of Micro Watersheds With Code	Name of Villages	Geographic al Area in (ha)	Treatable area of the village(ha)	Land under agriculture use (ha)	Rain fed area (ha)	Wasteland	
							Cultivable	Non-Cultivable
1	Ghamroj (2C5D4m5)	Ghamroj	1100	950	656	338	6	595
2	Rai Sena A (2C5D4m6)	Rai Sena A	842	720	319	259	-	523
3	Rai Sena B (2C5D4n5)	Rai Sena B	914	780	347	265	1	566
4	Herya Heri	Harya Heri	805	730	568	268	186	173

Sr. No.	Name of Micro Watersheds With Code	Name of Villages	Geographic Area in (ha)	Treatable area of the village(ha)	Land under agriculture use (ha)	Rain fed area (ha)	Wasteland	
							Cultivable	Non-Cultivable
	(2C5D4m4)							
			3661	3180	1611	1130	193	1857

(Source – District Census Handbook, 2001 Gurgaon)

3.2 SOIL AND TOPOGRAPHY

The soils of Rai Sena Watershed are Loamy sand to sandy clay loam with or without graveliness and rockiness. The topography of the area ranges from level to gentle slopes and moderate to high slope in sand duneal and hillock areas. Soils are subject to susceptible to moderate to severe water and wind erosion. The slope ranges from 3 to 10 % and above. 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.	Ghamroj	2C5D4m5	1100	Loamy sand to sandy clay loam with or without gravels and fragment rocks	Nearly level to very gentle slope occasionally moderate to high in hilly areas
2.	Rai Sena A	2C5D4m6	842		
3.	Rai Sena B	2C5D4n5	914		
4.	Herya Heri	2C5D4m4	805		
	Total		3661		

Source: - Department of Agriculture, Haryana

3.2.1 Flood and Drought Condition

There have been very few incidences of flood in watershed villages. The data collected from the revenue department reveals that the instances of flood and drought incidences once in 10 years. The flood 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.	Ghamroj	Once in a 10 Year	Once in a 10 Year
2.	Rai Sena A		
3.	Rai Sena B		
4.	Herya Heri		

3.3 SOILS

3.3.1 Soil Erosion

In the identified four micro watersheds, it is observed that due to light texture & less vegetative cover to increase the loss of soil in the watershed area. This results in degradation of agricultural land, deforestation and low organic matter contents average annual rainfall is 494 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 occur, which also carries valuable top soil. Soil erosion in respect of sheet is moderate. Majority of the watershed Community are dependent on agriculture. Agriculture suffers due to area being rain fed and due to deficit rains in the region, resulting in further deterioration of socio economic conditions of community.

3.3.2 Soil Salinity/Alkalinity (Salinity ingress)

There is moderate soil salinity in the Project and pH is normal and within the limits of 7.0 to 8.3.

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.	Ghamroj	8.1	Low to moderate
2.	Rai Sena A	8.2	Low to moderate
3.	Rai Sena B	8.3	Low to moderate
4.	Herya Heri	7.0,7.8	Normal

3.3.3 SOIL CLASSIFICATION

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

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 subclasses were indicated by adding the following limitation symbols to the capability classes:

1. Erosion and runoff (e) including risk of erosion and great erosion damage.
2. Excess of water (w) including wetness, high water table, and problem of drainage.

3. Root zone limitation (s) including shallow depth, low water holding capacity, salinity or alkalinity/rockiness.
4. Climate limitation (c).

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

Land capability subclass III e2s2

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

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

1. Land leveling should be done at 50% subsidy, because farmers are not economically capable to bear the cost of land leveling.
2. Engineering measures like earthen embankments if required with drop structure for safe disposal of excess rainwater should be undertaken.
3. Agronomic measures; mainly dry land farming, leguminous crop growing as mix cropping should be recommended.
4. Provide proper drainage system in low lying depression in the area.
5. Increase biomass through adopting agro-forestry on field bunds.

Land capability subclass IV e3s3

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

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

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

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

3.3.5 Climatic Conditions

The average rainfall of the district is 494 mm (during the past 10 year's data). The highest rainfall is 864 mm during the year 2010 and lowest 200 mm during the year 2006. The uneven rainfall distribution is leading to run off soil every year to the steams, rivulets and depressed area of the Rai Sena Watershed (IWMP I). The year wise rainfall from 2004 to 2013 is presented in **Table.5**.

Table-5. Rainfall during the years 2004-13

Sr. No.	Year	Rainfall (in mm)
1	2004	654
2	2005	483
3	2006	200
4	2007	324
5	2008	624
6	2009	505
7	2010	864
8	2011	356
9	2012	559
10	2013	373
	Total Average	494

(Source: - Ground Water Cell, Gurgaon)

The mean maximum temperature is 49° C (May and June) and mean minimum is 2° C (January) of the district.

3.3.6 Physiography and Relief

Physiographically, the area is divided into two parts active and stabilized sand dunes. The general Elevation in the area belongs to stabilized sand dunes and Interdunal plains 194-276 m above mean sea level. Upper area is moderately affected by erosion due to absence of vegetative cover and uneven slopes. The elevation range and percentage slope distribution has been presented in **Table 6**.

Table 6. Physiography and Relief

Project Name	Elevation (MSL)	Slope Range (%)
Rai Sena Watershed (IWMP I)	194-276 m	3 to 10 %

3.4 LAND AND AGRICULTURE

The land holding pattern of the villages under Rai Sena Watershed shows that the majority of the land holding is 1-3 ha. In the majority of Watershed area suffering from assured irrigation source has forced the majority of the farmers adopt side income source to survive because the rainfed agriculture not fulfill of their daily needs. The nearest Industrial Area is Gurgaon. This affects directly the demographic profile of the village.

The major crops Bajra, Gwar, Ahar, Green fodder and pulses in Kharif under rainfed conditions. The major crops during Rabi Wheat, Green fodder and seasonal vegetables, Gram, Mustard in rain fed and irrigated conditions. The soil and water conservation measures such as Engineering like the Construction of Dams, Construction of Pond, Ramp, inlet & outlet, Earthen Embankments /Marginal bunds with pucca outlet, Small earthen embankment with vegetative support for dune stabilization, Community water storage Tank, Water Conveyance System 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	Kathahal	Congress Grass
2	Bargad	Sahsoot	Munj Grass
3	Pipal	Amrood	Dub Grass
4	Sisham	Amla	Dhok
5	Bakan	Neembu	Khar Bathu
6	Kikar	Ber	Bathu

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
789	46	113	-	948

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	Ghamroj	Ghamroj	656	544	413
2	Rai Sena A	Rai Sena A	319	276	198
3	Rai Sena B	Rai Sena B	347	297	215
4	Harya Heri	Harya Heri	568	474	359
		Total	1890	1591	1185

(Source: Department of Agriculture, Haryana)

3.4.3 IRRIGATION

Lack of Assured Irrigation Facilities

The area being located in the tail end of the canal network where surface water availability is uncertain. The present source of irrigation in the watershed has been tabulated in **Table 10**.

Table 10. Irrigation Pattern.

S. No	Name of Villages	Source 1: Canal		Source 2: Groundwater (Tube wells)	
		Availability months	Net area (ha)	Availability months	Net area (ha)
1.	Ghamroj	-	-	July to June	161
2.	Rai Sena A+B	-	-	July to June	60
3.	Harya Heri	-	-	July to June	82
4.	Ali Pur	-	-	July to June	178
					481

(Source – District Census Handbook Gurgaon)

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. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
1	Herya Heri	Herya Heri	79	325401	4119	D.A.P./ Urea	30	51390	1713	D.A.P. Urea/Sulphur

		Alipur	246	1013274	4119	D.A.P./ Urea	89	152457	1713	D.A.P. Urea/Sulphur
2	Ghamroj	Ghamroj	277	1140963	4119	D.A.P./ Urea	49	83937	1713	D.A.P. Urea/Sulphur
3	Rai Seena (A+B)	Rai Seena	333	1371627	4119	D.A.P./ Urea	177	303201	1713	D.A.P. Urea/Sulphur
Total			935	3851265			345	590985		

Table 11 B. Crop Details (Kharif)

Sr. No.	Name of Micro Watersheds	Village	Bajra				Jawar/Gwar			
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
1	Herya Heri	Herya Heri	75	146025	1947	FYM/Urea/DAP	2/2	3160	1580	FYM/Urea
		Alipur	153	297891	1947	FYM/Urea/DAP	10/34	4740	1580	FYM/Urea
2	Ghamroj	Ghamroj	190	369930	1947	FYM/Urea/DAP	10/7	11060	1580	FYM/Urea
3	Rai Seena (A+B)	Rai Seena	321	624987	1947	FYM/Urea/DAP	4/4	6320	1580	FYM/Urea
Total			739	1438833				25280		

3.4.5 Livestock

Farmers in these villages have maintaining 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 murrhah buffalo with better milk production will popularize dairy farming in the area. Also, the farmyard manure procured from these animals would help improve the soil health.

Table 12. Village Wise Distribution of Milk Production in Rai Sena 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	Herya Heri	Herya Heri	356/2848/512640	68/340/61200	-	73	-
		Alipur	896/7168/1290240	248/1240/223200	-	44	-
2	Ghamroj	Ghamroj	406/3248/16240	179/895/161100	-	-	-
3	Rai Seena (A+B)	Rai Seena	1051/8408/1513440	198/990/178200	-	317	-

(Source: Animal Husbandry, Gurgaon)

***Average yield of Buffalo is 7-8 lit/day and the Average yield of Cow is 3-4 lit/day**

3.4.6 Ground Water Concern

a) Depth to Water

Ground Water Cell of Haryana has fixed hydrograph station scattered over the district whose monitoring is undertaken during pre and post monsoon season. The water level data has been analyzed for the purpose of ground water studies in the watershed area. The ground water level of all micro watersheds varies from 25-32 m depth. 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 Rai Sena Watershed (IWMP I)

Sr. No.	Name of Micro Watersheds	Name of Villages	Source	Pre-Project level (m)
1	Herya Heri	Herya Heri	Tube Well	25.00
		Alipur	Tube Well	27.00
2	Ghamroj	Ghamroj	Tube Well	26.00
3	Rai Seena (A+B)	Rai Seena	Tube Well	32.00

The ground water quality of the area based on the water samples collected by ground water cell as their on-going activity has been utilized for preparation of water quality map and is presented in Annexure-IX. The map reveals that area

underlain in RaiSena Micro-watershed is fresh except the small pocket located around the village settlement which is marginal. The remaining area covering Ghamroj, Alipur and Harya Heri micro-watersheds are underlain by marginal ground water quality.

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 declining at the rate 43 cm per year (Ground water cell record).

The average Sohna block seasonal fluctuation i.e. Pre and Post monsoon period is 18 cm.

c) Rain water harvesting and Recharging

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

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

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

Table14. Detail of Common Property Resources

Name of the Project	CPR Particulars	Total Area, ha (Area owned / in possession of)				Area available for treatment (ha)			
		Pvt. Person	Govt.	PRI	Any Other	Pvt. Person	Govt.	PRI	Any Other
Rai Sena Watershed (IWMP I)	Waste land	300	160	145	-	300	160	145	-
	Pasture	-	-	-	-	-	-	-	-

Orchards	172	-	-	-	270	-	-	-
Village wood lot	-	-	-	-	-	-	-	-
Forest	175	-	250	-	600	-	-	-
Village ponds, lake	-	-	10	-	-	-	9	-
Community Buildings	-	8	4	-	-	-	-	-
Weekly Mkts	3	-	-	-	-	-	-	-
Permanent Mkts	-	10	8	-	-	-	-	-
Temples/place of worship	-	-	-	-	-	-	-	-
Others	300	160	145	-	300	160	145	-

3.5 SOCIO ECONOMIC AND LITERACY PROFILE

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

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

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

3.5.1 Demographic Status

Table 15. Demographic Status/ Population Pattern

Sr. No.	Name of villages	Total no. of houses	Total Population			SC			
			Male	Female	Total	Male	Female	Total	%age

Sr. No.	Name of villages	Total no. of houses	Total Population			SC			
			Male	Female	Total	Male	Female	Total	%age
1	Ghamroj	842	2494	2303	4797	427	376	803	16.7
2	Rai Sena A+B	463	1332	1223	2555	298	256	554	21.7
3	Harya Heri	270	767	736	1503	178	191	369	24.6
4	Ali Pur	591	1789	1609	3398	304	270	574	16.9
		2166	6382	5871	12253	1207	1093	2300	18.8

(Source- District Census 2011)

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

Sr. No.	Name of the Micro watershed	Name of villages	Total population	Literacy					
				Total Literates	% age	Male	% age	Female	% age
1	Ghamroj	Ghamroj	4797	3459	72.1	1953	56.5	1506	43.5
		Ali Pur	3398	2453	72.2	1422	58.0	1031	42.0
2	Rai Sena A+B	Rai Sena A+B	2555	1649	64.5	968	58.7	681	41.3
3	Harya Heri	Harya Heri	1503	842	56.0	496	58.9	346	41.1
			12253	8403	68.6	4839	57.6	3564	42.4

(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	Ghamroj	Ghamroj	427	376	111	11	49	6	15	2	861	72
2	Rai Sena A+B	Rai Sena A+B	298	256	259	106	55	3	0	2	137	19

3	Herya Heri	Herya Heri	178	191	51	5	20	3	2	0	221	15
		Ali Pur	304	270	217	37	62	5	8	6	493	39
			1207	1093	638	159	186	17	25	10	1712	145

Source: Census 2011

3.5.2 MIGRATION PATTERN

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

Table 18. Migration Pattern in Rai Sena 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/persons
1	Ghamroj	Ghamroj	6500	122	120	For work	5500
2	Haria Hera	Haria Hera	1550	60	150	For work	5800
		Alipur	3500	102	150	For work	5400
3	Rai Seena (A+B)	Rai Seena	3400	85	180	For work	5600

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

Table 19. BPL Pattern

Sr. No.	Name of villages	Total Houses	Total Household BPL	% of BPL HH
1	Ghamroj	867	304	35
2	Alipur	639	110	17
3	Haria Hera	270	182	67
4	Rai Seena	463	220	48

(Source: District Administration Gurgaon, 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	Ghamroj	Ghamroj	Yes	Yes	Primary/Middle/High	No	Yes	Yes	No
2	Herya Heri	Herya Heri	No	No	Primary/Middle	No	Yes	No	No
		Alipur	Yes	No	Primary/Middle/High	No	Yes	No	Yes
3	Rai Seena	Rai Seena	No	No	Primary/Middle	No	Yes	No	No

FACILITIES/ HOUSEHOLD ASSETS

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

Sr. No.	Name of micro watershed	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	Ghamroj	Ghamroj	867	771	20	784	517	88	636	102	867	269
2	Herya Heri	Herya Heri	270	152		236	187	16	195	36	270	82
		Alipur	639	553	5	588	493	84	490	95	639	183
3	Rai Seena (A+B)	Rai Seena	463	308	3	487	369	32	365	55	463	147

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 Rai Sena Watershed (IWMP I)

Sr. No.	Name of Villages	Agriculture in Rs. P.A.	Animal Husbandry in Rs. P.A.	Casual labour in Rs. P.A.	Others in Rs. P.A.	Total in Rs.
1	Ghamroj	18235	15980	5650	3912	43777
2	Alipur	19476	16316	5121	4130	45073
3	Haria Hera	16388	12582	4853	4750	38573
4	Rai Seena	17567	17129	4980	5126	44802

3.5.4 Comparative Status of crop Productivity

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

3.6 REASONS FOR LOW PRODUCTIVITY

- Moderate to severe erosion hazard
- Poor physical and chemical properties of the soils are light in texture with boulders in pockets and poor fertility.
- Low water holding/ retention capacity.
- Medium to Moderate permeability.
- Low organic carbon content.
- Poor phosphorous and medium potash nutrients availability.
- Lack of assured irrigation facility.

- Acceptance of hybrid/ high yielding varieties is very low.
- Irregular and erratic rainfall: there is long span between two subsequent rainfalls in the area.
- Essential micro- nutrient deficiency in the soil.
- Full and partial dependence of monsoon.
- Improper use of fertilizer per unit cropped area.
- Lack of economic condition of farmers.
- Lack of good quality of seeds and fertilizer.
- Lack of post harvesting facilities such as storage and marketing.
- Poor ground water quality.

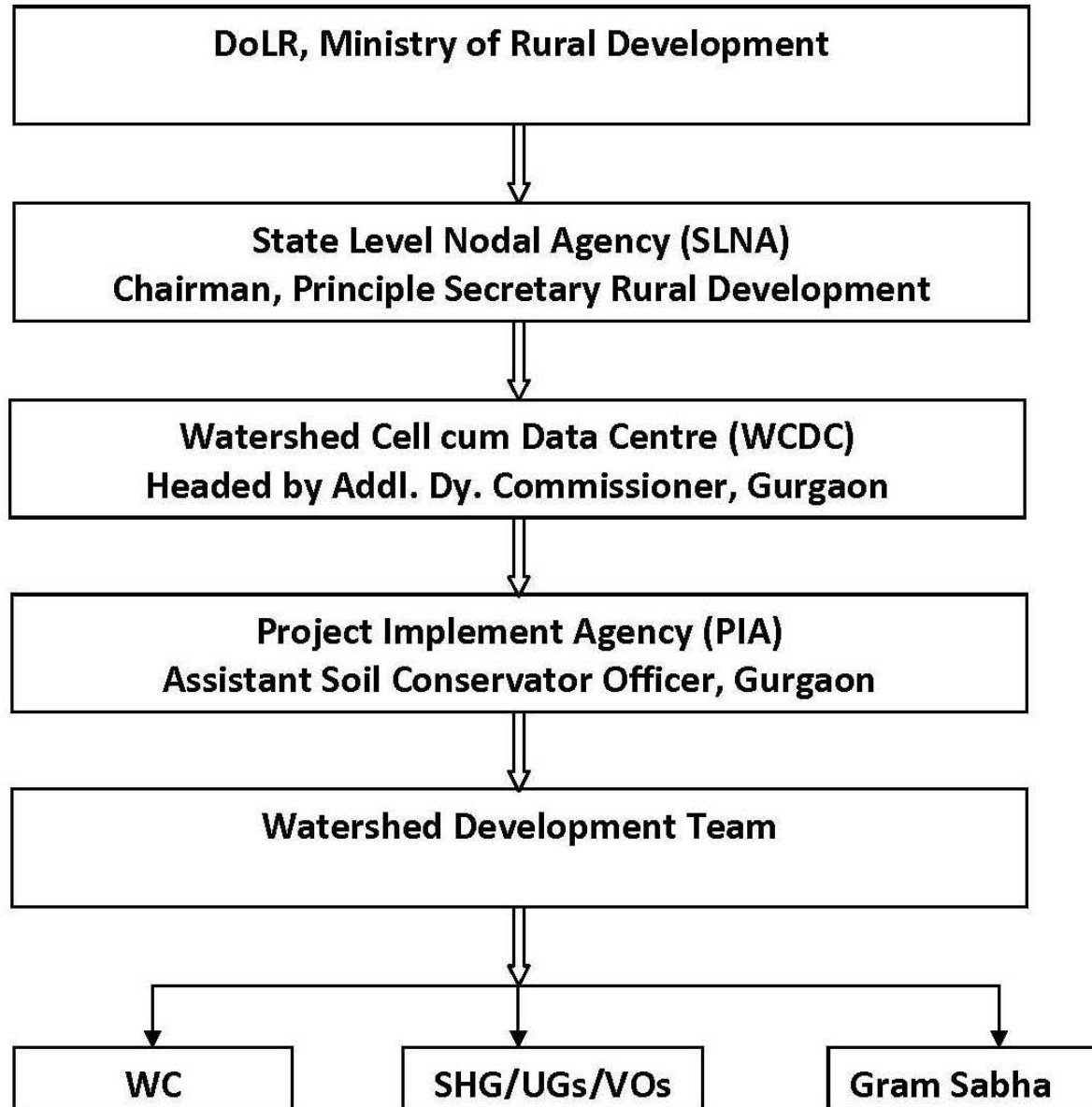
CHAPTER-4

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:



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 stakeholders 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, GURGAON

WCDC has been notified by SLNA and the same has been constituted. The team comprises of 3 to 4 subject matter specialists on Agriculture, Water Management, Social Mobilization and Management & Accounts. WCDC is headed by

Deputy Commissioner and Additional Deputy Commissioner has been designated as Project Manager under IWMP. The WCDC members comprise of Technical Expert, Computer Operator and Accountant. As per guideline 3 to 6 full time staff (3 in district with less than 25000 ha project area and 6 in districts with more than 25000 ha project area) would assist the Project Manager. The Project Manager will prepare well defined annual goals against which the performance that 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 Gurgaon is selected by the State Level Nodal Agency (SLNA) for Integrated Watershed Management Programme (IWMP) in Haryana. In the district Gurgaon, where the area of development is 10921 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, Gurgaon. With the vast experience in implementing various watershed development Projects. PIA will put dedicated watershed development team and will provide necessary technical guidance

to the Gram Sabha /Watershed Committee for implementation of development plans for the watershed projects through Participatory Rural Appraisal Exercise.

PIA will also undertake:

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

Table 1. PIA/ Project Implementing Agency

S.No.	Name of the Project	Details of PIA	
1	Rai Sena Watershed (IWMP-I)	i) Type of organization	Govt Organization
		ii) Name of organization	Department of Agriculture
		iii) Designation & Address	ASCO, Gurgaon
		iv) Telephone	
		v) Fax	-----
		vi) E-mail	ascogurgaon@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 of office with officials from the Gurgaon district to apprise themselves of the status of ongoing project.

4.5 Watershed Development Team

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

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

- a) Constitution of Watershed Committee and its functioning,
- b) Organizing and strengthening User groups, Self Help Groups,
- c) Mobilizing women to ensure that the perspectives and interests of women are adequately reflected in the watershed action plan
- d) Conducting Training and Capacity Building,
- e) Common property resource management and equitable sharing

- f) Preparing detailed resource development plan including Soil & Water Conservation,
- g) Undertake engineering surveys,
- h) Prepare engineering drawings and cost estimate for structures to be built.
- i) Monitoring, checking, assessing, undertaking physical verification and measurements of the work done
- j) Facilitating the development of livelihood opportunities for the landless
- k) Maintaining project accounts
- l) Arranging physical, financial and social audit of the work undertaken
- m) Setting up suitable arrangements for post- project operation, maintenance and future development of the assets created during the project period.

4.6 WATERSHED COMMITTEE DETAILS

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

Their representation of various groups is as under:

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

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

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

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

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

4.6.1 Formation of Watershed Committees (WC)

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

Table 2. Watershed Committees (WC) Details

Name of Micro Watersheds	Name of President	Name of Secretary	Name of Members
Ghamroj	Satpal Raghav	Kuldeep	Yograj Singh, Ravindra, Usha Devi, Sher Singh, Suraj, Amaraj, Ghanshyam, Jagdeesh, Keshav, Surajpal
Alipur	Manvir Dagar	Sajjan Singh	Krashtra, Sarita, Sakuntala, Chetram, Sunita, Sunil, Ratan Lal, Pravin, Madan, Manvir, Promila

Haria Hera	Santa Devi	Shri Ram	Sukhpal, Santram, Rakesh, Nidhi Devi, Surendra, Sriram, Vijendra, Suneel, Bheem Singh, Vijendra, Usha Devi
Rai Seena	Mulesh Devi	Mahendra	Mahendra, Vijay, Santosh, Seema, Arjun, Yakub, Mahendra, Sushil, Indra, Nand Kishor

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

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

4.7 INSTITUTIONAL SETUP AT WATERSHED LEVEL

4.7.1 Self Help Groups

The formation of the self help group in all the villages is underway. It is proposed to form at least 2 self help group in each village. In each village Self Help Groups consisting of 10 to 15 members having common goal are being formed. The members of SHGs would be drawn from very poor families, BPL families, SC families, Landless families, Small and Marginal farmers SHG would be homogeneous in nature and would work together for their socio-economic upliftment.

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 RAI SENA 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
Rai Sena Watershed (IWMP I)		3180	38160000	Administrative costs	381600	381600	1144800	1144800	763200	3816000
				Monitoring	0	0	0	381600	0	381600
				Evaluation	0	95400	95400	95400	95400	381600
				Entry point activities	1526400	0	0	0	0	1526400
				Institution and capacity building	0	1908000	0	0	0	1908000
				Detailed project report	381600	0	0	0	0	381600
				Watershed development works	0	3052800	6105600	6487200	5724000	21369600
				Livelihood activities for the asset less persons	0	0	1144800	1908000	381600	3434400
				Production system and micro enterprises	0	0	1144800	1526400	1144800	3816000
				Consolidation phase	0	0	0	0	1144800	1144800
				Total	2289600	5437800	9635400	11543400	9253800	38160000
				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: Ghamroj)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total	
950	11400000	Administrative costs	114000	114000	342000	342000	228000	1140000	
		Monitoring	0	0	0	114000	0	114000	
		Evaluation	0	28500	28500	28500	28500	114000	
		Entry point activities	456000	0	0	0	0	456000	
		Institution and capacity building	0	570000	0	0	0	570000	
		Detailed project report	114000	0	0	0	0	114000	
		Watershed development works	0	912000	1824000	1938000	1710000	6384000	
		Livelihood activities for the asset less persons	0	0	342000	570000	114000	1026000	
		Production system and micro enterprises	0	0	342000	456000	342000	1140000	
		Consolidation phase	0	0	0	0	342000	342000	
		Total		684000	1624500	2878500	3448500	2764500	11400000
		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: Rai Sena A)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
720	8640000	Administrative costs	86400	86400	259200	259200	172800	864000
		Monitoring	0	0	0	86400	0	86400
		Evaluation	0	21600	21600	21600	21600	86400
		Entry point activities	345600	0	0	0	0	345600
		Institution and capacity building	0	432000	0	0	0	432000
		Detailed project report	86400	0	0	0	0	86400
		Watershed development works	0	691200	1382400	1468800	1296000	4838400
		Livelihood activities for the asset less persons	0	0	259200	432000	86400	777600
		Production system and micro enterprises	0	0	259200	345600	259200	864000
		Consolidation phase	0	0	0	0	259200	259200
		Total		518400	1231200	2181600	2613600	2095200
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: Rai Sena B)
(BUDGET AT A GLANCE)**

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total	
780	9360000	Administrative costs	93600	93600	280800	280800	187200	936000	
		Monitoring	0	0	0	93600	0	93600	
		Evaluation	0	23400	23400	23400	23400	93600	
		Entry point activities	374400	0	0	0	0	374400	
		Institution and capacity building	0	468000	0	0	0	468000	
		Detailed project report	93600	0	0	0	0	93600	
		Watershed development works	0	748800	1497600	1591200	1404000	5241600	
		Livelihood activities for the asset less persons	0	0	280800	468000	93600	842400	
		Production system and micro enterprises	0	0	280800	374400	280800	936000	
		Consolidation phase	0	0	0	0	280800	280800	
		Total		561600	1333800	2363400	2831400	2269800	9360000
		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: Harya Heri)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total	
730	8760000	Administrative costs	87600	87600	262800	262800	175200	876000	
		Monitoring	0	0	0	87600	0	87600	
		Evaluation	0	21900	21900	21900	21900	87600	
		Entry point activities	350400	0	0	0	0	350400	
		Institution and capacity building	0	438000	0	0	0	438000	
		Detailed project report	87600	0	0	0	0	87600	
		Watershed development works	0	700800	1401600	1489200	1314000	4905600	
		Livelihood activities for the asset less persons	0	0	262800	438000	87600	788400	
		Production system and micro enterprises	0	0	262800	350400	262800	876000	
		Consolidation phase	0	0	0	0	262800	262800	
		Total		525600	1248300	2211900	2649900	2124300	8760000
		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 framework 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 split up into annual action plan were also attempted. Various maps using

GIS were created like Base map, Present Land Use, Geo-hydrological, Micro Watershed, Drainage, Contours, Slope, Soil Classification, Soil fertility, Land Capability Classification, Ground Water Depth and Quality, Proposed Activities of works. All the works proposed in the DPR are location specific and are as per the local demand and socio-economic conditions of the watersheds.

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

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

Strengths

- ❖ Strong linkage with national and state level institutes and KVK for capacity building and technical guidance. The HAU is situated nearby the watershed so the services can be utilized in case of assistance in farming.
- ❖ Most families are engaged in animal husbandry activities.
- ❖ Availability of drinking water.
- ❖ Good response to earlier watershed management programmes.
- ❖ Local residents are active in micro enterprises.

Weaknesses

- ❖ Erratic rainfall
- ❖ Poor ground water quality for irrigation
- ❖ Lack of good quality fodder.
- ❖ Lack of advanced cattle breed.

- ❖ Low level of milk production.
- ❖ Lack of knowledge base regarding scientific cattle management.
- ❖ Prevalence of soil erosion
- ❖ No organized micro enterprises activities.
- ❖ Lack of technical skills.

Opportunities

- ❖ Available Rain Water harvesting for life saving irrigation.
- ❖ Promotion of organic farming.
- ❖ Promotion of horticultural activities (dry land plants).
- ❖ Provide training on dairy farming and other income generating activities.
- ❖ Promotion of nursery raising and pasture development.

Threats

There are few negative issues that may have adverse effect

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

CAPACITY BUILDING- 5%

Rs. 19,08,000/-

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

As since re 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 Gurgaon District

Sr. No.	Title of Training Programme and Duration	Level of Participants	Total persons	Trainees Per Programme	Number of Programmes
01	District Level Sensitization Workshop for Watershed Committees. <u>One Day</u>				
	Gurgaon District	Members of Watershed Committees @ 10 per committee would also include accompanying WDT Members.	320	300-350	1
02	Block Level Functional Programmes for Secretaries of Watershed Committees. <u>Two Days</u>				
	Gurgaon District	Secretaries of Village Watershed Committees	32	35-40	1
03	Project Level Sensitization Camps for WC <u>One Days</u>				
	Gurgaon District	Members of Watershed Committees @ 10 Persons (Tentative) per WC	320	50	6
04	Village Level Awareness Camps on IWMP at Micro Watershed Level for User Groups <u>One Day</u>				
	Gurgaon District	Approximately 50 <u>prospective</u> user groups per micro watershed.	1600	50	32
05	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP <u>One Day</u>				
	Gurgaon District	Three persons (Leader, Secretary and Treasurer) per Self Help Group @ around one SHG per village.	86	50	2

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

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	23964
2	Block Level Functional Programmes for Secretaries of Watershed Committees. <u>Two Days</u>	3181
3	Village Level Sensitization Camps for WC <u>One Days</u>	16482
4	Village Level Awareness Camps on IWMP at Micro Watershed Level for Prospective User Groups <u>One Day</u>	38178
5	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP <u>One Day</u>	6009
	Total	87814

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

S. No.	Target Group	Training Topics	No. of days	Budget per camp	No. of Camps	No. of Participant per camp	Cost for all participant 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	32000	5	16	80000	1000	2000	160000
2	User groups from each micro watershed	NRM, Post Project Management etc. – Exposure Visit	2	32000	5	16	80000	1000	2000	160000
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 Members	Exposure Visit- Within Fundamentals of Watershed, Finance Management, Final Report on WDP etc	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 Participant per camp	Cost for all participant per day	Cost per participant/ per day	Cost per person	Total Budget
5	District Level-WDC	Exposure visit to successful watershed/ University.	2	16000	5	8	40000	1000	2000	80000
6	District Level-Line Dept., 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	24000
Total			18		35	72				1080000

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

S. No.	District	No. Micro watershed	No. of Camps/ Year/ Micro watershed	Total No. of camps per Year	Total No. of camps for 5 Year's	Amount of per Camp	Amount per Micro watershed	Total Budget
1.	Farmer Training Camp in each season	4	2	8	40	12,000	96,000	4,80,000
2.	Propaganda & Documentation (Puppet show, documentary movies show, videography, Photography, wall Painting, Display Board, pamphlets, leaflets. Etc)	4	2	8	40	5000	40,000	2,00,000
3	Contingency charges							60186
	Total							740186

- i) **Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD = 87,814/-**
- ii) **Micro Watershed Wise Exposure cum training Visit For SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members = 1080000/-**
- iii) **Farmer's / Beneficiaries training camps with Extension Program's = 7,40,186/-**

Grand Total = 19,08,000/-

6.2.1 EXPECTED OUTCOME OF CAPACITY BUILDING

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

6.3 Entry Point Activities 4%

EPA activities are taken up under the watershed to build rapport with village community at the beginning of the project, generally certain important works which are in urgent demand of the local community are taken up. A group discussion was conducted in the Gram Sabha meeting/watershed committee regarding EPA activities. It was conveyed to the Gram Sabha that an amount of **Rs. 15,26,000/-** was provided for EPA. The provision of IEC material for community will be met under EPA. The stakeholders 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 Rai Sena Watershed (IWMP I) (Rs. In Lacs)

Sr. No.	Block	Name of Project	No. of EPAs Identified	No. of EPAs Completed	No. of EPAs in progress	Name/Nature of EPA	Location	Expenditure in Rs.
1	Sohna	IWMP-I	12	12	-	Channel (2)	Ghamroj	3.47
						Cattle Trough (1)	Ghamroj	1.37
						Street Solar Light (5)	Ghamroj	0.70
						Channel (2)	Alipur	1.73
						Ramp (1)	Alipur	0.76
						Drinking Water Tank (1)	Hariahera	0.47
						Street Solar Light (3)	Hariahera	0.42
						Root Rainwater Harvest (1)	Raiseena	0.42
						Drinking Water Tank (1)	Raiseena	0.49
						Dam (2)	Raiseena	5.74
						Street Solar Light(5)	Raiseena	0.69
Total								16.26

Total Cost of project area @ 4%: Rs. 15,26,000/-

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 team of experts comprising of PIA, Livelihood expert, Agriculture, horticulture expert and expert in Animal Husbandry. Participatory approach has been adopted to identify the activities under the project. The detailed discussions were held with watershed committees and works identified along with villagers after making visits to identified sites. The works mainly relate to soil and water conservation activities like Construction of Dams, Construction of Pond, Ramp, inlet & outlet, Earthen Embankments /Marginal bunds with pucca outlet, Small earthen embankment with vegetative support for dune stabilization, Community water storage Tank, Water Conveyance System 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.

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

Drainage line Treatment

Small or large old ponds which have been silted up, needs strengthening. The land holding is small and any loss of land nearby area would be loss to the farmer. Under the IWDP/ Haryali some works like construction/renovation of farm ponds,

field bunding has been undertaken but still at few places inlet of the ponds and outlet needs to be constructed. So their repair and renovation is proposed during the discussion it was felt to be genuine demand for repair, renovation and capacity enhancement in the area. This will increase the rain water harvesting.

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

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

7.2 Proposed Activity

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

Due to the paucity funds the repair works has been undertaken under different schemes in piecemeal. During the discussions/interaction the stakeholders gave high priority for construction of retaining wall as lot of water is being wasted through cutting of banks.

7.2.1 Earthen Embankment

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

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

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

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

Table. 1

Name of Project IWMP I			Name of Watershed: Rai Sena			Name of Village: Alipur			
Sr. No.	Nature of Works	Location	Catchment, storage capacity, Submergence and command area (wherever applicable)	Location (with latitude and longitude)	Unit	No. of Works		Estimated Cost Rs. In Lacs.	Objective
						Phy./Area	Unit Cost (Rs.in Lacs)		
1	Digging of pond	N28.18.712 E77.03.643 Panchayat land	18hac. 10125 cum. 6750 sqm. 8hac	Panchayat land	No.s	1	5.0	5.0	Increasing water level, availability cattle drinking water and irrigated water and all villagers are beneficiaries
2	Construction of (WHS) dam	N28.18.958 E77.02.964 N28.19.111 E77.03.053 Near devi mandir	110 hac. 61875 cum. 24750 sqm. 65hac	Near devi mandir	No.s	1	25.0	25.0	Increase ground water level and storing water for live stock purposes all village are beneficiaries
3	Horticulture	N28.18.978 E77.03.677 Personal land	-	Personal land	hac	5	0.4	2.0	Proper Utilization of un cultivated fields and a dditional income for farmers
Total Cost								32.0	
Available Fund								26.9	
Convergence								5.1	

Name of Project: IWMP I			Name of Watershed: Rai Sena			Name of Village: Ghamroj			
Sr. No.	Nature of Works	Location	Catchment, storage capacity, Submergence and command area (wherever applicable)	Location (with latitude and longitude)	Unit	No. of Works		Estimated Cost Rs. In Lacs.	Objective
						Phy.	Unit Cost (Rs.in Lacs)		
1	Construction of big dam with water conveyance system	N28.19.262 E77.03.112 N28.19.363 E77.02.787 Near ashram	150 hac. 84375 cum. 28125 sqm. 77hac	Near ashram	Nos	1	80	80	Increase ground water level and storing water for live stock purposes all village are beneficiaries
2	Check dam	N28.19.774 E77.02.726 In the hill	90 hac. 50625 cum. 33750 sqm. 35hac	In the hill	nos	1	10	10	Proper Utilization of uncultivated fields and additional income for farmers
Total Cost								90	
Available Fund								63.84	
Convergence								26.16	

Name of Project IWMP I			Name of Watershed: Rai Sena			Name of Village: Hariyahera			
Sr. No.	Nature of Works	Location	Catchment, storage capacity, Submergence and command area (wherever applicable)	Location (with latitude and longitude)	Unit	No. of Works		Estimated Cost Rs. In Lacs.	Objective
						Phy.	Unit Cost (Rs.in Lacs)		
1	Construction of dam (WHS)	N28.18.358 E77.02.491 N28.18.462 E77.02.374 Near shamshan ghat	32hac. 18000 cum. 9000sqm. 18hac	Near shamshan ghat	Nos	2	5	10	Increase ground water level and storing water for live stock purposes all village are beneficiaries
2	Water conveyance system	N28.18.282 E77.03.084 Village to Farm pond	-	Village to Farm pond	Mtr	1500	0.007	10.5	Waste water saving , smoothly divert waste water
3	Horticulture	N28.18.082 E77.03.968 Personal land	-	Personal land	hac	5	0.4	2	Proper Utilization of uncultivated fields and additional income for farmers
4	Agroforestry	N28.18.338 E77.03.026 Panchayat and personal land	-	Panchayat and personal land	hac	8.5	0.2	1.7	For the greenery , vegetation and peaceful environment
Total Cost								24.2	
Available Fund								22.1	
Convergence								2.1	

Name of Project IWMP I		Name of Watershed: Rai Sena			Name of Village: Raisina				
Sr. No.	Nature of Works		Catchment, storage capacity, Submergence and command area (wherever applicable)	Location (with latitude and longitude)	Unit	No. of Works		Estimated Cost Rs. In Lacs.	Objective
						Phy.	Unit Cost (Rs.in Lacs)		
1	Construction of check dam	N28.18.511 E77.01.871 N28.17.475 E77.01.881 N28.18.801 E77.01.831 N28.19.101 E77.01.618 N28.19.054 E77.01.675 N28.18.924 E77.00.876 N28.18.868 E77.01.225 N28.18.608 E77.01.442 N28.18.212 E77.01.392 N28.18.336 E77.01.059 N28.19.223 E77.01.971 N28.18.397 E77.01.326 In the hilly area	1hac 562.5 cum. 562 sqm. 0.5hac	In the hilly area	Nos	12	0.5	6	For decrease the soil Erosion and velocity of Rain water and improving the Ground water level Increase ground water level and storing water for live stock purposes all village are beneficiaries
2	Digging of pond	N28.18.177 E77.01.664	15 hac. 8440 cum.	Panchayat land	Nos	1	3	3	Increase ground water level and storing water for live

		Panchayat land	5625 sqm. 9hac						stock purposes all vilage are beneficiaries
	Digging of pond	N28.18.008 E77.01.656 Panchayat land	17hac. 9560 cum. 6375 sqm. 11hac	Panchayat land		1	3	3	Increase ground water level anad storing w ater for live stock purposes all vilage are beneficiaries
3	Stone dam	N28.17.508 E77.01.112 In the Hill	120 hac. 67500 cum. 22500 sqm. 65hac	In the Hill	Nos	1	30	30	For decrease the soil Erosion and velocity of Rain water and improving the Ground water level
4	Small dam	N28.17.524 E77.01.240 N28.17.643 E77.01.672 N28.17.681 E77.01.203 N28.17.732 E77.01.221 In the hills	35 hac. 19600 cum. 13050 sqm. 18hac	In the hills	Nos	4	5	20	For decrease the soil Erosion and velocity of Rain water and improving the Ground water level
5	Earthen dam with conveyance system	N28.18.119 E77.01.989 Baghod	150 hac. 84375 cum. 33750 sqm. 80hac.	Baghod	Nos	1	50	50	For decrease the soil Erosion and velocity of Rain water and improving the Ground water level
6	Horticulture	N28.17.613 E77.02.422 N28.17.652 E77.01.977 Personal land		Personal land	hac	10	0.4	4	Proper Utilization of uncultivated fields and additional income for farmers
Total Cost								116	
Available Fund								101	
Convergence								15	

Cost Sharing: During the PRA exercise and meeting with the stake holders from time to time, the beneficiaries agreed to contribute in form of material, labour and cash to 10% of structure cost. The watershed development funds and pattern of utilization would be decided by the UGs/ WDT and PIA during implementation programme.

Table. 7. Detailed estimate of Pond

Detail Estimate of village Pond						
Volume of Pond	=	$A+AB+C \times D$				
		6				
	=	$(50 \times 50) + 4(41 \times 41) + (32 \times 32)$			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	=	$(\text{length}/2) + (\text{cross section area}/2 \times 0.60)$				
	=	$80/2 + \{(16.50 + 3)/2 \times 2.25\}/2 \times 0.60$				
	=	61.94 mtr.				
Vertical Leads	=	$(\text{Depth} + \text{Height}) \times 0.4 \times 10$				
	=	21.00 mtr.				
Total Leads	=	$\{(61.94 + 21.00) - 15.00\}/7.5$				
	=	9 Leads				

Table. 8. Abstract of cost of estimate for Digging Village Pond

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

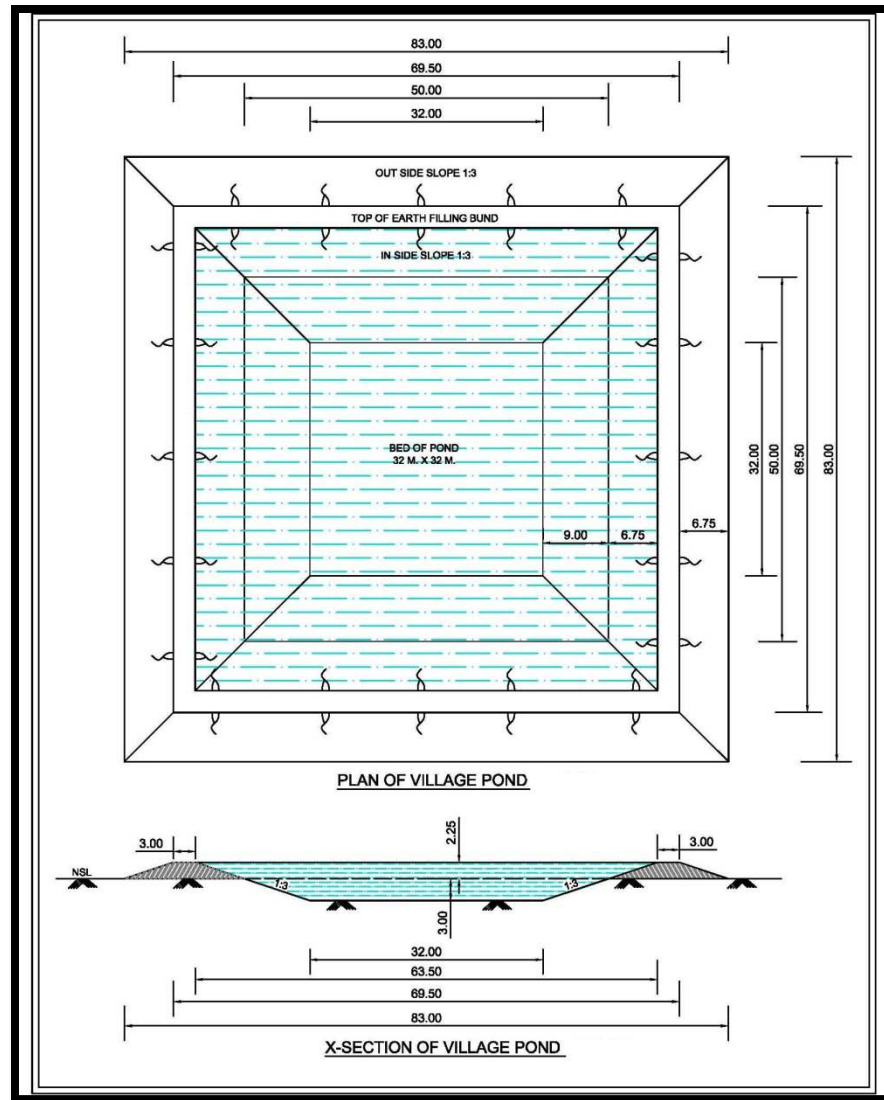


Table: Estimate of Open Channel

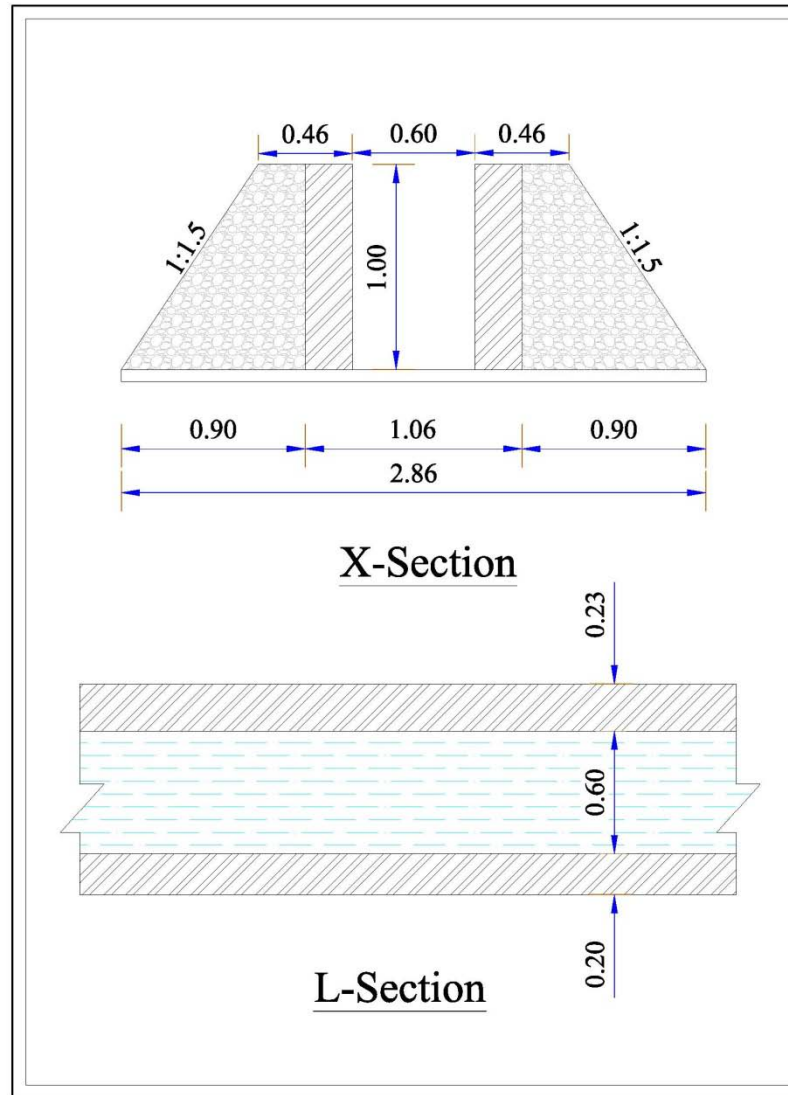
Abstract cost of Pucca Disposal open channel in

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	64.8 m ³	415.50-15%	100 m ³	1201.49

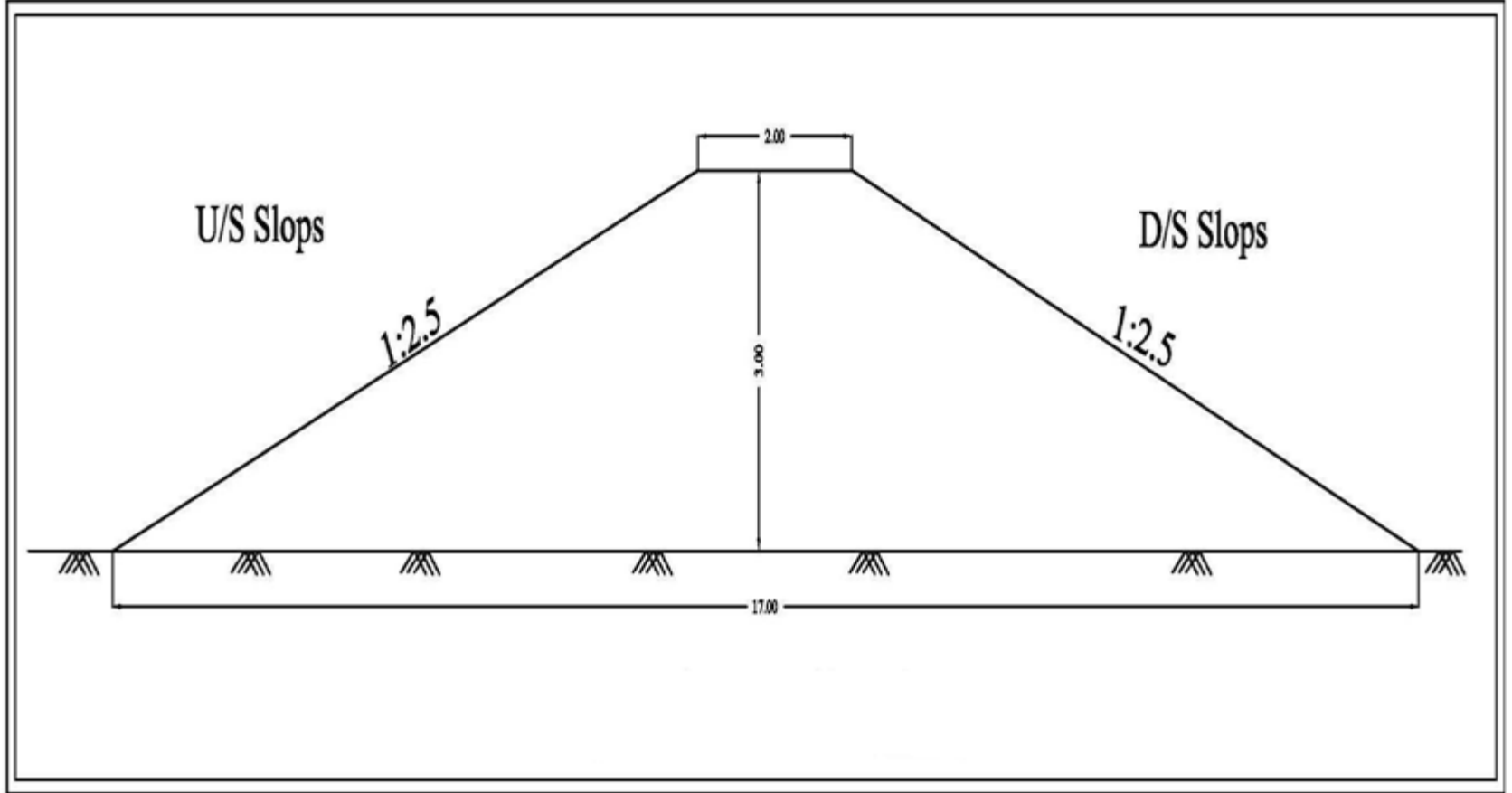
	ordinary soil as per HSR 6.1(a)		+425% =1854.16		
2	Flat bricks laid in bed HSR 14.24	106 m ²	520- 15%+600% = 296.60	m ²	3279.64
3	First class bricks works land in CSM 1.5 HSR 11.23	20.25 m ³	49.85 + 15% + 600% =296.60	m ³	6339.62
4	Plaster bed 1.4 12 mm thick 15.5 HSR	60 m ²	5.5 + 15% + 500% = 28.05	m ²	1683.00
5	Plaster 14 m side wall 15.5 HSR	90 m ²	5.5 + 15% + 500% = 28.05	m ²	2574.50
6	Field Gota 1.4 HSR 15.5	23.4 m ²	5.5 + 15% + 500% = 28.05	m ²	656.37
7	Topping 25 mm thick on top of wall HSR 14.8	46 M ²	8.60+15% + 600% = 51.17	m ²	2302.65
8	E/work for wall protection HSR 6.1 (a)	85.50 M ³	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

Table 16. DETAILED ESTIMATE OF EARTHEN EMBANKMENT

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



EARTHEN EMBANKMENT

<u>Leads Statement :-</u>					
Cross Section Area = (Base + Top) ÷ 2 x Height i.e. $\{(17.00 + 2.00) \div 2\} \times 3.00 = 28.50$ Square meters					
Horizontal leads = (Base/2) + (Cross section area/ 2 x 0.6) i.e. $(17.00/2) + \{28.50\}/(2 \times 0.6) = 32.25$ meters					
Vertical leads = (Height + 0.60) x 0.4 x 10 i.e. $(3.00 + 0.60) \times 0.4 \times 10 = 14.40$ meters					
Total leads = 32.25 meters + 14.40 meters = 46.65 meters					
Number of leads = $(46.65 - 15.00) / 7.5 = 4.22$ leads Or Say 5 No. of Leads					
<u>Area of Jungle Clearance :-</u>					
Area to be covered by the body of Dam = Length x Average base i.e. $40.00 \times 17.00 = 680.00$ Sq. meters					
Area from where E/W is to be excavated = Av. Length x leads i.e. $40.00 \times 46.65 = 1866.00$ Sq. meters					
Total Area = $680.00 + 1866.00 =$		2546.00	Sq. meters.		
<u>Volume of Loose soil to be removed :-</u>					
Area to be covered by the body of Dam X Depth of loose soil i.e. $(680.00 \times 0.30) =$				204.00	cum
<u>Volume of Earthwork in bund filling :-</u>					
(Cross Section Area X Length) + Loose soil to be removed i.e. $(28.50 \times 40.00) + 204.00 =$				1344.00	cum
<u>ABSTRACT OF COST</u>					
<u>S.No.</u>	<u>Item of Work</u>	<u>Quantity</u>	<u>Rate</u>	<u>Unit</u>	<u>Amount</u>
1	Jungle clearance including uprooting of rank vegetation, grass, bushes woods etc H.S.R.6.26	2546.00 sq.m	Rs.66.80 + 300% C. Prem. =267.20	100 sq.m	6802.91
2	Removal of loose soil up to 0.3 m below Natural surface level H.S.R. 6.2 (b)	204.00 cum	Rs.586.60 + 350% C. Prem.= 2639.70	100 cum	5384.99
3	E/work excavation for making embank-	1344.00	Rs.586.60 + 350% C.	100	35477.57

	ment undressed including breaking of Clods. H.S.R. 6.2 (b)	cum	Prem.= 2639.70	cum	
4	Extra for admixture for single or kanker Exceeding 30% but up to 40% . H .S.R. 6.2 (h) ii	1344.00 cum	Rs. 318.55 + 350% C. Prem.= 1433.48	100 cum	19265.97
5	Extra for every 7.5 meter additional lead beyond 60m t but up to 255 m by the animal or ani mal dr iven c art (5 l eads) H.S.R. 6.2 (c) (ii)	1344.00 cum	[(15.00 x 5 N o.)+ 350% C . P rem.= 337.50	100 cum	4536.00
6	Dressing of earthwork H.S.R. 6.3 (i)	1344.00 cum	Rs.45.90 + 350 % C . Prem.= 206.55	100 cum	2776.03
Total =					74243.4712
Add Contingency at the rate of 3% =					2227.30
Grand Total =					76470.78

Table. 9. Estimate of Orchard Development in the Watersheds Per Hectare (Lemon & Kinnoo)

A. Horticulture

Sr. No.	Particulars	Quantity	Unit	Rate	Am
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	14297.4
2	Application of Farmacyard Manure, including cost			L.S.	750.00
3	Cost of fertiliser/ pesticide @250gm/plant			L.S.	750.00

4	Cost of plants (including 15% etc. for mortality) including transportation and planting	450.00	Nos.	15/Plant	6750.00
5	Casualty replacement @ 10% of item No. 4 & 5				465.00
6	Cost of 2 weedings and hoeing			1.00/Pant	540.00
7	Contingency and unforeseen (3%)				492.00
Total					24044.4
Say `					24000.0
	Maintenance cost 2 nd year			L.S.	1000.00
	For next 5 years i.e. , ` 1000 x 5				5000.00
Total					30000.0
Say `					30000.0

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

A. Horticulture

Sr. No.	Particulars	Quantity	Unit	Rate	Amount
1	Soil working 1m x 1m x 1m size pits (225 Nos.) including cost of refilling(At the distance 20'x20')	225.00	cum	36.66	8248.50
2	Application of Farmacyard Manure, including cost			L.S.	450.00

3	Cost of fertiliser/ pesticide @250gm/plant			L.S.	450.00
4	Cost of plants (including 15% etc. for mortality) including transportation and planting	260.00	Nos.	30/Plant	7800.00
5	Casualty replacement @ 10% of item No. 4 & 5				465.00
6	Cost of 2 weedings and hoeing			1.00/Pant	540.00
7	Contingency and unforeseen (3%)				492.00
Total					18445.50
Say `					18500.00
8	Maintenance cost 2 nd year			L.S.	1000.00
	For next 5 years i.e. , ` 1000 x 5				5000.00
Total					24500.00
Say `					24500.00

Table. 10. 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
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G	Material					
ii	Spade and pick axes	----	----	----	----	135.00
iii	Basket/Bucket	----	----	----	----	135.00
v	Fertilizer	----	----	----	----	135.00
vi	Insecticide	----	----	----	----	270.00
					Total	675.00

					G. Total =	18767.34
					or Say =	18767.00

PRODUCTION SYSTEM- 10%

7.3 PRODUCTION SYSTEM

7.3.1 Crop Production

Present Status: Agriculture is the mainstay of the inhabitants of the project area which is mainly rain-fed and people gamble with the uncertain rains. The fertility of the soil is very poor especially in nitrogen and phosphorous because the organic carbon contained in the soil is very low and the available potash in the soil is medium (fertility map attached in annexure VI). 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 tree farming and dairy farming. But there is acute shortage of green and dry fodder. Still traditional farm practices are followed such as manual weeding and hoeing, use of desi ploughs and bullock power in tillage operations. The use of chemical fertilizer is limited to urea upto 50 Kg/acre in maize and wheat. Only farm yard manure is added to maintain yield levels. Food grains are hardly sufficient for 6 to 8 months with small farmers.

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

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

- The application of fertilizers on soil test basis and minimum use of chemicals for weed and disease control shall be promoted.
- Farmers would be linked to farm advisory services and Krishi Vigyan Kendras.
- The concept of precision farming and non-monetary inputs shall be introduced.
- Agro-forestry with integration of trees like Eucalyptus, Neem, Acacia, Shisham would be promoted in the areas where problem of wild animals does not exist.
- Leguminous crops mainly Moong and mash short duration varieties need to be introduced.

7.3.2 Horticulture

Existing System: Ber, amla and guava are the most preferred fruit crop of the farmers and scattered plants of local citrus fruits are seen in farm lands. Some farmers have started raising Guava and Kinnow where irrigation facilities are available. Citrus fruits also raised but mostly for domestic use. There is no well organized marketing system in fruit plants.

Proposed System: The average annual rainfall is 494 mm in the project area. The project areas are well connected by roads and the economic condition of the locals can be improved by introducing improved cultural practices of fruit plants coupled with rain water harvesting and efficient use of water. Large number of farmers are interested to increase area under Guava and Kinnow and requested for supply of good quality nursery raised plants. Several families have shown interest in raising Citrus fruits and amla. The following activities are proposed to promote horticulture in the area.

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

- Appropriate safeguards from wildlife damage, frost damage and wind breaks.
- Arrangements for limited irrigation at least for first few years.
- Proper planning for raising filler plants like Papaya, pomegranate and shade loving crop like turmeric.
- Organizing SHGs around horticulture and joint purchase of inputs and marketing

7.3.3 Vegetable cultivation

Present status: Vegetable cultivation as such for market purpose is not followed mainly because of the limitation of irrigation facilities. Most farmers raise vegetable crops in back yards for self use. Some poly houses have come up in the area with financial support from National Horticulture Mission (NHM) and have started commercial cultivation of off season vegetables with the introduction of NHM scheme the farmers are interested for drip/sprinkler irrigation to enhance the net production value of the farm.

7.3.4 Promotion of Farm Forestry and Agro-forestry

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

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

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

7.3.5 Livestock Improvement Including Fodder Production

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

7.3.6 Marketing Arrangements and Proposal for Improvement

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

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

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

7.3.7 Detail of production system to be promoted

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

Table 11.Detail of Production System proposed to be promoted in the project village

S. No.	Particulars	Contents	No. of micro watershed s	No. of beneficiaries per micro watershed	No. of total beneficiarie s	Cost per beneficiarie s	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.	4	50	200	6000	1200000
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.	4	250	1000	500	500000

S. No.	Particulars	Contents	No. of micro watershed s	No. of beneficiaries per micro watershed	No. of total beneficiarie s	Cost per beneficiarie s	Total
3	Bio-fertilizers	For i ntegrated nutrient m anagement (combination of ch emical f ertilizers, organic manure, cr op r esidue and nitrogen fixing. Under IWMP, financial assistance @ Rs. 40 per farmer for 2 Acre (0.8 ha) holding is provided.	4	350	1400	40	56000
4	Pest- Manageme nt	For i ntegrated pest M anagement, t he bio co ntrol t echnique has been reported e co-friendly f or co ntrol of pests. A pr ovision of Azadirachtin bi o pesticide @ Rs. 250 /lit. per farmer i s provided.	4	300	1200	250	300000
5	Sprinkler irrigation	Sprinkler irrigation i s a m ethod of applying i rrigation w ater w hich i s similar to natural rainfall. Under IWMP, financial a ssistance @ 25% of R s. 30000/- or pr ice fixed by agriculture department is provided.	4	25	100	7500	750000
6	Drip Irrigation	Drip I rrigation is an irrigation m ethod that sa ves water and f ertilizer by allowing water t o drip slow ly to the roots of pl ants. U nder I WMP, financial a ssistance @ 10% of R s. 58000 per ha for horticulture fixed by Agriculture Department is provided.	4	10	40	5800	232000

S. No.	Particulars	Contents	No. of micro watershed s	No. of beneficiaries per micro watershed	No. of total beneficiarie s	Cost per beneficiarie s	Total	
7	Lazer Leveling	Lazer Lev eling i s one su ch proven technology t hat i s highly useful i n conversation of irrigation water. Under IWMP, financial assistance @ 30% of Rs. 1075 per farmer is provided	4	20	80	322.5	25800	
8	Kitchen Gardening	To f acilitate with i nputs, se eds and equipments etc., f or deve lopment of Kitchen G ardening. Under I WMP, financial a ssistance @ R s. 50 per farmer per season (Rs. 100 per year) is provided.	4	400	1200	100	160000	
9	Horticulture	Potential for G rafted H orticulture plants. Supply of plants @ Rs. 40/- per plant under IWMP 50 % cost share for cultivation of f ruits like C itrus fruits, Guava, Amla, B er f loriculture and vegetables (especially, turmeric, garlic, onion and tomato)	4	400	1200 (12000)	Rs.20 per plant	320000	
10	Reclamation & Alcination	Supply of gypsum bags@ 75	4	5	20	7500	150000	
	Total							3693800
	Contingency, printing material other unforeseen items							122200

Total: Rs. 3816000/-

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.

Under Agro forestry, tree species commonly planted are eucalyptus and neem. The impacts of such type's plantation have given extra source of income.

7.3.8. Vermin Compost

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

One of the important occupations of villagers is the animal husbandry. At present, the animal wastes are not being used by the villagers. This waste can be utilized as vermin- compost on the farm where the productivity and physical condition of the soil can be increased manifold. The animal waste can be used for preparation of vermin- compost. The available nutrients in vermin- compost are higher than country type farmyard manure. As per NHM guideline, the installation cost of structure of 1 vemin compost unit (size) 500 Sq. ft., the total cost of the unit would be is Rs. 60000/-. Out of this the 50% subsidy i.e. Rs.30000/- is met from the ongoing programme of horticulture department. The additional amount i.e. Rs. 10000/- will be born under IWMP Programme. The nutrition value of vermin compost is more than Farm Yard Manure and compost i.e. nitrogen- 1.2 to 1.6%, Phosphorous 1.5 to 1.8%, Potash 1.2 to 2% are just double.

Table 12: Model/ Estimate for a Vermin Compost Unit

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

Components of Vermin Compost Unit

1. Shed

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

2. Vermin- beds

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

3. Land

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

4. Seed Stock

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

5. Machinery

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

LIVELIHOOD ACTIVITIES FOR THE ASSET LESS PERSONS-9%

7.4 LIVELIHOOD SUPPORT TO SHG'S

The key issue of inclusion of this chapter is that about 80% of the population in the proposed villages depends on agriculture and allied activities, but it rarely provides sufficient means of survival to small and marginal farmers. During the base line survey, this aspect was discussed with the existing Self Help Group/ Gram Sabha members. The representative of WAPCOS, Sociologist of the team held comprehensive discussions on the possibilities of livelihood in the 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) Gurgaon and Haryana Institute of rural development, Nilokheri. Agriculture University, Gurgaon, Central Soil and Water research and training Institute, Chandigarh and HIRD, Nilokheri. It is proposed to lend revolving fund of Rs. 25000/- to each SHG/individual formed in the watershed villages. Since the members from SHGs/landless are very poor, they do not have resources to start micro enterprises, it is envisaged that they should be assisted and given loan of this amount in the shape of Revolving Fund Assistance (RFA) so that 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 coordinate 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. Pickles, sauces, jam, jelly etc.
- 12. Backyard poultry
- 13. Floriculture

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

Table 13. Revolving Fund Assistance for SHGs

S.No.	Name of micro watersheds	No. of villages	Total SHGs	Amount of RFA per SHG	Total
1	Ghamroj	1	2	25000	50000
2	Rai Sena A	1	2	25000	50000
3	Rai Sena B				
4	Herya Heri	2	4	25000	100000
	Total	4	8		200000

Table 14. 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	Ghamroj	1	2	35000	70000
2	Rai Sena A	1	2	35000	70000

3	Rai Sena B				
4	Herya Heri	2	4	35000	140000
	Total	4	8		280000

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 15. 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	Ghamroj	1	40	10000	400000
2	Rai Sena A	1	40	10000	400000
3	Rai Sena B				
4	Herya Heri	2	80	10000	800000
	Total	4	160		1600000

Note: The beneficiaries will contribute 10% as cost sharing of the livelihood support programme Rs. 950000 @ 10% cost sharing.

= 1600000- 160000

= **1440000/-**

Table 16. 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	Ghamroj	1	5	25000	125000
2	Rai Sena A	1	5	25000	125000
3	Rai Sena B				
4	Herya Heri	2	10	25000	250000
	Total	4	20		500000

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. 500000 @ 10% cost sharing.

= 500000- 50000

= **450000/-**

Table 17. 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	Ghamroj	1	1	2	2000	6	12000
2	Rai Sena A	1	1	2	2000	6	12000
3	Rai Sena B						
4	Herya Heri	2	2	4	2000	6	24000
	Total	4	4	8			48000

Total cost for 4 Centres

1. Payment to trainers 48000/-
2. Sewing Machine Cost 48000/- @ Rs. 6000 per machine
3. Total 96000/-

Table 18. 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	Ghamroj	1	1	2000	6	12000	1	12000
2	Rai Sena A	1	1	2000	6	12000	1	12000
3	Rai Sena B							
4	Herya Heri	2	2	2000	6	12000	2	24000
	Total	4	4				4	48000

Payment to trainer: Rs.48000/-

Cost of Machine: Rs. 80000/- @ Rs. 20000 per machine

Total Cost: Rs. 128000/-

Table 19. Livelihood Support

S.No.	Name of micro watershed	No. of villages	Revolving fund assistance to individuals unemployed youth/ landless, women			
			Dairy Unit	Bee Keeping	Vegetable and Flower production	Computer Cyber Cafe
1	Ghamroj	1	20	20	2	1
2	Rai Sena A	1	40	40	2	1
3	Rai Sena B					

4	Herya Heri	2	40	40	4	2
	Total	4	100	100	8	4
	Rate (Rs)		2400	2400	24000	36000
	Cost (Lakh Rs)		2.40	2.40	1.92	1.44

Contingency, printing material and other unseen items: Rs. 24400/-

Total funds available under this component are Rs. 3434400/-

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

- i. HIRD, Nilokheri
- ii. Agriculture, Technology and Extension, Gurgaon 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), Gurgaon

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. 20)

Detail of Convergence of IWMP and other schemes

Table 20. GAPS IN FUNDS REQUIREMENT – MICRO WATERSHED WISE

S.No	Name of micro watershed	Total cost requirement for works	Total funds available under IWMP for works	Gap in funds requirement for works	Convergence with MGNREGA
1	Ghamroj	90.00	63.84	26.16	26.16
2	Rai Sena A	116.00	101.00	15.00	15.00
3	Rai Sena B				
4	Herya Heri	56.20	49.00	7.20	7.20
	Total	262.20	213.84	48.36	48.36

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

7.5.2 Non-Negotiable for works executed under MGNREGA

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

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

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

7.5.3 Convergence with Forest Department

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

7.5.4 Convergence with Horticulture Department

National Horticulture Mission is implementing the horticulture development programme which includes construction of water harvesting structures, drip and sprinkler irrigation activities which would be undertaken in convergence with the horticulture department. Under this activity 30 ha horticulture development programme with the financial assistance of Rs. 12.0 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 Construction of Dams, Construction of Pond, Ramp, inlet & outlet, Earthen Embankments /Marginal bunds with pucca outlet, Small earthen embankment with vegetative support for dune stabilization, Community water storage Tank, Water Conveyance System etc. where the machinery and material component is required and the unit cost exceeds for completion exceeds to the project provision, the same will be met in convergence with the similar activities of the agriculture.

7.5.6 Convergence with Animal Husbandry Department

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

CHAPTER – 8

QUALITY AND SUSTAINABILITY

8.1 Monitoring and Evaluation

8.1.1 Plans for Monitoring and Evaluation:

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

8.1.2 Monitoring

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

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

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

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

Table 1. Micro Watershed wise details

S.no	Name of the Micro Watersheds	Effective Area	Total Cost	Monitoring 1%
1	Ghamroj	950	1,14,00,000	1,14,000
2	Rai sena A	720	86,40,000	86,400
3	Rai sena B	780	93,60,000	93,600
4	Harya Heri	730	87,60,000	87,600

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	Ghamroj	950	1,14,00,000	1,14,000
2	Rai sena A	720	86,40,000	86,400
3	Rai sena B	780	93,60,000	93,600
4	Harya Heri	730	87,60,000	87,600

CONSOLIDATION PHASE- 3 %
Consolidation Phase = Rs. 11, 44,800 /-

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: Ghamroj

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	0.68
2	Preparation of Project completion report	0.18
3	Documentation of success stories	0.17
4	Management of proper utilization of WDF	0.51
5	Mechanism for quality and sustainability issues under the Project	0.17
6	Watershed activities	1.71

Total: 3.42 lacs

Name of Micro watershed: Rai sena A

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	0.52
2	Preparation of Project completion report	0.13
3	Documentation of success stories	0.13
4	Management of proper utilization of WDF	0.39
5	Mechanism for quality and sustainability issues under the Project	0.13
6	Watershed activities	1.29

Total: 2.59 lacs

Name of Micro watershed: Rai sena B

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	0.56
2	Preparation of Project completion report	0.14

3	Documentation of success stories	0.14
4	Management of proper utilization of WDF	0.42
5	Mechanism for quality and sustainability issues under the Project	0.14
6	Watershed activities	1.41

Total: 2.81 lacs

Name of Micro watershed: Harya Heri

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	0.53
2	Preparation of Project completion report	0.13
3	Documentation of success stories	0.13
4	Management of proper utilization of WDF	0.39
5	Mechanism for quality and sustainability issues under the Project	0.13
6	Watershed activities	1.32

Total: 2.63 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. The service 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 3180 ha and the Project Cost is 381.60 lacs covering micro watersheds and in all 4 villages. Benefits will be much more than the project cost as detailed below:

With the several interventions under IWMP 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 Rai Sena Watershed 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. Similarly due to lack of fodder animal husbandry does not keep them engaged full time. Thus the people mainly depend upon casual labour either in the villages or in Gurgaon Industrial Complex.

Table 1. Expected Employment Generation in the Project area

S. No.	Name of micro watershed	Wage employment								Self employment				
		No of man days				No. of Beneficiaries				No. of Beneficiaries				
		SC	ST	others	Total	SC	ST	others	Total	SC	ST	others	Women	Total
1	Ghamroj	3575	-	6639	10214	447	-	830	1277	11	-	11	-	22
2	Rai Sena A	3716	-	4026	7741	465	-	503	968	-	-	11	-	11
	Rai Sena B	4026	-	4361	8387	503	-	545	1048	-	-	-	11	11
3	Herya Heri	5259	-	2590	7849	657	-	324	981	11	-	22	11	44
	Total	16576		17616	34191	2072	-	2202	4274	22	-	44	22	88

34191 man days would be generated with the implementation of the project in Rai Sena Watershed (IWMP I), which means 68 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 Rai Sena Watershed (IWMP I)

S.No	Name of micro watersheds	Name of Villages	No. of persons migrating		No. of days per year of migration		Comments
			Pre Project	Expected post project	Pre Project	Expected post project	
1	Ghamroj	Ghamroj	122	61	120	60	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
2	Rai Sena A	Rai Seena	85	43	180	90	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
3	Rai Sena B						
4	Herya Heri	Haria Hera	60	30	150	75	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
		Alipur	102	51	150	75	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%

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

9.3 GROUND WATER TABLE (Drinking Water)

Through the ground water table is depleting over the years and presently stands 18 to 25 m. The area is underlain by marginal ground water quality where the farmers are irrigating their field in conjunction with the fresh water available through the irrigation system which is not adequate due to the area falling in tail end of the distribution system. Rain water harvesting has been made to recharge in the area where water table is declining and in the areas close by irrigation channel where water table is rising the necessary provision of bio drainage/UGPL has been provided.

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

Name of micro watersheds	Source	Existing pre-project ground water table level (m)	Post Project ground water table (m)	Remarks
Ghamroj	Tube Well	26.00	18.00	Area experiencing deeper water table, necessary provision of percolation tank is provided for checking further fall in water table. The provision of rain water recharging is also provided.
Alipur	Tube Well	27.00	20.00	
Haria Hera	Tube Well	25.00	19.00	
Rai Seena	Tube Well	32.00	25.00	

Source: Ground Water Cell, Haryana

9.4 CROPS

Agriculture primary depends upon water, but this is availability of this is lacking without existence of canal network and deeper ground water conditions. All this can change with the integrated land and water management during the watershed project. The planned Construction of Dams, Construction of Pond, Ramp, inlet & outlet, Earthen Embankments /Marginal bunds with pucca

outlet, Small earthen embankment with vegetative support for dune stabilization, Community water storage Tank, Water Conveyance System etc. can preserve sub moisture in the soil. This will help in additional area coming under cultivation and increasing productivity too. The crop yield pre project and expected and post project is presented in table 4.

Table 4. Increase in Expected Yield in Rai Sena Watershed (IWMP I)

Name of Villages	Name of Crops	Pre Project		Total Production (in Kg)	Total Value Rs. (In Lacs)	Expected post project		Total Production (in Kg)	Total Value Rs. (in lacs)
		Area ha	Average yield kg. Per ha			Area ha	Average yield kg. Per ha		
Ghamroj	Wheat	277	4119	1140963	15403000	305	4243	1294115	17470553
	Mustard	49	1713	83937	2518110	54	1799	97146	2914380
	Bajra	190	1947	369930	4624125	209	2025	423225	5290313
Alipur	Wheat	249	4119	1013274	13679199	271	4243	1149853	15523016
	Mustard	89	1713	152457	4573710	98	1799	176302	5289060
	Bajra	153	1947	297891	3723638	168	2025	340200	4252500
Haria Hera	Wheat	79	4119	325401	4392914	87	4243	369141	4983404
	Mustard	30	1713	51390	1541700	33	1499	59367	1781010
	Bajra	75	1947	146025	1825313	83	2025	168075	2100936
RaiSeena	Wheat	333	4119	1371627	18516965	366	4243	1552938	20964663
	Mustard	177	1713	303201	9996030	195	1799	350805	10524150
	Bajra	371	1947	624987	7812338	408	2025	826200	10327500

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

9.5 HORTICULTURE

Table 5. Pre and post project area under Horticulture

Sr. 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
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1	Ghamroj	4	8	12
2	Alipur	3	5	8
3	Haria Hera	-	5	5
4	Rai Seena	165	80	245

9.6 AFFORESTATION/ VEGETATIVE COVER

Table 6. Pre and post project forest and vegetative cover

Sr. No.	Name of micro watersheds	Existing area under tree covered, ha	Area under tree cover proposed ha	Total
1	Ghamroj	40	35	75
2	Alipur	39	35	74
3	Haria Hera	38	45	83
4	Rai Seena	35	30	65

9.7 LIVESTOCK

Table 8. Details of livestock in the project area

Sr. No.	Name of Villages	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	Ghamroj	Buffalo	406	8-9	320-360	468	9-10	315-350	Increase in milk Yield and number of animals by approx 15%
		Cow	179	5-6	140-168	206	6-7	150-175	Increase in milk Yield and number of animals by approx 15%
2	Alipur	Buffalo	896	8-9	320-360	1030	9-10	315-350	Increase in milk Yield and number of animals by approx 15%
		Cow	248	5-6	140-168	285	6-7	150-175	Increase in milk Yield and number of

									animals by approx 15%
3	Haria Hera	Buffalo	356	8-9	320-360	409	9-10	315-350	Increase in milk Yield and number of animals by approx 15%
		Cow	68	5-6	140-168	78	6-7	150-175	Increase in milk Yield and number of animals by approx 15%
4	Rai Seena	Buffalo	1051	8-9	320-360	1209	9-10	315-350	Increase in milk Yield and number of animals by approx 15%
		Cow	198	5-6	140-168	228	6-7	150-175	Increase in milk Yield and number of animals by approx 15%

9.8 LINKAGES

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

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

Table 9: Backward-Forward Linkages

Sr. No.	Project	Type of Marketing Facility	Pre-Project (no.)	During the Project (no.)	Post-project (no.)
1	Rai Sena 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	Extension & Training in village level	Improved

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

9.8.1 LOGICAL FRAMEWORK ANALYSIS

Table 10. Logical Framework Analysis

Components	Activities	Outputs	Effect	Impact
Village Institution Formation	Formation of Watershed Community, User Groups	<ul style="list-style-type: none"> Watershed Committee each village Number of user groups depending on the coverage of particular intervention 	Project can be implemented and managed in a democratic and Participatory way ensuring equity and transparency.	<ul style="list-style-type: none"> Unity and prosperity in the village management. People's Participation and positive perception towards the programme.
Strengthening Village operations	<ul style="list-style-type: none"> Organizing training and awareness programme for village institutions (I.E.C. Activities). Capacity Building workshops and exposure visits for User Group and Watershed Community Facilitating and monitoring the 	<ul style="list-style-type: none"> Awareness camps to be organized Trainings and exposure visits UGs and WCs to be held Capacity building workshops to be organized one. Federations of UGs and WCs to be formed. 	<ul style="list-style-type: none"> Quality of management of common resources improved. Quality of distribution of benefits between people improved. Increased awareness amongst women about village resources Women participation enhanced in decision-making of GVCs. Involvement of 	

Components	Activities	Outputs	Effect	Impact
	<p>functioning of UGs and W Cs</p> <p>Strengthen linkages between UGs and W Cs and Panchayat Institutions</p> <ul style="list-style-type: none"> • Gender sensitization of UGs and W Cs to increase inclusiveness of Samuh (Joint) decision making. • Sensitize Village communities to involve children and youth in development 		<p>youth and children in village development.</p>	
Fund Management	<ul style="list-style-type: none"> • Improve management and utilization of UGs and WCs • Prepare 	UGs and W Cs operating bank account and managing resources on their own.	<ul style="list-style-type: none"> • Purpose, frequency and volume of use of the fund enhanced • Volume of funds 	

Components	Activities	Outputs	Effect	Impact
	<p>communities to explore other sources of income for UGs and WCs.</p>		<p>generated for UGs and WCs from other sources of income increased</p>	
<p>Ecological restoration</p>	<ul style="list-style-type: none"> • Protection, Treatment and regeneration of common and private lands. • Protection, treatment and regeneration of forest lands. • Plantation of fruits and forest species. • Input trainings, conduct meetings and organize exposure visits for communities, village volunteers and staff to 	<ul style="list-style-type: none"> • Common and private lands to be brought under new plantations and a gro- horti- forestry like Neem, A dussa, prosopis, B anyan and Peepul. • Forest lands to be brought under new plantations and protection. • Trainings, exposure visits and meetings to be organized for communities, village volunteers and staff. • Income generation intervention promoted 	<ul style="list-style-type: none"> • Fodder availability from common and private lands increased. • Accessibility to common and forest lands increased with removal of encroachments and resolution of conflicts 	<ul style="list-style-type: none"> • Better Ecological order in the area. • Increase in the proportion of households having more security of fodder. • Reduction in drudgery of fodder and fuel collection, especially women

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

Components	Activities	Outputs	Effect	Impact
	<p>organic farming practices.</p> <ul style="list-style-type: none"> • Formation of Fodder banks to increase fodder security and promote dairy development among communities. • Identification and promotion of agri-produce based income generation activities like grading, processing and packaging. • Promotion of better irrigation practices like drip irrigation • Impart trainings, conduct meetings and organize 	<ul style="list-style-type: none"> • 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. 	<p>availability of water for 9 to12 months.</p> <ul style="list-style-type: none"> • Increased availability of water for livestock • Increase in agricultural productivity of land. • Augmentation of drinking water supply. 	

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

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

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