

Contents (IWMP IV)

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CHAPTER- 1

METHODOLOGY

INTRODUCTION

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

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

In order to implement watershed area (IWMP IV) programme, a systematic baseline survey has been conducted to know the potentiality of the village. With this view, a baseline survey was conducted in six micro- watersheds Mayan (2C5G6k6), Padla (2C5G3d4), Bass Dudha (2C5G3d2), Chitadungra (2C5G6m4), Kolana (2C5G3a5), Bhalkhi (2C5G6m8). The baseline survey will serve as a bench mark against which the results of project could be compared at the end of the implementation. It would also helpful in guiding watershed programme to plan its goal in identifiable terms for future reference. PRA techniques and transect walk were conducted with the Gram Sabha members and beneficiaries for building confidence for 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 IV) of 6 micro watersheds namely Mayan (2C5G6k6), Padla (2C5G3d4), Bass Dudha (2C5G3d2), Chitadungra (2C5G6m4), Kolana (2C5G3a5), Bhalkhi (2C5G6m8) with their respective codes.

1.1.2 Base Line Survey

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

1.1.3 Collection of Primary Data

Though the project was sanctioned by the September, 2011 but the preparatory phase started in 2012. Initially, a meeting was arranged with officials of concerned departments and stake holders located in villages Mayan, Padla, Bass Dudha, Chitadungra, Kolana, Bhalkhi micro- watersheds. During this meeting, Preliminary Project Report (PPR) were thoroughly discussed.

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

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

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

1.1.4 Collection of Secondary data

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

1.2 PARTICIPATORY RURAL APPRAISAL

The due process of participatory Appraisal was followed in which village committees were sensitized about project activities. An appraisal of land resources, water resources, forest and pasture land resources, common property resources, production system and livestock resources was carried out by collecting data from primary and secondary sources. Group meetings were organized at common places and problems with possible solution were debated, discussed and efforts were made to reach an agreement on activities required under the projects. This was followed by transect walks across the entire area of the village and spots indicated by the community. The Technical possibilities were discussed and measurements were recorded for jointly agreed activities. Similarly, discussions were held about entry point activities and items of work were finalized keeping in view the availability of funds in the project. Through discussions were held on production activities and new 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 were thoroughly discussed with the community and to the 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 Water conveyance system, Strengthening of Water Conveyance Channel (Water Course in fields) (Water Saving Technology), Diversion Dam with drain, Dug out Pond /Renovation, Ramp, outlet and Inlet, Earthen Embankment with pacca outlet, Small Earthen Embankment with vegetative support, Roof top rain water recharge, Dry Stone Masonry Structures, etc. were recommended to conserve and store water used for life saving irrigation in the rain fed area and to avoid degradation of the land.

1.2.2 Community Participants in Social Mapping

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

1.2.3 Transect Walk

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



Transect Walk

1.2.4 Focus Group Discussions

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



Gram Sabha member's participation and group discussion

1.3 USE OF GIS TECHNOLOGY FOR PLANNING

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

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

1.3.1 Prioritization

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

1.3.2 Planning

Based on the land use and hydrology 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 based on 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's characteristics each structures like Water conveyance system, Strengthening of Water Conveyance Channel (Water Course in fields) (Water Saving Technology), Diversion Dam with drain, Dug out Pond /Renovation, Ramp, outlet and Inlet, Earthen Embankment with pacca outlet, Small Earthen Embankment with vegetative support, Roof top rain water recharge, Dry Stone Masonry Structures, etc. were provided in consultation with the Gram Sabha Members.

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 the site condition. These maps were generated as per SLUSI coding system.

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

S.No.	Scientific Criteria/input used	Whether Scientific Criteria was used
	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	-
	Bio pesticides	Yes
	Organic manure	Yes
	Vermin- compost	Yes

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

1.4 Preparation of Action Plan and Approval

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

CHAPTER – 2

PROJECT BACKGROUND

2.1 PROJECT BACKGROUND

Integrated Watershed Management Programme (IWMP-IV) project is falls in Khol block of Rewari district in Haryana state. The project is a cluster of six micro- watersheds namely Mayan (2C5G6k6), Padla (2C5G3d4), Bass Dudha (2C5G3d2), Chitadungra (2C5G6m4), Kolana (2C5G3a5), Bhalkhi (2C5G6m8). The total geographical area of the project is **3931 ha** out of which **3344 ha** has been undertaken to be treated under IWMP-IV starting from year 2011-2012. The project is divided into six micro watersheds. The Base map is shown in **Annexure I**.

Table 1: Basic Project Information

Sr. No	Name of the project	Name of the micro watersheds	Code No.	Name of the villages	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
1	Bass Dudha watershed (IWMP IV)	Mayan	2C5G6k6	Mayan	Khol	Rewari	841	704	84.48	ASCO Rewari
				Nangla Mayan						
2	Bass Dudha watershed (IWMP IV)	Padla	2C5G3d4	Padla	Khol	Rewari	676	598	71.76	ASCO Rewari
3	Bass Dudha watershed	Bass Dudha	2C5G3d2	Bass Dudha	Khol	Rewari	1023	840	100.80	ASCO

Sr. No	Name of the project	Name of the micro watersheds	Code No.	Name of the villages	Block	District	Area of the Project (ha)	Area proposed to be treated (ha)	Total Project cost (Rs lacs)	PIA
	(IWMP IV)									Rewari
4	Bass Dudha watershed (IWMP IV)	Chitadungra	2C5G6m4	Chitadungra	Khol	Rewari	380	313	37.56	ASCO Rewari
5	Bass Dudha watershed (IWMP IV)	Kolana	2C5G3a5	Kolana	Khol	Rewari	362	305	36.60	ASCO Rewari
6	Bass Dudha watershed (IWMP IV)	Bhalkhi	2C5G6m8	Bhalkhi	Khol	Rewari	649	584	70.08	ASCO Rewari
					Grand Total		3931	3344	401.28	

2.2 NEED OF WATERSHED DEVELOPMENT PROGRAMME

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

- i. poverty index,
- ii. percentage of SC,
- iii. actual wages,
- iv. percentage of small and marginal farmers,

- v. ground water status,
- vi. moisture index,
- vii. area under rain fed agriculture,
- viii. drinking water situation in the area ,
- ix. percentage of degraded land,
- x. productivity potential of land,
- xi. continuity of any other watershed already developed/treated,
- xii. cluster approach for plain terrain,
- xiii. cluster approach for hilly terrain,

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

Table 2. Criteria and Weightage for Selection of Watershed

S. No.	Criteria	Maximum Score	Ranges and Scores			
i.	Poverty index (% of poor to population)	10	Above 80 % (10)	80 to 50 % (7.5)	50 to 20 % (5)	Below 20% (2.5)
ii.	% of SC/ST population	10	More than 40 % (10)	20 to 40 % (5)	Less than 20% (3)	
iii.	Actual wages	5	Actual wages are significantly lower than minimum wages (5)	Actual wages are equal to or higher than minimum wages		

S. No.	Criteria	Maximum Score	Ranges and Scores			
				(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 87.5 concerning these thirteen parameters, a composite ranking was given to Bass Dudha Watershed (IWMP IV) project as given in **Table- 3**.

The total numbers of families under BPL are less than the total number of households in the village. Hence a score of 5 was allotted. Rain fed agriculture is more and more than 80 percent and more than 50 % farmers are small and marginal. So the scoring is done 5. So accordingly, scoring was done like project area comes under Arravalli range and Sahibi basin of Haryana, has no assured irrigation facility, erratic rainfall, deep quality of ground water is saline and the shallow are being exploited for development of irrigation, hence the block falls over exploited and score 5 is given. The percentage of schedule castes in this watershed is about 30 percent of the total population, hence 5 score was allotted. Due to high percentage of the poor population i.e. about 70 percent thus the scope of poverty index is 7.5. More than 60 percent of the farmers are small and marginal in nature. Hence a composite rank of 5 is allotted. With all the parameters taken together gives the watershed score to be 87.5.

Table 3: Weightage of the Project

1	2	3	4	5	6	7	8	9													
Sr. No	District	Name of the project	No. of micro-watersheds proposed to be covered	Geographical area (ha)	Proposed Area for Development	Type of project (Hilly/ Desert/ Others)	Proposed cost (Rs. In Lakh)	Weightage under the criteria													
								i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	Total
1.	Rewari	Bass Dudha watershed (IWMP IV)	6	3931	3344	others	401.28	7.5	5	0	5	5	10	10	5	10	10	5	15	0	87.5

Table 4: Watershed Information

Name of the Project	No. of Micro-Watersheds to be Treated	Watershed codes	Watershed regime/type/order
Bass Dudha watershed (IWMP IV)	6	2C5G6k6, 2C5G3d4, 2C5G3d2, 2C5G6m4, 2C5G3a5, 2C5G6m8	Others

2.3 OTHER ONGOING DEVELOPMENT PROJECTS / SCHEMES IN THE PROJECT VILLAGES

These villages being backward have been on top priority in number of developmental projects. These programmes are Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Total Sanitation Campaign (TSC), Swarnajaynti Gram Swarojgar Yojna (SGSY) and Indira Awas Yojana (IAY), NWDPR. The programmes that are active in this area are tabulated in Table 5.

Table 5. Ongoing Developmental Programs in the Project Area

S. No.	Name of the Program /Project	Name of Micro watersheds	Sponsoring agency	Objective	Estimated number of beneficiaries for year 2013-14 (Job card issued)
1	MGNREGA	Mayan	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of village.	188
2	MGNREGA	Padla	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of village.	77
3	MGNREGA	Bass Dudha	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of	110

				village.	
4	MGNREGA	Chitadungra	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of village.	68
5	MGNREGA	Kolana	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of village.	75
6	MGNREGA	Bhalkhi	DRDA, Rewari	To provide assured employment of 100 days in a year to unskilled labour and development of village.	88

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

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

Watershed Area Development Treated/Sanctioned											
1	2	3		4				5			
S. No	Names of District	Total micro watersheds in the District		Micro- watersheds covered so far				Total watersheds covered		Net watersheds to be covered	
				Deptt. of Land Resources		Other Ministries/ Deptt.					
				Pre- IWMP projects (DPAP+DDP+IWDP)		Any other watershed project					
		No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)		
1	Rewari	402	150678	115	57500	15 (EAS)	7500	130 (221 villages)	65000	181	85678

CHAPTER – 3

BASIC INFORMATION OF THE PROJECT AREA

GEOGRAPHY AND GEOHYDROLOGY

Bass Dudha Watershed (IWMP IV) falls in Khol Block of District Rewari. The area is occupied by Indo- Gangetic alluvium plains and area is traversed and drained by Krishnawati seasonal streams of Sahibi river system. Physiographically, the area is divided in Arravali hillocks, with dunes along hillocks and Interdunal plains. The area of watershed lies in between 28°06'35" to 28°13'35" N Latitude & 76°20'45" to 76°26'30" east longitude with general elevation varies between 252- 375 m (google earth map) above mean sea level (MSL). The average rainfall of district is 702mm. About 80 percent of its annual rainfall is received in the month of July to September. The rainfall pattern reveals that during past twenty years, eight years when the rainfall is below average. The Drainage and Contour map is presented in **Annexure II**.

3.1 LAND USE PATTERN

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

Table. 1 Land use pattern of Bass Dudha Watershed (IWMP IV)

Sr. No.	Name of Micro Watersheds With Code	Name of Villages	Geographical Area in (ha)	Treatable area of the village(ha)	Land under agriculture use (ha)	Rain fed area (ha)	Wasteland	
							Cultivable	Non-Cultivable
1	Mayan (2C5G6k6)	Mayan	630	501	554	425	0	76
		Nangla Mayan	211	203	200	192	0	11
2	Padla (2C5G3d4)	Padla	676	598	546	468	18	112
3	Bass Dudha (2C5G3d2)	Bass Dudha	1023	840	830	647		193
4	Chitadungra (2C5G6m4)	Chitadungra	380	313	341	274	2	37
5	Kolana (2C5G3a5)	Kolana	362	305	330	273		32
6	Bhalkhi (2C5G6m8)	Bhalkhi	649	584	504	439	11	134
Grand Total			3931	3344	3305	2718	31	595

(Source – District Census Handbook, 2001 Rewari)

3.2 SOIL AND TOPOGRAPHY

The soils of Bass Dudha Watershed is characterized as shallow to deep on hillocks and hill side slopes developed on gentle to steep slope, loamy skeletal, lithic Ustorthent. The soils are very deep, sandy to coarse loamy, typic ustipssamant/ torripssammant, typic ustorthent/ torriorthent, typic haplustepts and typic haplocambids in the majority area. The topography of the area ranges from nearly level land in the majority area and very gentle/ steep rolling slopes in the hilly area. Soils are subject to susceptible to severe to very severe water erosion along the hillocks and moderate to severe in lower area. The slope ranges from 1 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	Mayan	2C5G6k6	841	Loamy sand to sandy loam	Nearly level to gentle
2	Padla	2C5G3d4	676	Loamy sand to sandy loam	Nearly level to gentle
3	Bass Dudha	2C5G3d2	1023	Sandy to sandy loam	Nearly level to very gentle
4	Chitadungra	2C5G6m4	380	Sandy to sandy loam	Nearly level to very gentle
5	Kolana	2C5G3a5	362	Sandy to sandy loam	Nearly level to very gentle
6	Bhalkhi	2C5G6m8	649	Sandy to sandy loam	Nearly level to very gentle
			3931		

Source: - Department of Agriculture, Haryana

3.2.1 Flood and Drought Condition

There have been incidences of flood observed in past years, however excess rainfall is observed once in a four years. The drought occurs in watershed villages, the rainfall data reveals, drought incidence is once in a four year. In absence of assured irrigation and drought resulted in low to very low in crop yield.

Table 3. Flood and Drought condition

S.No.	Name of Micro- watersheds	Flood Incidence	Drought Incidence
1.	Mayan	Once in 8-10 years	Once in a four Year
2.	Padla	Once in 8-10 years	Once in a four Year
3.	Bass Dudha	Once in 8-10 years	Once in a four Year
4.	Chitadungra	Once in 8-10 years	Once in a four Year
5.	Kolana	Once in 8-10 years	Once in a four Year
6.	Bhalkhi	Once in 8-10 years	Once in a four Year

3.3 SOILS

3.3.1 Soil Erosion

In the identified six micro watersheds in seven villages, it is observed that due to erratic rains, unscientific mining and thin vegetative cover to increase the losses of soil in the watershed area. Thus results in degradation of agricultural land, deforestation and lowering organic matter in the soil. The erosion materials brought by the small nalas are deposited in the sloping areas and are deposited in lower fields. The repeated deposition of coarse sediments render these areas comparatively low in agriculture production. Average annual rainfall 702mm of the district falling under these watersheds during heavy storms in rainy season the top soil washed away in the form of runoff which also carries valuable top soil (sheet). Soil erosion in respect of sheet is quite high. Majority of the watershed Community are dependent on agriculture. Agriculture suffers due to area being rain fed and due to excess rains in the region, resulting in further deterioration of socio economic conditions of community. It is also observed that sand deposition along hillocks to formed dunes by winds blow up (dust storm) from Rajasthan area.

3.3.2 Soil Salinity/Alkalinity (Salinity ingress):

There is low to moderate soil salinity in the Project and pH is normal and within the limits of 7.05 to 8.15.

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

Table 4. Soil pH and Salinity

S.No.	Name of Micro Watersheds	Soil pH	Type of salinity (inherent/ ingress)
1.	Mayan	7.10- 7.86	Low to Moderate
2.	Padla	7.05 – 8.05	Low to Moderate
3.	Bass Dudha	7.11- 8.15	Low to Moderate
4.	Chitadungra	7.12- 8.03	Low to Moderate
5.	Kolana	7.15- 8.10	Low to Moderate
6.	Bhalkhi	7.25- 8.11	Low to Moderate

3.3.3 SOIL CLASSIFICATION

Major soils associations' fall in the watershed are five units. The detailed description of all soil associations are given below. The Soil map is presented in **Annexure V**. The fertility status of the project area, reveals low level of available nitrogen and available phosphorus. However, the available potash is medium. The fertility status map of the project area is exhibited in **Annexure-VI**.

Soil Mapping Unit- 2 (Ruppu Saroi Soil Association)

The Ruppu Saroi soil series is only series in this soil association. The soil series is excessively drained, Sandy loam to Loam, Loamy Skeletal Mixed hyperthermic Lithic Ustorthents. The soil series is non calcareous, shallow to deep, pH 7.15- 7.45, dark yellowish brown to yellowish brown in colour (10YR 4/4-10YR 5/4) developed on Steep to Very steep slope in Aravali Hills with "Rock out crops".

Soil Mapping Unit- 3 (Khol- Madola Soil Association)

The Khol soil series is dominated in this soil association and associated soil series is Madola soil series. The dominant soils are Excessive to Well drained, Sandy, Sandy Mixed hyperthermic Typic Torripsamments, 1st associate soil series is excessively drained, Loamy sand to Silt loam, Coarse loamy Mixed hyperthermic Typic Torriorthents, Khol soil series is strongly calcareous, very deep, pH 8.00- 8.70, pale brown to yellowish brown in colour (10YR 6/3-10YR 5/4) developed on Unstable sand dunes/Undulating terrain and Madola soil series is Moderate to strongly calcareous, very deep, pH 8.40-8.80, brown to yellowish brown in colour (10YR 5/3-10YR 5/6) developed on Pediments formed by the accumulation of eroded particles from Aravali hills with Common medium and hard concretions of calcium carbonate in C horizon.

Soil Mapping Unit- 4 (Khol- Bohka Soil Association)

The Khol soil series is dominated in this soil association and associated soil series is Bohka soil series. The dominant soils are Excessive to Well drained, Sandy, Sandy Mixed hyperthermic Typic Torripsamments, 1st associate soil series is well drained, Loamy sand to Sandy loam, Coarse loamy non-calcareous Calcareous Mixed hyperthermic Typic Haplocambids, Khol soil series is strongly calcareous, very deep, pH 8.00- 8.70, pale brown to yellowish brown in colour (10YR 6/3-10YR 5/4) developed on Unstable sand dunes/Undulating terrain and Bohka soil series is slightly calcareous, very deep, pH 7.70-8.20, brown to pale brown in colour (10YR 4/3-10YR 6/3) developed on Gently sloping/Leveled plain with Hard layer of calcium carbonate concretions from 160cm depth.

Soil Mapping Unit- 5 (Berli- Bawal Soil Association)

The Berli soil series is dominated in this soil association and associated soil series is Bawal soil series. The dominant soils are Well drained, Loamy sand to Sandy loam to Sandy clay loam, Coarse loamy Mixed hyperthermic Typic Haplustepts, 1st associate soil

series is well drained, Loamy sand to Sandy loam, Sandy Mixed hyperthermic Typic Ustipsamments, Berli soil series is non calcareous, very deep, pH 8.40-9.20, brown to yellowish brown in colour (10YR 4/3-10YR 5/4) developed on Interdunal valley-dune complex/Very gentle sloping/Fine aeolian sand and Bawal soil series is non calcareous, very deep, pH 8.10-8.21, yellowish brown in colour (10YR 5/4-10YR 5/6) developed on Fluvio-aeolian plains/old dry riverbeds.

Soil Mapping Unit- 12 (Jamalpur- Ahrod Soil Association)

The Jamalpur soil series is dominated in this soil association and associated soil series is Ahrod soil series. The dominant soils are Excessively drained, Sandy, Sandy Mixed hyperthermic Typic Ustipsamments, 1st associate soil series is well drained, Loamy sand to Sandy loam to Loam, Coarse loamy Mixed hyperthermic Typic Torriorthents, Jamalpur soil series is non calcareous, very deep, pH 8.00-8.20, dark yellowish brown to yellowish brown in colour (10YR 4/4- 10YR 5/4) developed on Dunal complex/Aeolian over alluvium and Ahrod soil series is strongly calcareous, very deep, pH 7.90-8.50, dark yellowish brown to yellowish brown in colour (10YR 4/4-10YR 5/4) developed on Very gentle sloping/Undulating in Aeolian plain with Fine medium hard broken dark concretion of calcium carbonate in C horizon.

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

3.3.4 Land Capability Classification

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

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

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

Land capability subclass III e2s2

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

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

1. Land leveling should be done at 50% subsidy, because farmers are not economically capable to bear the rate of land leveling.
2. Engineering measures like Percolation Embankments and other related measures are to be under taken.
3. Agronomic measures like Dry farming, strip& Mixed cropping with other soil conservation measures like agro forestry and rainfed horticulture are recommended.
4. Green manuring should be promoted for increase physical and chemical properties of soil.
5. Masonry structure (outlet) should be constructed with field bandhs and percolation embankments for rills control and insitu moisture conservation.
6. Strengthening of old abandoned water courses.
7. Provide water storage tanks for storage of excess canal water for using supplementary irrigation during lean period.

Land capability subclass IV e3s3

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

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

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

Land capability subclass VI es

These soils are shallow to deep developed on gentle to steep slope, light to medium skeletal structure textured soils, complex sloping, moderate to severely eroded lands. The water holding capacity is very poor and the water erosion hazard is moderate to severe.

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

1. Specific and special soil conservation measures should be adopted to check water erosion adopting land development majors soils should be provided permanent vegetation (A forestation) and rainfed horticulture cover to check further deterioration of soils.
2. Restrict to unscientific mining in the hilly area.
3. Soils would be suitable for pasture development; forestation and other major water harvesting structures (Percolation pond).

3.3.5 Climatic Conditions

The average rainfall of the district is 702 mm (during the past 19 year's data). The highest rainfall is 1138 mm during the year 2008. The uneven rainfall distribution is leading to run off soil every year to the steams/ nalas on hillocks and depressed area of the Bass Dudha Watershed (IWMP IV). The year wise rainfall from 1994 to 2012 is presented in **Table.5**

Table 5. Rainfall during the years 1994-12

S.No.	Year	Rainfall (in mm)
1	1994	791
2	1995	1087
3	1996	1064
4	1997	589
5	1998	953
6	1999	718
7	2000	479

8	2001	665
9	2002	408
10	2003	1024
11	2004	527
12	2005	889
13	2006	557
14	2007	575
15	2008	1138
16	2009	428
17	2010	625
18	2011	508
19	2012	323
	Average Rainfall	702

(Source: - Deputy Director Agriculture, Rewari)

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

3.3.6 Physiography and Reliefs

Physiographically, the area is divided into two parts from South –West to North - East. The general Elevation in the area belongs to hillocks, sand dunes with Recent and old Alluvial Plains 252 – 375 m above mean sea level (google earth maps). Area experiences moderate rainfall in the state and water is drained through seasonal streams/tributaries of Krishnawati river watershed which flows South –West to North - East and ultimately merge in Sahibi if heavy flood occurs during rainy season. Upper area is badly dissected by these drainage pattern and unscientific mining activities. The elevation range and percentage slope distribution has been presented in **Table 6**.

Table 6. Physiography and Relief

Project Name	Elevation (MSL)	Slope Range (%)	Major Streams
--------------	------------------	-----------------	---------------

Bass Dudha Watershed (IWMP IV)	252- 375	1 to 10	1. Krishna wati 2. Sahibi
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3.4 LAND AND AGRICULTURE

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

The major crops Bajra, Gawar, green fodder and pulses in Kharif under rain fed conditions, during Rabi wheat, mustard, gram, green fodder and seasonal vegetables in rain fed and irrigated conditions. The soil and water conservation measures such as Engineering like Water conveyance system, Strengthening of Water Conveyance Channel (Water Course in fields) (Water Saving Technology), Diversion Dam with drain, Dug out Pond /Renovation, Ramp, outlet and Inlet, Earthen Embankment with pacca outlet, Small Earthen Embankment with vegetative support, Roof top rain water recharge, Dry Stone Masonry Structures, etc. The project would help the farmers to take crop production which will enhance the net production value. The following plants are commonly observed in the Project Area. The natural vegetation in the project area is exhibited in **Table 7**.

Table 7. NATURAL VEGETATION

Sr. No.	Trees	Fruits	Grasses and Shurbs
1	Babool & Australian Babool	Pomegranate	Saccharum munja
2	Black Siris	Ber	Bhroot
3	Jal	Lemon	Jharberi
4	Shisham	Guava	Ker (Tint)
5	Neem	Jamun	
6	Khejri	Amla	

Sr. No.	Trees	Fruits	Grasses and Shurbs
7	Pipal	Papaya	
8	Eucalyptus		

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
950	1358	223	-----	2494

Source: PIA

3.4.2 AGRICULTURE/PATTERN

Table 9. Agriculture/ Pattern

Sr. No.	Name of Micro Watersheds	Villages	Land under agriculture use (ha)	Net Sown area (ha)	
				One time	Two times
1	Mayan	Mayan	554	439	375
		Nangla Mayan	200	155	145
2	Padla	Padla	546	422	402
3	Bass Dudha	Bass Dudha	830	645	635
4	Chitadungra	Chitadungra	341	278	226
5	Kolana	Kolana	330	245	235

Sr. No.	Name of Micro Watersheds	Villages	Land under agriculture use (ha)	Net Sown area (ha)	
				One time	Two times
6	Bhalkhi	Bhalkhi	504	395	371
		Total	3305	2579	2389

(Source: Department of Agriculture, Haryana)

3.4.3 IRRIGATION

Lack of Assured Irrigation Facilities

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

Table 10. Irrigation Pattern

S.No.	Name of Micro Watersheds	Name of Villages	Source 1: Groundwater(Tube wells)	
			Availability months	Net area (ha)
1	Mayan	Mayan	July to June	445
		Nangla Mayan	July to June	155
2	Padla	Padla	July to June	319
3	Bass Dudha	Bass Dudha	July to June	311

S.No.	Name of Micro Watersheds	Name of Villages	Source 1: Groundwater(Tube wells)	
			Availability months	Net area (ha)
4	Chitadungra	Chitadungra	July to June	341
5	Kolana	Kolana	July to June	330
6	Bhalkhi	Bhalkhi	July to June	421
		Total		2322

(Source – District Census Handbook Rewari)

3.4.4 CROPPING PATTERN (crop details)

Cropping Pattern

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

Table 11 A. Crop Details (Rabi)

S. No.	Name of Micro Watersheds	Village	Rabi crops(Wheat)				(Mustard)				(Barley)		
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.
1	Mayan	Mayan	114	395010	3465	Yes	245	306250	1250	Yes	3	9075	3025
		Nangla Mayan	43	146286	3402	Yes	91	113750	1250	Yes	2	6050	3025
2	Padla	Padla	142	482800	3400	Yes	225	280125	1245	Yes	1	3022	3022
3	Bass Dudha	Bass Dudha	256	887040	3465	Yes	305	381250	1250	Yes	5	15120	3024
4	Chitadungra	Chitadungra	97	336105	3465	Yes	106	131546	1241	Yes	1	3025	3025
5	Kolana	Kolana	88	304040	3455	Yes	107	128400	1200	Yes	3	9063	3021
6	Bhalkhi	Bhalkhi	134	464310	3465	Yes	205	256250	1250	Yes	-	-	-
		Grand Total	874				1284				15		

Table 11 B. Crop Details (Kharif)

S. No.	Name of Micro Watersheds	Village	(Bajra)				(Gwar)			
			Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer	Area (ha)	Prod. (kg)	Productivity (kg/ha) Avg.	Use of fertilizer
1	Mayan	Mayan	280	348880	1246	Yes	-	-	-	-
		Nangla Mayan	45	56025	1245	Yes	-	-	-	-
2	Padla	Padla	280	348880	1246	Yes	-	-	-	-
3	Bass Dudha	Bass Dudha	488	608048	1246	Yes	-	-	-	-
4	Chitadungra	Chitadungra	221	275145	1245	Yes	-	-	-	-
5	Kolana	Kolana	261	313200	1200	Yes	49	85505	1745	Nil
6	Bhalkhi	Bhalkhi	317	394982	1246	Yes	25	43225	1729	Nil
Grand Total			1892				74			

3.4.5 Livestock

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

Table 12. Village Wise Distribution of Milk Production in Bass Dudha Watershed (IWMP IV)

S. No	Name of Micro Watersheds	Villages	Buffalo(*Lit/per day/annum) for 6 months	Cow(*lit/per day/annum) for 6 months	Sheep	Goat	Camel
1	Mayan	Mayan	474/3792/68256 (Lit/annum)	120/ 660/118800 (Lit/annum)	-	342	9

S. No	Name of Micro Watersheds	Villages	Buffalo(*Lit/per day/annum) for 6 months	Cow(*lit/per day/annum) for 6 months	Sheep	Goat	Camel
		Nangla Mayan	55/440/79200 (Lit/annum)	13/71.5/12870 (Lit/annum)	-	14	1
2	Padla	Padla	398/3184/573120 (Lit/annum)	60/330/59400 (Lit/annum)	-	315	10
3	Bass Dudha	Bass Dudha	757/6056/1090080 (Lit/annum)	66/363/65340 (Lit/annum)	3	275	22
4	Chitadungra	Chitadungra	422/3376/607680 (Lit/annum)	34/187/33660 (Lit/annum)	85	150	6
5	Kolana	Kolana	1611/12888/2319840 (Lit/annum)	58/319/57420 (Lit/annum)	30	182	19
6	Bhalkhi	Bhalkhi	269/2152/387360 (Lit/annum)	37/203.5/36630 (Lit/annum)	-	62	3

(Source: Animal Husbandry, Rewari)

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

3.4.6 Ground Water Concern

a) Depth of Water

The ground water hydrology focuses on occurrence and distribution of movement of water below the surface. Ground Water Cell of Haryana has fixed hydrograph station whose monitoring is undertaken during pre and post monsoon season. The water level data has been analyzed for the purpose of ground water studies in the watershed area. The ground water behavior in the watershed reveals the variation of depth to water level from 36 to 69 m below ground level. In Mayan micro- watershed part of the area is between 30- 40m whereas remaining area in the range of 40-60m depth. In Kolana micro- watershed, the depth range is 40-60m. The water table Bass dudha watershed is between 40-60m and a small pocket is below 60m. The water table of padla and Bhalkhi is lowest in the IWMP between 60-80m. The water table

in Chitadungra micro- watershed varies from 40-60m. The depth to water level follows the topography of the area. 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 Bass Dudha Watershed (IWMP IV)

S. No.	Name of Micro Watersheds	Name of Villages	Source	Pre- Project level (m)
1	Mayan	Mayan	Open wells	57
		Nangla Mayan	Open wells	56
2	Padla	Padla	Open wells	68
3	Bass Dudha	Bass Dudha	Open wells	69
4	Chitadungra	Chitadungra	Open wells	69
5	Kolana	Kolana	Open wells	68
6	Bhalkhi	Bhalkhi	Open wells	36

The source of drinking water supply is through the tube wells as well as canal network in the area. The micro watershed wise quality ranges from fresh to saline. The water quality distribution in Kolana, Mayan and Bass dudha is byenlarge fresh except small a pocket which is under marginal quality of ground water. The Padla and Bhalkhi and Chitadungra falls in marginal water quality zone except a small area of Bhalkhi is underlain by saline ground water (the water quality map of the area is presented in **Annexure-IX**) are saline. The drinking water supply is available thought the year but shortage in villages during May and June where the supply is augmented by tankers. The department of Public Health Engineering is responsible for the water supply for drinking purpose.

b) Water table fluctuation

The long term fluctuation has been observed that the water table is falling 0.38 to 1 m/year. The seasonal fluctuation i.e. Pre and Post monsoon period is 2.38 to -0.38 m.

c) Rain water harvesting and Recharging

The rapid growth of drinking and irrigation lead 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/recharging by construction of water harvesting/percolation tanks as the area is under deep water table condition. The provision of this has been provided in the project proposal.

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

Table 14. Detail of Common Property Resources

Name of the Project	CPR Particulars	Total Area, ha (Area owned / in possession of)				Area available for treatment (ha)			
		Pvt. Person	Govt.	PRI	Any Other	Pvt. Person	Govt.	PRI	Any Other
Bass Dudha Watershed (IWMP IV)	Waste land	---	---	667	---	---	---	221	---
	Pasture	---	---	48	---	---	---	48	---
	Orchards	5	---	---	---	5	---	---	---
	Village wood lot	---	---	31	---	---	---	31	---
	Forest	---	---	96	---	---	---	96	---
	Village ponds, lake	---	---	14	---	---	---	14	---
	Community Buildings	---	19	---	---	---	19	---	---

	Weekly Mkts	---	---	---	---	---	---	---	---
	Permanent Mkts	---	---	---	---	---	---	---	---
	Temples/place of worship	---	---	17	---	---	---	17	---
	Others	---	---	---	---	---	---	---	---

Source: PIA

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 are quite poor. They cannot use necessary agriculture inputs in a timely fashion due to financial constraints which adversely affects the crop yield.

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

3.5.1 Demographic Status

Table 15. Demographic Status/ Population Pattern

S. No.	Name of the Micro watersheds	Name of villages	Total no. of houses	Total Population			SC			
				Male	Female	Total	Male	Female	Total	%age
1	Mayan	Mayan	486	1311	1165	2476	388	360	748	30
		Nangla Mayan	54	132	119	251	47	41	88	35
2	Padla	Padla	565	1608	1542	3150	419	386	805	25
3	Bass Dudha	Bass Dudha	604	1594	1405	2999	288	243	531	18

S. No.	Name of the Micro watersheds	Name of villages	Total no. of houses	Total Population			SC			
				Male	Female	Total	Male	Female	Total	%age
4	Chitadungra	Chitadungra	332	840	806	1646	210	223	433	26
5	Kolana	Kolana	371	916	876	1792	91	82	173	10
6	Bhalkhi	Bhalkhi	298	985	881	1866	114	98	212	11
		Total	2710	7386	6794	14180	1557	1433	2990	21

(Source- District Census 2011)

Table16. Village wise Literacy Rate in Bass Dudha Watershed (IWMP IV)

S.No.	Name of the Micro watersheds	Name of villages	Total population	Literacy					
				Total Literates	% age	Male	% age	Female	% age
1	Mayan	Mayan	2476	1653	68	981	59	672	41
		Nangla Mayan	251	171	68	99	58	72	42
2	Padla	Padla	3150	2095	66	1216	58	879	42
3	Bass Dudha	Bass Dudha	2999	2119	70	1281	60	838	40
4	Chitadungra	Chitadungra	1646	1129	68	673	59	456	41
5	Kolana	Kolana	1792	1312	73	785	60	527	40
6	Bhalkhi	Bhalkhi	1866	1300	69	775	60	525	40
		Total	14180	9779	69	5810	59	3969	41

(Source- District Census- 2011)

Table 17. EMPLOYMENT STATUS

S.No.	Name of Micro Watersheds	Name of villages	Schedule caste		Cultivators		Agricultural labourers		Household industry workers		Other workers	
			Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	Mayan	Mayan	388	360	136	10	11	2	5	2	401	35
		Nangla Mayan	47	41	23	20	0	0	0	0	27	29
2	Padla	Padla	419	386	188	59	9	2	4	1	379	61
3	Bass Dudha	Bass Dudha	288	243	318	92	19	5	5	1	275	142
4	Chitadungra	Chitadungra	210	223	109	166	19	15	6	8	240	21
5	Kolana	Kolana	91	82	219	249	12	11	25	1	95	14
6	Bhalkhi	Bhalkhi	114	98	199	123	0	0	30	1	140	10
		Total	1557	1433	1192	719	70	35	75	14	1557	312

Source: Census 2011

3.5.2 MIGRATION PATTERN

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

Table 18: Migration Pattern in Bass Dudha Watershed (IWMP IV)

S. No.	Name of Micro Watersheds	Name of villages	Total Population	No. of persons migrating	No. of days per year of migration	Main reason for migration	Income during migration/ month/person
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S. No.	Name of Micro Watersheds	Name of villages	Total Population	No. of persons migrating	No. of days per year of migration	Main reason for migration	Income during migration/ month/person
1	Mayan	Mayan	2476	6	90	Lack of employment opportunity	6500- 10000
		Nangla Mayan	251	6	60	Lack of employment opportunity	6500- 10000
2	Padla	Padla	3150	12	90	Lack of employment opportunity	6500- 10000
3	Bass Dudha	Bass Dudha	2999	16	60	Lack of employment opportunity	6500- 10000
4	Chitadungra	Chitadungra	1646	14	120	Lack of employment opportunity	6500- 10000
5	Kolana	Kolana	1792	16	120	Lack of employment opportunity	6500- 10000
6	Bhalkhi	Bhalkhi	1866	25	90	Lack of employment opportunity	6500- 10000

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

Table 19. BPL Pattern

S. No.	Name of Micro watersheds	Name of villages	Total houses	Total Household- BPL	% of BPL HH
1	Mayan	Mayan	486	258	53
		Nangla Mayan	54	-	-
2	Padla	Padla	565	174	31
3	Bass Dudha	Bass Dudha	604	164	27
4	Chitadungra	Chitadungra	332	107	32
5	Kolana	Kolana	371	81	22
6	Bhalkhi	Bhalkhi	298	78	26

S. No.	Name of Micro watersheds	Name of villages	Total houses	Total Household- BPL	% of BPL HH
		Total	2710	862	32

(Source: Additional Dy. Commissioner, Rewari, Haryana)

INFRASTRUCTURE DETAILS

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

Table 20. Village Infrastructure

S. No.	Name of Micro watersheds	Name of villages	Bank Y/N	Post office Y/N	School Primary/ High/ Sr.Sec	Milk Collection Centre Y/N	Pucca Road to Village Y/N	Health Facility Govt/Private Y/N	Veterinary facility Y/N
1	Mayan	Mayan	N	Y	High School	N	Y	Y	N
		Nangla Mayan	-	-	-	-	-	-	-
2	Padla	Padla	N	N	Middle School	N	Y	N	N
3	Bass Dudha	Bass Dudha	N	Y	High School	N	Y	Y	Y
4	Chitadungra	Chitadungra	N	Y	Middle School	N	Y	N	N
5	Kolana	Kolana	N	Y	Middle School	N	Y	N	N
6	Bhalkhi	Bhalkhi	N	N	Middle School	N	Y	N	N

FACILITIES/ HOUSEHOLD ASSETS

Table 21. Facilities/ Household assets in Bass Dudha Watershed (IWMP IV)

S. No.	Name of micro water	Name of villages	Total no. of	HHs with Safe	HHs with phones	HHs with vehicles	HHs with TV sets	HHs with cooking	HHs with drinking	HHs with fridge
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					Landline	Mobile	2 wheelers	4 wheelers				
1	Mayan	Mayan	486	121	29	243	72	19	77	38	486	26
		Nangla Mayan	54	13	3	27	8	2	8	4	54	2
2	Padla	Padla	565	141	33	282	84	22	90	45	565	31
3	Bass Dudha	Bass Dudha	604	151	36	302	90	24	96	48	604	33
4	Chitadungra	Chitadungra	332	83	19	166	49	13	53	26	332	18
5	Kolana	Kolana	371	92	22	185	55	14	59	29	371	20
6	Bhalkhi	Bhalkhi	298	74	17	149	44	11	47	23	298	16

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 Bass Dudha Watershed (IWMP IV)

S. No.	Name of micro watersheds	Name of villages	Agriculture in Rs. P.A	Animal Husbandry in Rs. P.A	Casual labour in Rs. P.A	Others in Rs. P.A	Total in Rs.
1	Mayan	Mayan	22500	18600	5800	4400	51300
		Nangla Mayan	20500	17400	4900	5200	48000
2	Padla	Padla	18400	14400	4200	4900	41900

S. No.	Name of micro watersheds	Name of villages	Agriculture in Rs. P.A	Animal Husbandry in Rs. P.A	Casual labour in Rs. P.A	Others in Rs. P.A	Total in Rs.
3	Bass Dudha	Bass Dudha	21600	18400	5400	4300	49700
4	Chitadungra	Chitadungra	24500	20500	6500	5500	57000
5	Kolana	Kolana	23200	22000	6000	5200	56400
6	Bhalkhi	Bhalkhi	22300	20200	6500	4800	53800

3.5.4 Comparative Status of crop Productivity

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

3.6 REASONS FOR LOW PRODUCTIVITY

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

- Soil erosion.
- Essential micro- nutrient deficiency in the soil.
- Dependence of monsoon.
- Low fertilizer consumption per unit cropped area.
- Lack of economic condition of farmers.
- Lack of good quality of seeds and fertilizer.
- Lack of post harvesting facilities such as storage and marketing.

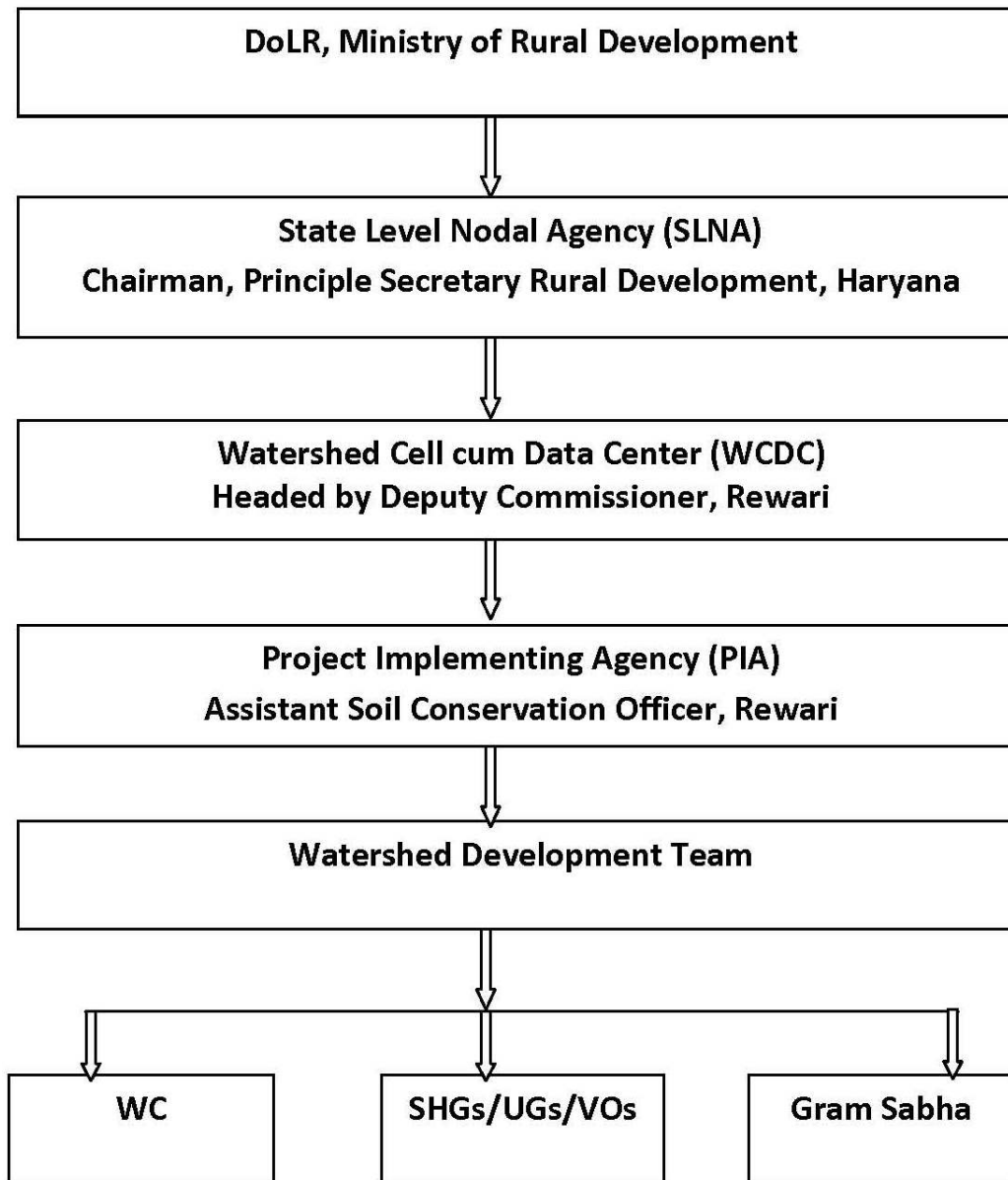
CHAPTER-4

PROJECT MANAGEMENT AGENCIES

4.1 INSTITUTIONAL ARRANGEMENT

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

The institutional set up is given below:



4.2 STATE LEVEL NODAL AGENCY, HARYANA

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

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

4.3 WATERSHED CELL CUM DATA CENTRE, REWARI

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

Organization of WCDC and its Objective

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

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

4.4 Project Implementation Agency

The project Implementing Agencies (PIA), ASCO Rewari is selected by the State Level Nodal Agency (SLNA) for Integrated Watershed Management Programme (IWMP) in Haryana. In the district Rewari, where the area of development is 25100 ha, a separate dedicated unit, called the Watershed Cell cum Data Centre has been established which is to oversee the implementation of watershed programme. The PIA is responsible for implementation of watershed project. Soil and Water Conservation Department, Rewari, will guide with its 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	Bass Dudha Watershed (IWMP-IV)	i) Type of organization	District Level Nodal Agency
		ii) Name of organization	District Watershed Development Unit
		iii) Designation & Address	Assistant Soil Conservation Officer, Rewari
		iv) Telephone	094160- 69536

	v) Fax	01274- 225240
	vi) E-mail	drdarwr@hry.nic.in

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

4.4.1 Monitoring Level Staff at PIA Head Office

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

4.5 Watershed Development Team

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

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

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

4.6 WATERSHED COMMITTEE DETAILS

The process of formation of watershed committees of all villages has been completed and watershed committees have been formed in all villages. The representation on these committees consists of members from- SC, landless, women and members from self

help groups and user groups. The committees would be imparted training for smooth management of the activities related to watershed.

Their representation of various groups is as under:

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

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

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

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

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

4.6.1 Formation of Watershed Committees (WC)

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

Table 2. Watershed Committees (WC) Details

Name of Micro Watersheds	Name of Villages	Name of President	Name of Secretary	Name of Members
Mayan	Mayan	Santosh	Desh Raj	Jagroop Singh, Harphool Singh, Ami lal, Laxman Singh, Davinder Singh, Amar Singh, Madan Singh, Shri Chand, Lala Ram, Madan Singh, Mahabir Parsad

Name of Micro Watersheds	Name of Villages	Name of President	Name of Secretary	Name of Members
	Nangla mayan	Santosh Devi	Desh Raj	Jagroop Singh, Harphool Singh, Ami Lal, Laxman Singh, Davinder, Amar Singh, Madan Singh, Shri Chand, Lala Ram, Madan Singh, Mahabir Parsad
Padla	Padla	Malkhan Singh	Karan Singh	Babu Lal, Hari Kishan, Omwati, Suresh Devi, Rajbir, Surinder Singh, Mangtu Singh, Sunita
Bass Dudha	Bass Dudha	Anirudh Kumar	Hawa Singh	Umrao Singh, Hanuman Singh, Santra Devi, Tirlok Chand, Lakhi Ram, Guljari Lal, Madan Singh, Shiv Lata, Kamal Singh
Chitadungra	Chitadungra	Raj Kumar	Anil Kumar	Brij Lal, Parbhathi Ram, Shish Ram, Smt. Sunita, Rajinder, Smt. Sunita, Duli Chand, Kanshi Ram
Kolana	Kolana	Sahi Ram	Pardeep Kumar	Ganshyam, Pavitra Devi, Ranjit, Chand Ram, Ramotar, Sushila Devi, Surender, Dharampal, Dharamveer
Bhalkhi	Bhalkhi	Kamlesh	Hanuman	Hement, Shiv Charan, Surender, Saroj Devi, Satish, Raja Singh, Rajender, Sher Singh

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

- Convening the meeting and recording the minutes of WC meeting and will be responsible for follow up the decision taken by the WC Committee.

- The secretary will be responsible for financial transactions of the project and will sign the cheques with WDT nominee on the behalf of WC.
- He will motivate the villagers for voluntary contribution and ensure equitable distribution of resources.

4.7 INSTITUTIONAL SETUP AT WATERSHED LEVEL

4.7.1 Self Help Groups

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

4.7.2 User Groups

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

CHAPTER- 5

BUDGETING

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

IWMP IV BASS DUDHA 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 IV

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
Bass dudha	3931	3344	40128000	Administrative costs	401280	401280	1203840	1203840	802560	4012800

Watershed (IWMP IV)			Monitoring	0	0	0	401280	0	401280
			Evaluation	0	0	0	0	401280	401280
			Entry point activities	1605120	0	0	0	0	1605120
			Institution and capacity building	0	2006400	0	0	0	2006400
			Detailed project report	401280	0	0	0	0	401280
			Watershed development works	0	3210240	6420480	6821760	6019200	22471680
			Livelihood activities for the asset less persons	0	0	1203840	2006400	401280	3611520
			Production system and micro enterprises	0	0	1203840	1605120	1203840	4012800
			Consolidation phase	0	0	0	0	1203840	1203840
			Total	2407680	5617920	10032000	12038400	10032000	40128000
			Percentage of total cost	6%	14%	25%	30%	25%	100%

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and
Funds in Rs.

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
704	8448000	Administrative costs	84480	84480	253440	253440	168960	844800
		Monitoring	0	0	0	84480	0	84480
		Evaluation	0	0	0	0	84480	84480
		Entry point activities	337920	0	0	0	0	337920
		Institution and capacity building	0	422400	0	0	0	422400
		Detailed project report	84480	0	0	0	0	84480
		Watershed	0	675840	1351680	1436160	1267200	4730880

		development works						
		Livelihood activities for the asset less persons	0	0	253440	422400	84480	760320
		Production system and micro enterprises	0	0	253440	337920	253440	844800
		Consolidation phase	0	0	0	0	253440	253440
		Total	506880	1182720	2112000	2534400	2112000	8448000
		Percentage of total cost	6%	14%	25%	30%	25%	100%

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and

Funds in Rs.

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
598	7176000	Administrative costs	71760	71760	215280	215280	143520	717600
		Monitoring	0	0	0	71760	0	71760
		Evaluation	0	0	0	0	71760	71760
		Entry point activities	287040	0	0	0	0	287040
		Institution and capacity building	0	358800	0	0	0	358800
		Detailed project report	71760	0	0	0	0	71760
		Watershed development works	0	574080	1148160	1219920	1076400	4018560
		Livelihood activities for the asset less persons	0	0	215280	358800	71760	645840
		Production system and micro enterprises	0	0	215280	287040	215280	717600
		Consolidation phase	0	0	0	0	215280	215280
		Total	430560	1004640	1794000	2152800	1794000	7176000

		Percentage of total cost	6%	14%	25%	30%	25%	100%
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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: Bass Dudha)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
840	10080000	Administrative costs	100800	100800	302400	302400	201600	1008000
		Monitoring	0	0	0	100800	0	100800
		Evaluation	0	0	0	0	100800	100800

	Entry point activities	403200	0	0	0	0	403200
	Institution and capacity building	0	504000	0	0	0	504000
	Detailed project report	100800	0	0	0	0	100800
	Watershed development works	0	806400	1612800	1713600	1512000	5644800
	Livelihood activities for the asset less persons	0	0	302400	504000	100800	907200
	Production system and micro enterprises	0	0	302400	403200	302400	1008000
	Consolidation phase	0	0	0	0	302400	302400
	Total	604800	1411200	2520000	3024000	2520000	10080000
	Percentage of total cost	6%	14%	25%	30%	25%	100%

MICRO WATERSHED WISE/COMPONENT WISE PHASING

YEAR WISE BUDGET PHASING UNDER IWMP

Area in Hectares and

Funds in Rs.

Table 5. PHASING YEAR WISE (Name of the Micro Watershed: Chita Dungra)

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
313	3756000	Administrative costs	37560	37560	112680	112680	75120	375600
		Monitoring	0	0	0	37560	0	37560
		Evaluation	0	0	0	0	37560	37560
		Entry point activities	150240	0	0	0	0	150240
		Institution and capacity building	0	187800	0	0	0	187800
		Detailed project report	37560	0	0	0	0	37560
		Watershed development works	0	300480	600960	638520	563400	2103360
		Livelihood activities for the asset less persons	0	0	112680	187800	37560	338040

		Production system and micro enterprises	0	0	112680	150240	112680	375600
		Consolidation phase	0	0	0	0	112680	112680
		Total	225360	525840	939000	1126800	939000	3756000
		Percentage of total cost	6%	14%	25%	30%	25%	100%

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

Area in Hectares and
Funds in Rs.

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
305	3660000	Administrative costs	36600	36600	109800	109800	73200	366000
		Monitoring	0	0	0	36600	0	36600
		Evaluation	0	0	0	0	36600	36600
		Entry point activities	146400	0	0	0	0	146400
		Institution and capacity building	0	183000	0	0	0	183000

	Detailed project report	36600	0	0	0	0	36600
	Watershed development works	0	292800	585600	622200	549000	2049600
	Livelihood activities for the asset less persons	0	0	109800	183000	36600	329400
	Production system and micro enterprises	0	0	109800	146400	109800	366000
	Consolidation phase	0	0	0	0	109800	109800
	Total	219600	512400	915000	1098000	915000	3660000
	Percentage of total cost	6%	14%	25%	30%	25%	100%

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

Area in Hectares and
Funds in Rs.

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

(BUDGET AT A GLANCE)

Effective Area	Funds Available	Name of activity	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
584	7008000	Administrative costs	70080	70080	210240	210240	140160	700800
		Monitoring	0	0	0	70080	0	70080
		Evaluation	0	0	0	0	70080	70080
		Entry point activities	280320	0	0	0	0	280320
		Institution and capacity building	0	350400	0	0	0	350400
		Detailed project report	70080	0	0	0	0	70080

		Watershed development works	0	560640	1121280	1191360	1051200	3924480
		Livelihood activities for the asset less persons	0	0	210240	350400	70080	630720
		Production system and micro enterprises	0	0	210240	280320	210240	700800
		Consolidation phase	0	0	0	0	210240	210240
		Total	420480	981120	1752000	2102400	1752000	7008000
		Percentage of total cost	6%	14%	25%	30%	25%	100%

CHAPTER – 6

PREPARATORY PHASES

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

6.1 AWARENESS GENERATION AND MOTIVATION FOR PARTICIPATION

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

6.1.1 Collection of Base Line Data and Hydrological Data

As explained earlier, baseline data from all possible sources is collected for the purpose of not only future impact assessment but also to design project intervention. Most of this was done at the PPR and DPR stages, which forms integral part of the preparatory

phase. In addition, data on rain fall amount and distribution, weather conditions and frequency of floods and drought was compiled at DPR stage.

6.1.2 Formation of Village Level Institutions

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

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

6.1.3 Preparation of DPR

PRA exercise and comprehensive data base have been carried out for DPR preparation. Meetings were held at district level, micro-watershed wise and village wise by involving the concerned departments and members of Gram Sabha on this aspect. The Draft Project Report was prepared on the basic information generated from primary and secondary sources. This also includes the outcome of participatory rural appraisal and outcome of transect walk and stakeholders' discussions. A list of scope of works that finally emerged were prepared. Based on the technical survey, detailed cost estimates were prepared for components including

resource management, entry point activities and production system. A broad frame work for capacity building at all levels as per the guidelines of DoLR was prepared. The livelihood opportunities which emerged from local product and market facility were analyzed and outlines of the same were included. Since the financial provisions were decided according to the area proposed to be covered, these provisions were distributed across project activities. The project activities are sequenced into three phase's namely preparatory phase, work phase, consolidation and withdrawal phase. So, the activities were segregated in the sequence and explained in detail. Finally the details about budget and its spilt up into annual action plan were also attempted. Various maps using GIS were created likes Base map, Present Land Use, Geo-hydrological, Micro Watershed, Drainage, Contours, Slope, Soil Classification, Land Capability Classification, Ground Water Depth and Quality, Proposed and existing Activities of works. All the works proposed in the DPR are location specific and are as per the local demand and socio- economic conditions of the watersheds.

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

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

Strengths

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

- ❖ Local residents are active in micro enterprises.

Weaknesses

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

Opportunities

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

Threats

There are few negative issues that may have adverse effect

- ❖ Unreliable rainfall.

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

CAPACITY BUILDING- 5%

Rs. 20, 06, 400/-

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 subjected to periodic reviews by expert committees with a broader view to improve upon its strategy and components as well as match with the growing socio-ecological requirements

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

2. Vision

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

3. Need

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

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

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

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

4. Rationale

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

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

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

5. Objectives

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

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

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

Sl. No.	Title of Training Programme and Duration	Level of Participants	Total persons	Trainees Per Programme	Number of Programmes
01	District Level Sensitization Workshop for Watershed Committees. <u>One Day</u>				
	Rewari	Members of Watershed Committees @ 10 per committee would also include accompanying WDT Members.	770	300-350	2
02	Block Level Functional Programmes for Secretaries of Watershed Committees. <u>Two Days</u>				
	Rewari	Secretaries of Village Watershed Committees	77	35-40	2
03	Project Level Sensitization Camps for WC <u>One Days</u>				
	Rewari	Members of Watershed Committees @ 10 Persons (Tentative) per WC	770	50	15
04	Village Level Awareness Camps on IWMP at Micro Watershed Level for User Groups <u>One Day</u>				
	Rewari	Approximately 50 <u>prospective</u> user groups per micro watershed.	2150	50	43
05	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP <u>One Day</u>				
	Rewari	Three persons (Leader, Secretary and Treasurer) per Self Help Group @ around one SHG per village.	231	50	5

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

6. Training Methods

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

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

7. Tools

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

8. Resource Persons

8.1. Internal

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

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

8.2. External

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

9. Fund Requirement

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

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

Sr. No	Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member’s , SHG & UG organize by HIRD	Total Funds
1	District Level Sensitization Workshop(s) for Watershed Committees	37990
2	Block Level Functional Programmes for Secretaries of Watershed Committees. <u>Two Days</u>	7048
3	Village Level Sensitization Camps for WC <u>One Days</u>	36071
4	Village Level Awareness Camps on IWMP at Micro Watershed Level for Prospective User Groups <u>One Day</u>	46403
5	Block Level Functional Programmes for SHGs [Leader, Secretary and Treasurer] under IWMP <u>One Day</u>	14442
	Total	141954

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

S. No.	Target Group	Training Topics	No. of days	Budget per camp	No. of Camps	No. of Participants per camp	Cost for all participants per day	Cost per participant/ per day	Cost per person	Total Budget
1	Self Help Groups- 2 SHGs- micro watershed level	Orientation on IWMP, SHGs cum Exposure Visit	2	16800	5	12	8400	700	2100	126000
2	User groups from each micro watershed	NRM, Post Project Management etc. –Exposure Visit	2	8400	5	6	4200	700	2100	63000
3	Sub watershed Level- WDT Members	Part II-Module I to V-Exposure Visit Outside State- Conceptual, Technical, Social, Management of Finance, Monitoring and Evaluation.	4	36000	5	6	9000	1500	4500	135000
4	Sub watershed Level- PIA Members	Exposure Visit- Within Fundamentals of Watershed,	2	8400	5	6	4200	700	4500	135000

S. No.	Target Group	Training Topics	No. of days	Budget per camp	No. of Camps	No. of Participants per camp	Cost for all participants per day	Cost per participant/ per day	Cost per person	Total Budget
		Finance Management, Final Report on WDP etc								
5	District Level-WDC	Exposure visit to successful watershed/ University.	2	16800	5	12	8400	700	1400	84000
6	District Level-Line Deptt., WDC	Exposure visit to successful watersheds within state.	2	16800	5	12	8400	700	1400	84000
7	SLNA and District Level Controlling Officers	Exposure visit to successful watersheds outside state	4	36000	5	6	9000	1500	6000	180000
Total			18		35	60				807000

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

S. No.	District	No. Micro watersheds	No. of Camps/ Year/ Micro watersheds	Total No. of camps per Year	Total No. of camps for 5 Year's	Amount of per Camp	Amount per Micro watershed	Total Budget
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1.	Farmer Training Camp in each season	6	2	12	60	12,000	1, 44, 000	7,20,000
2.	Propaganda & Documentation (Puppet show, documentary movies show, video-graphy, Photography, wall Painting, Display Board, pamphlets, leaf lets. Etc)	6	2	12	60	5000	60,000	3,00,000
3	Contingency charges							37446
Total								1057446

- i) **Training Programmes for SLNA, WDT, PIA , Field Functionary , WDC member's , SHG & UG organize by HIRD = Rs. 1,41,954/-**
- ii) **Micro Watershed Wise Exposure cum training Visit For SLNA, WDT, PIA , Field Functionary , WDC, SHG & UG Members = Rs. 8, 07,000/-**
- iii) **Farmer's / Beneficiaries training camps with Extension Program's = Rs. 10,57,446/-**

Grand Total = Rs. 20, 06,400/-

6.2.1. EXPECTED OUTCOME OF CAPACITY BUILDING

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

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

6.3 Entry Point Activities 4%

EPA activities are taken up under the watershed to build rapport with village community at the beginning of the project, generally certain important works which are in urgent demand of the local community are taken up. A group discussion was conducted in the Gram Sabha meeting/ watershed committee regarding EPA activities. It was conveyed to the Gram Sabha that an amount of **Rs. 16, 05,120/-** was provided for EPA. The provision of IEC material for community will be met under EPA. The stake holders discussed the various activities which they felt is important but after the discussion the following activities were finalized. The convergence with the other project can also be undertaken.

Table 5. Entry Point Activities in Bass Dudha Watershed (IWMP IV)

(Rs. In Lacs)

Sr. No.	Block	Name of Project	No. of EPAs Identified	No. of EPAs Completed	Name/Nature of EPA	Location	Expenditure
1.	Khol	Bass Dudha Watershed (IWMP IV)	7	7	Pacca Nala/PVC Pipe Line	Bass Dudha	3.00
					Retaining Wall	Chita Dungra	2.41
					Retaining Wall/ Water Tanki & Khel	Bhalkhi	2.33
					Pacca Nala	Padla	2.90
					Pacca Nala	Kolana	0.96
					Ramp/Inlet/ R/wall	Mayan	3.21
					Retaining Wall	Nangla Mayan	1.24
						Total	16.05

CHAPTER – 8

QUALITY AND SUSTAINABILITY

8.1 Monitoring and Evaluation

8.1.1 Plans for Monitoring and Evaluation:

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

8.1.2 Monitoring

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

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

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

Table 1. Micro Watershed wise details

S.no	Name of the Micro Watersheds	Effective Area	Total Cost	Monitoring 1%
1	Mayan	704	84,48,000	84,480
2	Padla	598	71,76,000	71,760
3	Bass dudha	840	1,00,80,000	1,00,800
4	Chita dungra	313	37,56,000	37,560
5	Kolana	305	36,60,000	36,600
6	Bhalkhi	584	70,08,000	70,080

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	Mayan	704	84,48,000	84,480
2	Padla	598	71,76,000	71,760
3	Bass dudha	840	1,00,80,000	1,00,800
4	Chita dungra	313	37,56,000	37,560
5	Kolana	305	36,60,000	36,600
6	Bhalkhi	584	70,08,000	70,080

CONSOLIDATION PHASE- 3 %

Consolidation Phase = Rs. 12, 03,840 /-

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: Mayan

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	0.51
2	Preparation of Project completion report	0.13
3	Documentation of success stories	0.12
4	Management of proper utilization of WDF	0.38
5	Mechanism for quality and sustainability issues under the Project	0.13
6	Watershed activities	1.26

Total: 2.53 lacs

Name of Micro watershed: Padla

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	0.43
2	Preparation of Project completion report	0.11
3	Documentation of success stories	0.11
4	Management of proper utilization of WDF	0.32
5	Mechanism for quality and sustainability issues under the Project	0.11
6	Watershed activities	1.07

Total: 2.15 lacs

Name of Micro watershed: Bass dudha

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	0.60
2	Preparation of Project completion report	0.16
3	Documentation of success stories	0.15
4	Management of proper utilization of WDF	0.45
5	Mechanism for quality and sustainability issues under the Project	0.15
6	Watershed activities	1.51

Total: 3.02 lacs

Name of Micro watershed: Chita dungra

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	0.23
2	Preparation of Project completion report	0.06
3	Documentation of success stories	0.05
4	Management of proper utilization of WDF	0.17
5	Mechanism for quality and sustainability issues under the Project	0.06
6	Watershed activities	0.56

Total: 1.13 lacs

Name of Micro watershed: Kolana

Table 7. Consolidated Phase

S. No	Type of activity	Amount earmarked (Rs. In lacs)
1	Managing/ upgrading of all activities taken up under the project	0.22

2	Preparation of Project completion report	0.06
3	Documentation of success stories	0.05
4	Management of proper utilization of WDF	0.17
5	Mechanism for quality and sustainability issues under the Project	0.05
6	Watershed activities	0.55

Total: 1.10 lacs

Name of Micro watershed: Bhalkhi

Table 8. Consolidated Phase

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

Total: 2.10 lacs

As per the common guideline the management of developed natural resources would involve the following features:

- Improving the sustainability of various structures and equitable distribution. The watershed committee will fix the charges of water and the funds generated would be utilized O& M Structures. These users charges account will be maintained separately.
- Involvement of Gram Panchayat for repair, maintenance and protection of created structures.

CHAPTER – 9

EXPECTED OUTCOME

EXPECTED OUTCOMES

The effective area is 3344 ha and the Project Cost is 401.28 lacs covering 6 no. micro watersheds and in all 7 villages. Benefits will be much more than the project cost as detailed below:

With the several interventions under IWMP IV 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 shall be benefited. 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 Bass Dudha Watershed IV will prove to be very beneficial in improving socio – economic status of people residing in Project villages.

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

9.1 EMPLOYMENT

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

Table 1. Expected Employment Generation in the Project area

S. No.	Name of micro watersheds	Wage employment								Self employment			
		No of man days				No. of Beneficiaries				No. of Beneficiaries			
		SC	others	Women	Total	SC	others	Women	Total	SC	others	Women	Total
1	Mayan	3847	3371	351	7569	435	1443	1685	3563	11	11	11	33
2	Padla	2237	3787	405	6429	419	1608	1928	3955	11	-	11	22
3	Bass Dudha	2057	6286	689	9032	288	1594	1648	3530	-	11	11	22

4	Chitadungra	1127	1972	266	3365	210	840	1029	2079	11	11	-	22
5	Kolana	1105	1720	454	3279	91	916	958	1965	11	-	11	22
6	Bhalkhi	1431	4346	502	6279	114	985	979	2078	-	11	11	22
	Total	11804	21482	2667	35953	1557	7386	8227	17170	44	44	55	143

35953 man days would be generated with the implementation of the project in Bass Dudha Watershed (IWMP IV), which means 72 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 Bass Dudha Watershed (IWMP IV)

S. No	Name of micro watersheds	No. of persons migrating	No. of days per year of migration	Comments
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		Pre Project	Expected post project	Pre Project	Expected post project	
1	Mayan	6	90	3	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
2	Padla	6	60	3	30	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
3	Bass Dudha	12	90	6	45	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
4	Chitadungra	16	60	8	30	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
5	Kolana	14	120	7	60	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%
6	Bhalkhi	16	120	8	60	No. of persons migrating will be reduced and also no. of days would be reduced by over 50%

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

9.3 GROUND WATER TABLE (Drinking Water)

The Drinking Water supply is managed by Public health Department by Installing Tube well and Canal water supply in the area. The area is facing scarcity of water during May and June.

Through the ground water table is depleting over the years and presently stands 38 to 69 m. It is expected that in the areas which is underlain by the fresh to marginal water table conditions, where the farmers are irrigating their field through ground water

development, the water table of such area is depleting from 0.38 m to 1m. per year. The area falls in Khol block which comes under over exploited category. The efforts have been made to construct the percolation tanks to check the further fall in water table.

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

S. No.	Name of Micro Watersheds	Name of Villages	Source	Existing pre- project ground water table level (m)	Expected post project conditions
1	Mayan	Mayan	Open wells	57	The provision of percolation tank for recharging at feasible site has been provided to check the further fall of water table in the area.
		Nangla Mayan	Open wells	56	
2	Padla	Padla	Open wells	68	
3	Bass Dudha	Bass Dudha	Open wells	69	
4	Chitadungra	Chitadungra	Open wells	69	
5	Kolana	Kolana	Open wells	68	
6	Bhalkhi	Bhalkhi	Open wells	38	

Source: Ground Water Cell, Haryana

9.4 CROPS

Agriculture primary depends upon water, Due to lack of proper canal system and deeper ground water there is a struggle in irrigating crops all this can change with the integrated land and water management during the watershed project. The planned Water conveyance system, Strengthening of Water Conveyance Channel (Water Course in fields) (Water Saving Technology), Diversion Dam with drain, Dug out Pond /Renovation, Ramp, outlet and Inlet, Earthen Embankment with pacca outlet, Small Earthen Embankment with vegetative support, Roof top rain water recharge, Dry Stone Masonry Structures, 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 Bass Dudha Watershed (IWMP IV)

Name of Micro-Watersheds	Name of Crops	Pre project		Total Production(in Kg)	Total Value Rs (in lacs)	Expected post project		Total Production (in Kg)	Total Value Rs (in lacs)
		Area ha	Average yield kg. Per ha			Area ha	Average yield kg. Per ha		
Mayan	Wheat	157	3465	544005	73.44	169	3638	614822	83.00
	Mustard	336	1250	420000	126.00	369	1375	507375	152.21
	Bajra	325	1246	404950	50.62	357	1370	489090	61.14
Padla	Wheat	142	3400	482800	65.18	153	3570	546210	73.74
	Mustard	225	1245	280125	84.04	247	1369	338143	101.44

	Bajra	280	1246	348880	43.61	308	1370	421960	52.75
Bass Dudha	Wheat	256	3465	887040	119.75	276	3638	1004088	135.55
	Mustard	305	1250	381250	114.38	335	1375	460625	138.19
	Bajra	488	1246	608048	76.01	536	1370	734320	91.79
Chitadungra	Wheat	97	3465	336105	45.37	104	3638	378352	51.08
	Mustard	106	1241	131546	39.46	116	1365	158340	47.50
	Bajra	221	1245	275145	34.39	243	1369	332667	41.58
Kolana	Wheat	88	3455	304040	41.05	95	3627	344565	46.52
	Mustard	107	1200	128400	38.52	117	1320	154440	46.33
	Bajra	261	1246	325206	40.65	287	1370	393190	49.15
Bhalkhi	Wheat	134	3465	464310	62.68	144	3638	523872	70.72
	Mustard	205	1250	256250	76.88	225	1375	309375	92.81
	Bajra	317	1246	394982	49.37	348	1370	476760	59.60
Total		4050			1181.4	4429			1395.1

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

9.5 HORTICULTURE

Table 5. Pre and post project area under Horticulture

S.No.	Name of Micro Watersheds	Existing area under horticulture (ha)	Additional Area under horticulture proposed to be covered through IWMP	Total area in ha – Post Project
1	Mayan	2.5	3	5.5
2	Padla	1.5	3	4.5
3	Bass Dudha	4	7	11
4	Chitadungra	1	3	4
5	Kolana	1.5	1	2.5
6	Bhalkhi	3	4	7
	Total	13.5	21	34.5

9.6 AFFORESTATION/ VEGETATIVE COVER

Table 6. Pre and post project forest and vegetative cover

S.No.	Name of micro watersheds	Existing area under tree covered, ha	Area under tree cover proposed ha	Total
1	Mayan	8	9	17
2	Padla	12	8	20
3	Bass Dudha	19	8	27
4	Chitadungra	4	5	9
5	Kolana	3	3	6
6	Bhalkhi	14	10	24
	Total	60	43	103

9.7 LIVESTOCK

Table 7. Details of livestock in the project area

S. No.	Name of micro watersheds	Type of Animals	Pre project			Post project			Remarks
			No.	Yield Kg/ day	Income In Rs per day	No.	Yield Kg/ day	Income In Rs per day	
1	Mayan	Buffalo	529	7-8	238-272	608	8-9	320-360	Increase in milk yield and number of animals by approx. 15%
		Cow	133	3-4	75-100	152	5-6	150-180	Increase in milk yield and number of animals by approx. 15%
2	Padla	Buffalo	398	7.5- 8.5	255-289	457	9.5- 10.5	380-420	Increase in milk yield and number of animals by approx. 15%
		Cow	60	3.5- 4.5	87-112	69	5.5- 6.5	165-195	Increase in milk yield and number of animals by approx. 15%
3	Bass Dudha	Buffalo	757	8-9	272-306	870	10-12	400-480	Increase in milk yield and number of animals by approx. 15%
		Cow	66	4.5- 5.5	87-112	76	6-8	180-240	Increase in milk yield and number of animals by approx. 15%
4	Chitadungra	Buffalo	422	7-8	238-272	485	9-11	360-440	Increase in milk yield and number of animals by approx. 15%
		Cow	34	4-5	100-125	39	6.5- 8.5	195-255	Increase in milk yield and number of animals by approx. 15%
5	Kolana	Buffalo	1611	7.5 – 8.5	255-289	1852	10-12	400-480	Increase in milk yield and number of

S. No.	Name of micro watersheds	Type of Animals	Pre project			Post project			Remarks
			No.	Yield Kg/ day	Income In Rs per day	No.	Yield Kg/ day	Income In Rs per day	
									animals by approx. 15%
		Cow	58	4.5- 5.5	87-138	67	6-8	180-240	Increase in milk yield and number of animals by approx. 15%
6	Bhalkhi	Buffalo	269	7-8	238-272	309	8-9	320-360	Increase in milk yield and number of animals by approx. 15%
		Cow	37	3-4	75-100	42	5-6	150-180	Increase in milk yield and number of animals by approx. 15%

9.8 LINKAGES

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

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

Table 8: Backward-Forward Linkages

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

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

9.9.1 LOGICAL FRAMEWORK ANALYSIS

Table 9. Logical Framework Analysis

Components	Activities	Outputs	Effect	Impact
Village Institution Formation	Formation of Watershed Community, User Groups	<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	<ul style="list-style-type: none"> • Organizing training and 	<ul style="list-style-type: none"> • Awareness camps to be organized 	<ul style="list-style-type: none"> • Quality of management of 	

Components	Activities	Outputs	Effect	Impact
operations	<p>awareness programme for village institutions (I.E.C. Activities).</p> <ul style="list-style-type: none"> • Capacity Building workshops and exposure visits for User Group and Watershed Community • Facilitating and monitoring the functioning of UGs and WCs Strengthen linkages between UGs and WCs and Panchayat Institutions • Gender sensitization of UGs and WCs to increase 	<ul style="list-style-type: none"> • Trainings and exposure visits UGs and WCs to be held Capacity building workshops to be organized one. • Federations of UGs and WC to be formed. 	<p>common resources improved.</p> <ul style="list-style-type: none"> • Quality of distribution of benefits between people improved. • Increased awareness amongst women about village resources • Women participation enhanced in decision-making of GVCs. • Involvement of youth and children in village development. 	

Components	Activities	Outputs	Effect	Impact
	inclusiveness of Samuh (Joint) decision making. <ul style="list-style-type: none"> • Sensitize Village communities to involve children and youth in development 			
Fund Management	<ul style="list-style-type: none"> • Improve management and utilization of UGs and WCs • Prepare communities to explore other sources of income for UGs and WCs. 	UGs and WCs operating bank account and managing resources on their own.	<ul style="list-style-type: none"> • Purpose, frequency and volume of use of the fund enhanced • Volume of funds generated for UGs and WCs from other sources of income increased 	
Ecological restoration	<ul style="list-style-type: none"> • Protection, Treatment and regeneration of common and private lands. • Protection, 	<ul style="list-style-type: none"> • Common and private lands to be brought under new plantations and agro-horti- forestry like Neem, Adussa, 	<ul style="list-style-type: none"> • Fodder availability from common and private land increased. • Accessibility to common and forest 	<ul style="list-style-type: none"> • Better Ecological order in the area. • Increase in the proportion of households having more security of

Components	Activities	Outputs	Effect	Impact
	<p>treatment and regeneration of forest lands.</p> <ul style="list-style-type: none"> • Plantation of fruits and forest species. • Input trainings, conduct meetings and organize exposure visits for communities, village volunteers and staff to effectively plan, execute and monitor activities. • Identification and promotion of non-timber forest produce based income generation activities. 	<p>prosopis, Banyan and Peepul.</p> <ul style="list-style-type: none"> • 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 	<p>lands increased with removal of encroachments and resolution of conflicts</p>	<p>fodder.</p> <ul style="list-style-type: none"> • Reduction in drudgery of fodder and fuel collection, especially women

Components	Activities	Outputs	Effect	Impact
Rainfed Area Development	<ul style="list-style-type: none"> • Treatment of land through improved soil and moisture conservation practices on watershed basis. • Promotion of good agricultural practices- horticulture, improved crop and vegetable. • Promotion of organic farming practices. • Formation of Fodder banks to increase fodder security and promote dairy development among communities. 	<ul style="list-style-type: none"> • Land to be brought under improved soil moisture conservation practices. • Good agricultural practices to be promoted. • Organic farming to be promoted. Fodder banks to be established. • Agriculture based livelihood income generation activities to be promoted • Water harvesting structures to be constructed. • Drip irrigation facilities to be distributed among farmers. • Approx 15000 person days of employment to be generated. • Trainings, exposure 	<ul style="list-style-type: none"> • Improved productivity of treated land. • Increased availability of water in cells. • Increase in annual agricultural production. • Farmers adopt organic farming practices. • Fodder security of farmers enhanced. • Increased availability of water for 9 to12 months. • Increased availability of water for livestock • Increase in agricultural productivity of land. • Augmentation of drinking water supply. 	<p>Increase in proportion of households having more security of food Increase in contribution of agricultural income to the household income</p>

Components	Activities	Outputs	Effect	Impact
	<ul style="list-style-type: none"> • 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 exposure visits of communities. 	<p>visits and meetings to be organized for communities, village volunteers.</p>		
<p>Women's socio-political and economic empowerment</p>	<ul style="list-style-type: none"> • Formation and strengthening of women' SHG groups • Capacity building of women folk. • Capacity building of SHG leaders 	<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 	<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 	<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.

Components	Activities	Outputs	Effect	Impact
	and accountants Linking SHGs with external financial institutions	products from sheep and goats	purposes Increased household income.	<ul style="list-style-type: none"> • 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 water available 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.